

G600 FD COMMAND BAR OPERATION WITH SVT ON

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by Dan Herr, TTCF Member

For greater precision with the G600's SVT, the angular scale with SVT is cut in half. When the aircraft is level, the top of the G600 screen with SVT on is 10 degrees pitch up; with SVT off it is 20 degrees. I love the scale change with SVT (I always fly with SVT on) because it makes it easier to fly a precise pitch. A pitch change of 1/2 of a degree with SVT is as obvious as a 1 degree pitch change without SVT.

Garmin's philosophy is that the FD command bar should have the same linear limits rather than the same angular limits. Let's use takeoff as an example. With the aircraft on the ground prior to takeoff and with SVT off, pushing the Go-Around button puts the FD command bar at 6 degrees pitch up. This measurement is an approximation, but let's say that the command bar is 1/2" above the symbolic airplane. If we turn SVT on, the command bar will still be 1/2" above the symbolic airplane, but the command bar will now be located at 3 degrees pitch up rather than 6. In other words, Garmin limits the linear deviation of the command bar rather than allowing the command bar displacement to be consistent with SVT's angular scale.

Garmin's philosophy is that if it allowed the command bar to be 1" above the symbolic airplane, i.e. command bar at 6 degrees with SVT on, pilots would over-control the aircraft as they attempt to correct this huge 1" deviation. Due to Garmin's linear preference, the SVT-on command bar is located at 3 degrees as the airplane rolls down the runway, but as the airplane rotates and pitches up, the command bar will continue to stay 1/2" above the symbolic airplane until the airplane is at 3 degrees pitch up, at which point the command bar will reach 6 degrees pitch up. In other words, when the aircraft is at 1 degree, the command bar will be at 4 degrees; when the aircraft is at 2 degrees, the command bar will be at 5 degrees; when the aircraft is at 3 degrees, the command bar will be at 6 degrees; the command bar will stay at 6 as the airplane pitches through 4, 5, and 6 degrees. Garmin thinks pilots look at the FD and say, "Gee, the command bar is 1/4" above the airplane, I need to increase pitch to raise the airplane 1/4 inch". Accordingly, Garmin has a preference for maintaining linear continuity when the angular scale changes (as angular scale does between SVT and non-SVT).

I disagree with Garmin. I think pilots look at the FD and think in degrees, not linear distance: "Gee, the command bar is 4 degrees above the airplane, I need to increase pitch 4 degrees". Since I view flying as an angular exercise, I believe angular consistency is paramount. If the FD command bar shows 6 degrees of separation with SVT off, it should show 6 degrees with SVT on. For me, the linear separation is irrelevant.

Consider the imperfect pilot who strays off attitude and needs a big correction in a hurry. For example, the airplane is pitched up 12 degrees, but the desired pitch is 0 degrees. With SVT on, the command bar would be located at 9 degrees (just 3 degrees away). As the pilot lowers the pitch from 12 degrees to 11 degrees, the command bar would move from 9 to 8. When the pilot gets to 10, the command bar would be at 7. This baby-step process would continue through the airplane being at 3 degrees, at which point the command bar would finally be at 0 degrees. Having played "chase the command bar" for 9 degrees (12 to 3), the pilot has little idea where this game will end. Only when the pilot gets to 2 degrees, and then 1 degree, and sees that the command bar remains at 0, will the pilot realize that 0 is the ultimate goal.

In this same scenario with SVT off, when the airplane is at 12 degrees, the FD command bar will be at 6 degrees. The FD command bar will reach 0 degrees when the aircraft is at 6 degrees. Allowing a 6 degree angular spread provides the pilot with more information. The pilot immediately knows that he needs to make a pitch reduction of at least 6 degrees (rather than lulling him into thinking it might be only a 3 degree reduction). The 6 degree separation also allows the pilot to see the ultimate target (0 degrees) much sooner: as the airplane is going through 6 degrees of pitch rather than through 3 degrees of pitch.

I dislike Garmin's SVT FD philosophy. There should not be a cat and mouse game of concealing information from the pilot just in case the pilot is so incompetent that he is unable to make large corrections smoothly. The purpose of the FD is to provide information to the pilot. That information should not be restricted simply because SVT is enabled.

I have suggested to Garmin that it would be an improvement to allow the SVT FD to match the angular scale. I think this could be accomplished via a software change or by changing the FD scaling adjustment for SVT. Garmin is steadfast in its preference for maintaining a linear scale.