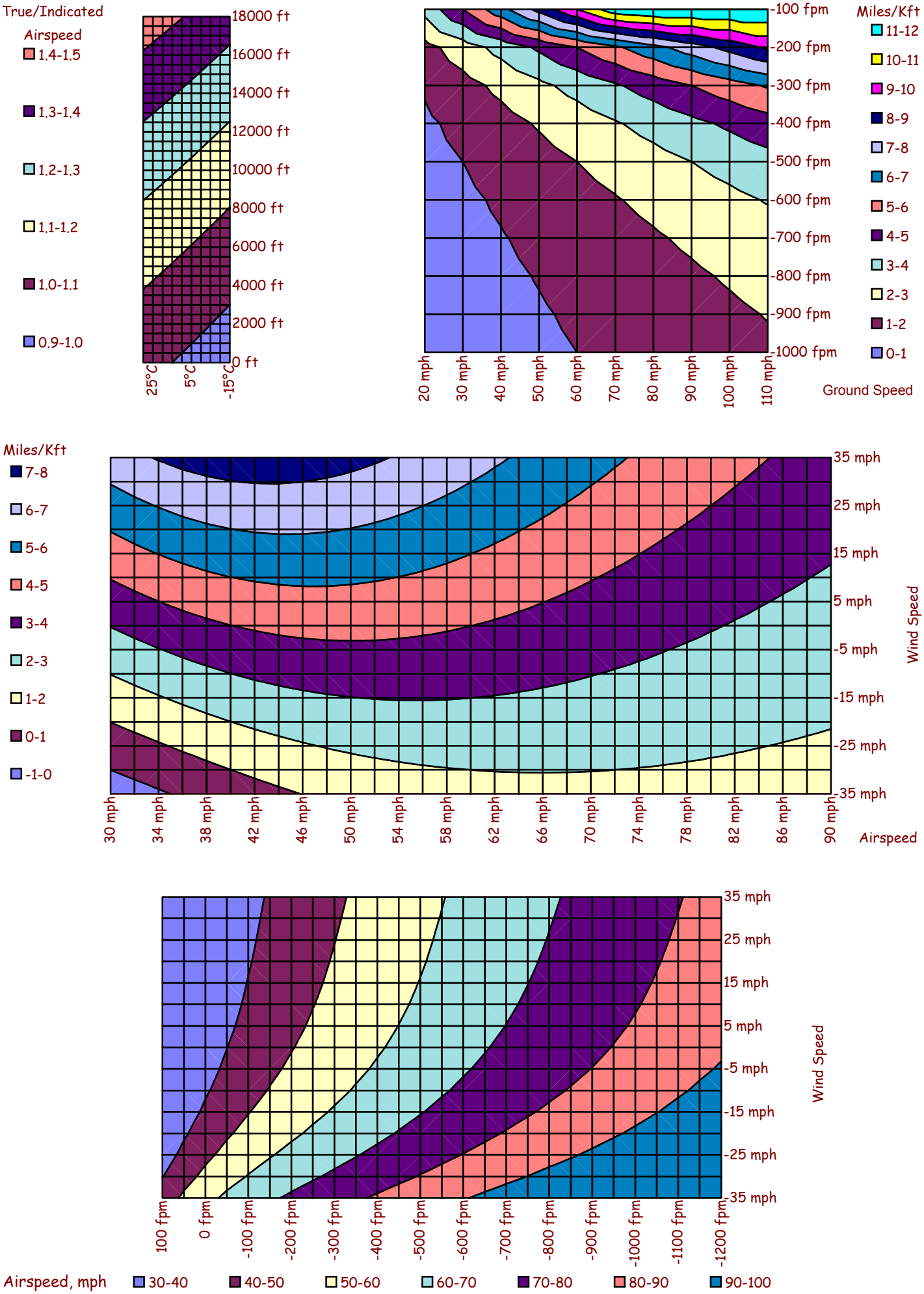
True/Indicated Airspeed
1.4-1.5
1.3-1.4
1.2-1.3
1.1-1.2
1.0-1.1
0.9-1.0
18000 ft
16000 ft
14000 ft
12000 ft
10000 ft
8000 ft
6000 ft
4000 ft
2000 ft
0 ft
25°C
5°C
-15°C
-100 fpm
-200 fpm
-300 fpm
-400 fpm
-500 fpm
-600 fpm
-700 fpm
-800 fpm
-900 fpm
-1000 fpm
20 mph
30 mph
40 mph
50 mph
60 mph
70 mph
80 mph
90 mph
100 mph
110 mph
Ground Speed
Miles/Kft
11-12
10-11
9-10
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
Miles/Kft
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
-1-0
35 mph
25 mph
15 mph
5 mph
-5 mph
-15 mph
-25 mph
-35 mph
Wind Speed
30 mph
34 mph
38 mph
42 mph
46 mph
50 mph
54 mph
58 mph
62 mph
66 mph
70 mph
74 mph
78 mph
82 mph
86 mph
90 mph
Airspeed
35 mph
25 mph
15 mph
5 mph
-5 mph
-15 mph
-25 mph
-35 mph
Wind Speed
100 fpm
0 fpm
-100 fpm
-200 fpm
-300 fpm
-400 fpm
-500 fpm
-600 fpm
-700 fpm
-800 fpm
-900 fpm
-1000 fpm
-1100 fpm
-1200 fpm
Airspeed, mph
30-40
40-50
50-60
60-70
70-80
80-90
90-100

1-26 Glide Performance Chart

The correct speed to fly for a glider is often determined by polar curves, rules of thumb, and speed rings, based on known or assumed atmospheric conditions and the sometime nebulous expected conditions. The two miles per thousand feet of loss in a headwind holds true for one airspeed and wind speed, but ignores the sink rate of the air mass. The plus one half the estimated wind speed is close to the actual performance of a glider, but, again, ignores the air mass. Setting a speed ring on an unknown parameter may work for someone with a lot of experience, but is the best performance of the glider for the current conditions being extracted? Could a better glide have been obtained with a different speed ring setting? What setting does the novice pilot use, and when should a different setting be selected? Additionally, the speed ring provides only one speed for the entire inter-thermal traverse and does not address the different speeds required for the flat air or sinking columns encountered.

In an effort to better understand glide performance, I developed the attached graphs for use in the cockpit. They are based on the polar curve in the SGS 1-26 manual, so the speeds will be appropriate, but the sink rates may not apply to your aircraft, although they should be close. Remember to maintain an altitude buffer for safety.

Ideally, a single graph that displays the correct speed to fly and the resulting sink rate, based on the current wind speed and variometer reading would provide the best data for the pilot. It would, also, show the performance trade offs for flying at different speeds. Unfortunately, geometry in four dimensions is required to make this graph, so I have developed the following separate graphs.

The first graph is used to estimate the current headwind / tailwind component, and is based on 29.92 in Hg., however, the error in using this at other barometric pressures is negligible. The difference in indicated and calibrated airspeed has, also, been ignored, but if you have calibrated instruments, use the corrected data. To estimate the current wind speed, locate your indicated altitude and outside air temperature on the chart and extract the true / indicated ratio, and multiply your indicated airspeed by this ratio to find your true airspeed. The difference between this true airspeed and the ground speed indicated on your GPS is the estimated wind component. For example, if you are flying at 6500 MSL at 50 mph, and the OAT is 0°C, the true / indicated ratio would be 1.1, and your true airspeed would be 55 mph. If your GPS indicated 40 mph, you would be flying into a 15 mph headwind.

The second graph will quickly provide you with your sink rate, in miles per thousand feet of loss, based on your variometer reading and the ground speed indicated on your GPS.

The third graph is the 1-26 glide polar in still air corrected for wind speed. It is used during glides, as the average inter-thermal speed, or in flat or rising air to determine the speed to fly, or to get a idea of the performance you are giving up by flying at a different airspeed. The curves indicate your sink rate in miles per thousand feet of loss. A separate curve connecting the minimum points of each displayed curve, such as 55 mph airspeed, 15 mph headwind, and 3 miles/Kft and 66 mph airspeed, 30 mph headwind, and 2 miles/Kft, is the best speed to fly a 1-26 in still air. This curve is the source of the plus one half of the estimated wind rule. The previous two data points are an example of obtaining the best speed to fly and the resulting sink rate. To determine a performance loss, consider a 15 mph headwind flown at the optimum 55 mph and at 81 mph. Flying at 81 mph will increase your sink rate from 3 miles/Kft to 2.5 miles/Kft, but you will get there much faster. Knowing this allows you to make a judgment based on data, instead of adjusting a speed ring based on expectations.

The forth graph provides the best speed to fly for the current conditions. Locate your current sink rate indicated by the variometer and the estimated wind component from the first graph, and read the speed to fly from the graph. Correcting your airspeed will change the gliders sink rate, requiring a quick reiteration. For example, using the previously determined 15 mph headwind with a 300 fpm sink rate indicates a speed to fly of 61 mph. If the variometer reading changes appreciably, because of your speed change or an air mass change, adjust your speed to the new conditions.