20 / 20 or Where Did That Airplane Go?

I have been considering writing an article on sailplane visibility for some time.

What is good vision, anyway? On the familiar Snellen eye chart, the one your doctor uses to check your eye sight, 20/ 20 vision [6/6 in the UK] equates to the ability to identify letters that fill a visual angle of 5 minutes (.08 degrees) of arc. Of course, your sailplane is not a letter of the alphabet. When it is 'specked out', you only have to see the speck. You don't have to be able to identify it as a 'T' shape (conventional airplane) or a 'V' shape (flying wing), you just have to see something.

A 1966 study by Lockheed says, in part, 'The smallest image that can be perceived at the fovea (the spot on the retina where vision is most acute) ranges from 0.5 to 1.0 minutes of arc, with a mean value of 0.7 minutes of arc.' That's roughly .01 degrees. However, the same study revealed that when the target moves as little as 20 degrees from straight ahead, the minimum detection angle rises to 10 minutes of angle. That's more than a ten fold increase.

In recent years, the National Transportation Safety Board (NTSO) [US] has come to the more reasonable conclusion that the probability of sighting other aircraft (in a potential airborne collision situation) is about 12 minutes (2 degrees).

How does this relate to flying your model? Obviously, the wing's the thing. From our vantage point, the stabilizer and fuselage will disappear before the wing. So, let's consider the wing alone. A two meter wing will reach the 0.7 minute size at a distance of about 34,000 feet. But wait a second. We must consider the wing chord, not the span. A telephone line stretches for miles, but we can not see it beyond a certain distance because it has a very small 'chord'.

Okay then, let us consider the 10 inch chord on that two meter plane. That dimension reaches the 0.7 minute size at 4200 feet. And don't forget that's straight ahead. If you look aside the 20 degrees noted above, you could lose sight of your plane at less than 300 feet. Of course, at that altitude it still appears quite large, and easy to find.   At higher altitudes, as the airplane becomes smaller, it is much more difficult to re-acquire if you look away momentarily.

So at about 4000 feet, it is virtually impossible to see a model with a ten inch chord, unless you're Chuck Yeager, who states in his autobiography in reference to on coming Luftwaffe fighters, 'Andy (Clarence L. 'Bud' Anderson) and I were the first to see them coming; at fifty miles or more…'

Referring back to the Snellen chart, have you ever had your eyes checked on a chart having colored letters? Certainly not. Because maximum contrast gives the best results. The same holds for sailplanes. Colors may have some relevance for power flyers, who operate up close to their planes, but glider guiders need contrast. Give me black wing bottoms every time. You can't get more contrast with clouds or bright sky than you can with black. Since I've been flying with 'blue blocker' sunglasses, I use dark blue under surfaces which look black through the orange lenses.

Paint 'em or cover 'em as you wish on the top, but I think dark below is a must. This from a fellow who has had two brightly colored transparent covered two meter airplanes go 'out-of-sight'.