You Have to See It…

Glass versus analog

I am writing in response to the article "You Have to See It … To interpret the panel" in the September issue. The author is correct in that "you have to see it to interpret it," but I think there is more to the story than what is stated, and it is not all that simple.

Research has shown that we only comprehend 80 percent of what we see on screen versus what we see in hard copy. I taught the AutoCAD computer program in a college design studio. Students would labor for hours on a project trying to correct any errors. Once they thought they had it perfected, they would print it on the plotter. As soon as it started coming off the machine, errors could be seen from halfway across the room.

Anyone who has done a fair number of manuscripts, letters, research papers, and correspondence on the computer knows that they have to print their work to get a good proofread.

Do not misunderstand me and think I do not mislike modern technology. I am for anything that can make my job easier. I started flying in the late 1950s, and I have seen all kinds of instruments, navigation devices, and pilot aids. Some things work great, and some things would have been better off left on the bench.

The author made mention of not being able to focus on the numbers, and if pilots cannot do that, then they probably cannot read the analog gauges either. I disagree. There is a big difference between trying to read small text and large analog

gauges. Which is easier to read with a quick glance, a digital watch or an analog watch?

I can take a quick glance at an analog altimeter, tell you the altitude, and at the same time from my peripheral vision give you the information from the airspeed, vertical speed indicator, attitude indicator, and turn coordinator. Students will ask me what kind of scan I use while flying instruments. I do not have a scan. I let my eyes drift around never focusing on anything but noting the position of all the needles. If you talk to anyone who has considerable flying time on instruments hand flying the aircraft, most of them will tell you the same thing. It makes for relaxed flying.

On military aircraft, all of the engine instrument gauges (analog) are turned in the instrument panel so the needles are pointing in the same direction during normal operations. A quick glance will tell me immediately if something is amiss.

I agree that for instrument flight, flat panels are easier to use because you do not have to have the scan and instrument interpretation that you do for analog gauges because everything is compact and concise. That allows people to fly on instruments that might not be able to otherwise because of the lack of spatial visualization.

I have talked to other aviators who have considerable flying time with both analog and glass screens, and the consensus is, to understand what is going on, more time should be spent inside the cockpit than out of the cockpit with glass panels versus the analog gauges.

It has been known for a long time that a pilot with an instrument rating makes a better visual flight rules

(VFR) pilot. They are better at flying VFR because they have developed a quick scan, looking inside and deciphering the instruments. This can be done so fast that someone sitting in the right seat will never pick up on it.

Depending on how the glass panel is set up, it can almost be an information overload. Sometimes less is more.

Vernon Childers, EAA 797084
Winslow, Arizona

Doug Norman's article, "You Have to See It," (*Sport Pilot,* September 2008) finally did it; I can't sit quietly by and let misinformation be slipped by us. I am a 67-year-old pilot, and I don't have presbyopia, not now nor ever did I over the span of 37 years' flying since 1970. Moreover, I have spent the last 12 years working hard to get glass displays in the cockpit of general aviation aircraft, having a significant role in demonstrating "highway in the sky" with the SATS (Small Aircraft Transportation System) program.

The reason I and other older pilots walk away from glass cockpits has nothing to do with not being able to read the panel. It has everything to do with glass panels that do not convey key information as quickly and easily as steam gauges. In human factors studies I have worked on, where we could switch panel displays between steam and digital with the flip of a switch, experienced pilots prefer "simulated steam gauges" on their glass panels for some information such as oil pressure, temperature, tachometer, and airspeed, where the numbers are not important but being in the right place is. Having to repeatedly interpret digital numbers for these chores is more cumbersome for most pilots than scanning a needle to monitor a key function, especially where a number of functions are to be monitored simultaneously.

Also, if frequently changing from airplane to airplane, knowing that a needle is entering a red zone is just cause for more attention and is vitally more important than trying to remember what the proper "numbers" are supposed to be, especially in those moments of sheer terror that are interspersed among those hours of pure boredom. Maybe newer pilots like to "fly by the numbers," but many of us older pilots still fly by the seat of the pants as well.

In one telling experiment I followed at a major university in Florida in the late 1990s, cameras monitoring the pilot's eyes clearly showed pilots repeatedly looking at a digital oil pressure reading "low" or "zero" and never reacting, flying on until a simulated engine failure occurred. With "simulated steam gauges," pilots would see a steam gauge reading "low" or "zero" and either react immediately or a second or so later when the brain finally registered the information and said to the pilot, "Hey, that's not right." The pilots would then halt their scan and come back to the errant gauge for another look. This phenomenon was more pronounced as workload increased.

Of course in reading a radio dial or transponder dial or a Kollsman window, a digital display is vital—all subject pilots agreed they preferred digital to dials. So, my message to Mr. Norman's comment that "the issue seems to be that they *can't* read the panel" is pure myth, and instead is that the issue seems to be that older pilots don't *want* to read the panel! Older pilots want to *see* the key information and read the panel where it counts. Presbyopia has nothing to do with it. Old brains know what works best and what doesn't. Let the research tell us what's going on, not what a journalist's perceptions tell us; one size does not fit all, in digitals nor dials.

Randall C. Davis,
Lanexa, Virginia

It's obvious that marketers of computer panels have used the term "steam gauges" as a put-down of traditional analog instruments. In fact, steam power preceded the air age by more than 100 years. This put-down is also a slap in the face of Gen. Jimmy Doolittle, who did the pioneer work in gyro-stabilized instruments in the late 1930s. He demonstrated how to fly totally on instrument cues from takeoff to landing.

Another misnomer introduced by marketers is the term "glass cockpit." All instruments have glass in common, and the immediate environment of the pilot is the cockpit, whether it's an ultralight or airliner. The preferred term is "computer panel." It is computer driven and displayed on computer screens on the instrument panel.

This is not to minimize computer panels; much that computers display today would be impossible with analog instruments. The ultimate examples are infrared displays that depict the runway environment well before visual capture. Another is proposed flight path displays common to military fighters. Of course, the ability to select alternative screens for engine, fuel, and environment conditions is helpful.

But, I am reminded of a dialogue I had with an airline captain, in which he described a short-term blank screen during a flight. That is why they install backup analog instruments. Pictures of modern computer panels frequently have the analog instruments cropped out. That is not very respectful.

So, the preferred terms are "analog instruments" and "computer panels." Say it once or twice; it will grow on you.

Alfred St. George, EAA 749307
Holt, Michigan

Submitting Letters... Letters intended for publication should be addressed to EAA/Letter to the Editor, P.O. Box 3086, Oshkosh, WI, 54906, or e-mailed to ***Editorial@eaa.org***. Please include your EAA number, city, and state. All letters are subject to editing. Unpublished letters will not be returned; however, we attempt to acknowledge all letters.

North Carolina ***Excalibur***

After one and one-half years, or 350 hours, we finished our pride and joy. My wife, Dawn, painted it, and the plane got its airworthiness certificate in March 2008. The first flight was in late May when the weather was just right. The never exceed speed is 100 mph, and it doesn't take long to get there with the 65-hp Rotax 582 blue head I installed. I cruise between 70 and 85 mph, and I could not be happier with the performance. I am halfway through my testing, and soon Dawn can have her long-awaited ride.

Benjamin K. Landron, EAA 790467;
Jarvisburg, North Carolina
E-mail: *weresol@embarqmail.com*

Texas ***Slepcev Storch***

The Slepcev Storch kit took nine months from start to first flight. A 75 percent replica of the Fieseler Storch, it has a Rotax 912ULS with a Kiev prop and leaves the ground at 22 mph. It has an empty weight of 776 pounds and grosses out at 1,240 pounds with a whopping 90 mph cruise speed. It was simple to build, and it's a hoot to fly!

Bob Harmon, EAA 684551; Killeen, Texas
E-mail: *robert.t.harmon@boeing.com*

New York ***Tandem-seat Hang Glider***

Instructor Steve and I soared above the Connecticut River near Charlestown, New Hampshire, on August 13, 2008. A lightplane towed us to 2,000 feet from Morningside Flight Park (MFP), and we then glided for 20 minutes. The experience was very exciting, and I felt some nervousness at first. A pod-type harness let me lie comfortably prone (note foot stirrups). Curious? Contact Jeff Nicolay of MFP at *morningside@flymorningside.com* or 603-542-4416.

John W. Morse, EAA 850066; Delmar, New York
E-mail: *jmscreb@verizon.net*

Share your plane with *EAA Sport Pilot* readers worldwide. Please include your name, address, and EAA number, and your e-mail address if you're willing. Submissions are published at the sole discretion of the publisher and may appear in any of EAA's publications or its website, *www.EAA.org*. We reserve the right to edit your description, and photos will not be returned.

Tips for Digital Photographs: Name files descriptively, such as "Smith_CT.jpg." • Use highest possible resolution. Full-resolution images from a 2-megapixel camera or better are required. • Don't send computer print-outs or Polaroids. • Send as a JPG or TIFF (not Word.doc) file.

Send your photos, stories, & descriptions to:

EAA Publications - Completed Projects
P.O. Box 3086
Oshkosh, WI 54903-3086

E-mail submissions to:
DHeimos@EAA.org