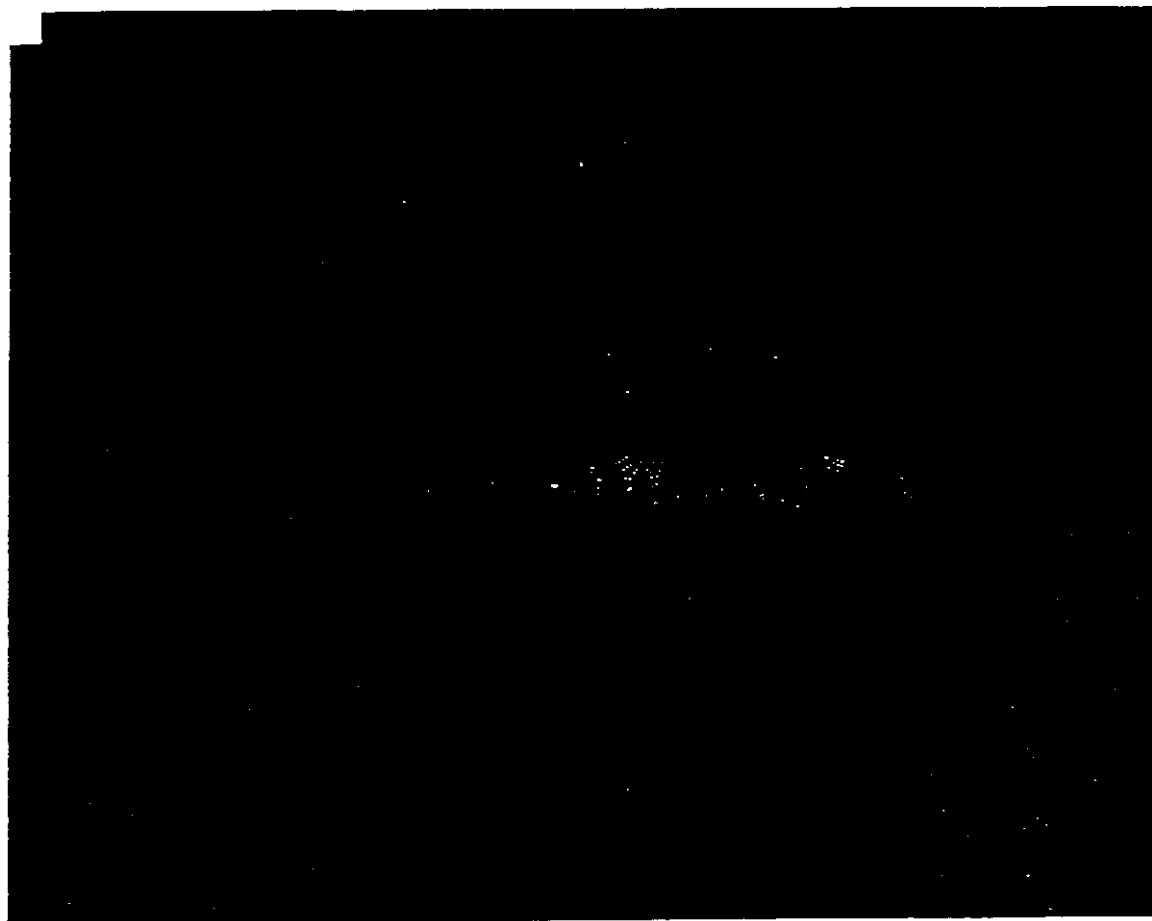


Flying in Adverse Conditions



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TAB
PRACTICAL
FLYING SERIES



Fig. 8-3. Pilots will have to be watchful as technologies trickle down from airplane cockpits to automobiles. A moving map and GPS system in a car is not going to be identical to an airplane installation; therefore, a pilot will have to consciously make an effort to operate each unit differently.

wrong switch is to look at it and confirm that my finger is on the switch I really want to manipulate before moving it. This is sometimes difficult to do at night or in the clouds. Quickly moving your head might induce vertigo, but moving your head is the only sure way to do it.

Theoretically, it is possible to eliminate all cockpit ergonomic problems; however, it is probably impossible to design a totally foolproof (pilotproof) cockpit because the second group of man-machine interface problems originates with the human in the cockpit.

Psychological baggage

Every pilot who steps into the cockpit of an aircraft carries a psychological flight bag of experience, background, and conditioned responses to outside stimuli. On the surface, we might all look like we're stamped from the same mold, but inside we are all very different. We are human. And despite the concentrated efforts of instructors to standardize our behavior in the cockpit, there will always be that element of uncon-

psychological control that might cause us to act in a manner diametrically opposed to what even we know is correct.

A personal example: When I first started flying helicopters, every once in awhile, while hovering, I'd press the wrong pedal when I wanted to turn. Intuitively I knew that I should press the right pedal to turn right and the left pedal to turn left, but sometimes a seat-of-the-pants reaction would cause me to press the opposite pedal first, before I could catch myself doing it. "Why?" I asked myself.

Steering a machine with my feet was an unfamiliar action, especially after I'd driven a car for some years. But it was also vaguely familiar. "Were there other things I had steered with my feet?" I wondered. Then I remembered.

Have you ever gone sledding? If you sit on a sled, you have to steer it with your feet. To turn the sled to the left, you push your right foot forward; to turn it to the right, you push your left foot forward. Being from Pennsylvania, I did a lot of sledding when I was a kid, and in the stress of learning how to hover, every now and then, my unconscious mind would take over and tell my right leg to push the nose of the helicopter around to the left.

It was a response that I had learned years before I started flying. Psychologically, my emotional state when I sledged as a kid was probably *not much different from my* emotional state when I was learning how to fly. Both experiences were exciting, fun, and a little scary.

Another example: When you first learned to taxi a small plane, you probably had to concentrate to *remember* to turn with the rudder pedals and not the yoke. But even after hundreds, or even thousands of hours, have you ever found yourself turning the yoke in the direction you want to turn while taxiing, even though your feet are doing the steering for you?

Or, have you ever caught yourself unconsciously pressing on the toe brakes of an airplane or helicopter when your final approach is a little too high and too fast? My 1946 Taylorcraft has *heel* brakes, an arrangement that I never knew about until I flew it for the first time. I have to continually remind myself to brake with my heels instead of my toes because my feet have more than 8,000 flight hours of toe-brakes to unlearn.

These are human-factor reactions that most of us overcome with habit and experience during normal operations. But when things start to get stressful, there's no telling what your unconscious might dredge up.

Compensating for every pilot's psychological baggage and stimulus-response habit pattern is impossible. That is all the more reason to get the human-factor ambiguities, the ergonomic problems, out of the cockpit. The only way is to standardize cockpits and procedures as much as possible. Additionally, an alert pilot must be constantly on guard for man-machine interface problems.

I am convinced that subtle human-factor causes are involved in most aircraft incidents and accidents. How can they not be involved? The very fact that whenever something goes wrong the pilots are in a stressful situation is reason enough to suspect that their unconscious minds influence their responses to the stress-producing stimuli.