Getting the Maximum from Personal Minimums

story and photos by Susan Parson

You don't have to be involved in aviation very long before you hear the time-honored advice on personal minimums. It goes something like this: "Legal weather minimums are just a starting point. You should establish your own personal minimums for flying, and you must have the discipline to stick to them—no matter how much you want to make the trip."

Sound familiar? It's good advice. Most pilots would agree that it's a good idea, and it's probably true that more accident pilots—not to mention their innocent passengers—might be alive today if they had followed it. So why didn't they? And why do so many pilots who appear for flight reviews or other training look sheepish and make excuses for why they haven't managed to write down their own personal minimums?

There are probably many reasons that the concept of personal minimums is more honored as an idea than as a regular practice. I suspect, however, that a major reason is that many pilots—even safety-conscious ones—don't have a clear idea about where to start, and that many flight instructors—even conscientious ones—may not know how to guide pilots through the process of establishing personal minimums. I confess that I have been guilty on both counts. I consider myself to be a safety-minded pilot, but for too many years my personal minimums were little more than a vague mental notion. I also like to think of myself as a conscientious and safety-minded flight instructor (CFI), but far too few of my clients would be able to tell you that I even talked about, much less taught about, personal minimums. To make amends, here are some ideas that might help fellow aviators avoid similar sins of omission.

Let's start with the basics. What exactly do we mean when we talk about "personal minimums?" In formal terms, personal minimums refers to an individual pilot's set of procedures, rules, criteria, and guidelines for deciding whether, and under what conditions, to operate (or continue operating) in the National Airspace System.

While this definition is accurate, there are several reasons why you may not find it particularly helpful as a starting point. First, it tends to describe the product rather than explain the process, which is where many pilots have trouble. Second, and more importantly, the formal definition of the end product—your personal set of procedures, rules, criteria, and guidelines—does not really convey one of the core concepts: personal minimums as a "safety buffer" between the demands of the situation and the extent of your skills.

Think of personal minimums as the human factors equivalent of reserve fuel. When you plan a flight, the regulations require you to calculate fuel use in a way that leaves a certain minimum amount of fuel in the tanks when you land at your destination or

your alternative. The reserve fuel is intended to provide a safety buffer between fuel required for normal flight and fuel available to avoid total quiet in your engine compartment.

In the same way, personal minimums should be set so as to provide a solid safety buffer between the skills required for the specific flight you want to make, and the skills available to you through training, experience, currency, and proficiency. In fuel calculations, you wouldn't dream of planning a flight that would force you to use your reserve fuel, or (worse) take you to the "unusable fuel" level in the tanks. In skill calculations, you shouldn't consider making a flight that requires use of skills at the "reserve" or (worse) "unusable fuel" level of your piloting ability.

So where do you start in developing personal minimums? There is no single "right" way to proceed, but if you're unsure of how to proceed in establishing your own personal minimums, this method offers a reasonable place to start.

Step 1 – Review Weather Minimums

Most people think of personal minimums primarily in terms of weather conditions, so begin with a quick review of weather definitions. The regulations define weather flight conditions for visual flight rules (VFR) and instrument flight rules (IFR) in terms of specific values for ceiling and visibility.

Category	Ceiling		Visibility
Visual Flight Rules **VFR** (green sky symbol)	greater than 3,000 feet AGL	and	greater than 5 miles
Marginal Visual Flight Rules **MVFR** (blue sky symbol)	1,000 to 3,000 feet AGL	and/or	3 to 5 miles
Instrument Flight Rules **IFR** (red sky symbol)	500 to below 1,000 feet AGL	and/or	1 mile to less than 3 miles
Low Instrument Flight Rules **LIFR** (magenta sky symbol)	below 500 feet AGL	and/or	less than 1 mile

For our purpose, we will define IFR as a ceiling less than 1,000 feet AGL and/or visibility less than three miles. LIFR is a sub-category of IFR. VFR is defined as ceiling greater than 3,000 feet AGL and visibility greater than five miles. MVFR is a sub-category of VFR.

Step 2 – Assess Your Experience and Comfort Level

At first glance, this part of the process might look a bit complicated, but please bear with me. It might take a few minutes to review, record, and summarize your personal experience, but I think you will find that the finished product is well worth your time.

First, think back through your flight training and complete the "Certification Training, and Experience Summary" chart on the next page. The Certification, Training, and Experience Summary Source is adapted from the FAA's *Personal and Weather Risk Assessment Guide* (October 2003). It can be found at:

<www.faa.gov/education_research/training/fits/guidance/media/Pers%20Wx%20Risk%20Assessment%20Guide-V1.0.pdf>.

Next, think through your recent flying experiences and make a note of the lowest weather conditions that you have comfortably experienced as a pilot in your VFR and, if applicable, IFR flying in the last six to 12 months. You might want to use the charts below as a guide for this assessment, but don't feel that you need to fill in every square. In fact, you may not have, or even need, an entry for every category. For example, suppose that most of your flying takes place in a part of the country where clear skies and visibilities of 30 plus miles are normal. Your entry might specify the lowest VFR ceiling as 7,000, and the lowest visibility as 15 miles. You may have never experienced MVFR conditions at all, so you would leave those boxes blank.

In my part of the country, normal summer flying often involves hazy conditions, but over relatively flat terrain. I

know the local terrain and, since I have regularly operated in hazy daytime MVFR conditions (e.g., 2,500 and four miles), I would use the MVFR column to record these values. Even in my home airspace, though, I would not consider flying down to VFR minimums at night—much less in the range of conditions defined as MVFR. For night VFR, I would not be comfortable with anything less than a ceiling of at least 5,000, and visibility of at least seven to eight miles. How my entries would look in the Experience & "Comfort Level" Asseement VFR & MFR chart:

If you fly IFR, the next part of the exercise is to record the lowest IFR conditions that you have comfortably, recently and regularly experienced in your flying career. Again, be honest in your assessment. Although I have successfully flown in low IFR (LIFR) conditions-–down to a 300 foot ceil-

Experience & "Comfort Level" Assessment VFR & MVFR			
Weather Condition		**VFR**	**MVFR**
Ceiling		**> 3000**	**1000-3000**
	Day	--	2,500
	Night	5,000	--
Visibility		**> 5 miles**	**3-5 miles**
	Day	–	4 miles
	Night	8 miles	--

Certification, Training, and Experience Summary

CERTIFICATION LEVEL	
Certificate level (e.g., private, commercial,ATP)	
Ratings (e.g., instrument, multiengine)	
Endorsements (e.g., complex, high performance, high altitude)	
TRAINING SUMMARY	
Flight review (e.g., certificate, rating, Wings)	
Instrument Proficiency Check	
Time since checkout in airplane 1	
Time since checkout in airplane 2	
Time since checkout in airplane 3	
Variation in equipment (e.g., GPS navigators, autopilot)	
EXPERIENCE	
Total flying time	
Years of flying experience	
RECENT EXPERIENCE (last 12 months)	
Hours	
Hours in this airplane (or identical model)	
Landings	
Night hours	
Night landings	
Hours flown in high density altitude	
Hours flown in mountainous terrain	
Crosswind landings	
IFR hours	
IMC hours (actual conditions)	
Approaches (actual or simulated)	

ing and 3/4 mile visibility—I would never claim to have been "comfortable" in these conditions, especially since I was operating in a single pilot/single engine configuration. I would therefore leave the LIFR boxes blank, and my entries for known "comfort level" in Instrument Meteorological Conditions (IMC) would be as shown below:

Experience & "Comfort Level" Assessment IFR & LIFR			
Weather Condition		**IFR**	**LIFR**
Ceiling		**500-999**	**< 500**
	Day	800	–
	Night	999	–
Visibility		**1-3 miles**	**< 1 mile**
	Day	1 mile	--
	Night	3 miles	–

If I combine my entries into a single chart, the summary of my personal known "comfort level" for VFR, MVFR, IFR, and LIFR weather conditions is as follows:

Experience & "Comfort Level" Assessment Combined VFR & IFR					
Weather Condition		**VFR**	**MVFR**	**IFR**	**LIFR**
Ceiling					
	Day	2,500		800	
	Night	5,000		999	
Visibility					
	Day	4 miles		1 mile	
	Night	8 miles		3 miles	

Step 3 – Consider Other Conditions

Ceiling and visibility are the most obvious conditions to consider in setting personal minimums, but it is also a good idea to have personal minimums for wind and turbulence. As with ceiling and visibility, the goal in this step is to record the most challenging wind conditions you have comfortably experienced in the last six to 12 months—not necessarily the most challenging wind conditions you have managed to survive without bending an airplane. As shown in the chart to the right, you can record these values for category and class, for specific make and model, or perhaps both.

In addition to winds, your "comfort level" inventory should also include factors related to aircraft performance. There are many variables, but start by completing the chart with reference to the aircraft and terrain most typical for the kind of flying you do most. Remember that you want to establish a safety buffer, so be honest with yourself. If you have never operated to/from a runway shorter than 5,000 feet, the "shortest runway" box should say 5,000 feet. We will talk more about safe ways to extend personal minimums a bit later. (See chart on the right.)

Step 4 – Assemble and Evaluate

Now you have some useful numbers to use in establishing baseline personal minimums. Combining these numbers the Baseline Personal Minimims chart on the next page shows how the whole picture might look.

Step 5 – Adjust for Specific Conditions

Any flight you make involves almost infinite combinations of pilot skill, experience, condition, and proficiency; aircraft equipment and performance; environmental conditions; and external influences. Both individually and in combination, these factors can compress the safety buffer provided by your baseline personal minimums. Consequently, you need a practical way to adjust your baseline personal minimums to accommodate specific conditions. See the chart on page 6 for an example of how this can be done.

Note that the suggested adjustment factors are just that—a suggestion. If your flying experience is limited or if you don't fly very often, you might want to double these values. In addition, if your situation involves more than one special condition from the chart above, you will probably want to add the adjustment factor for each one. For example, suppose you are planning a night cross-country to an unfamiliar airport, departing after a full workday. If you decide to make this trip—or you might decide that it is safest to wait until the next day—this chart suggests that you should at least raise your baseline personal minimums by adding 1,000 feet to your ceiling value; one mile to visibility, and 1,000 feet to required runway length.

How about adjustments in the other direction? Some pilots fear that establishing personal minimums is a once-and-for-all exercise. With time and experience, though, you

Experience & "Comfort Level" Assessment Wind & Turbulence				
		SE	**ME**	**Make/ Model**
Turbulence				
	Surface wind speed	10 knots	15 knots	
	Surface wind gusts	5 knots	8 knots	
	Crosswind component	7	7	

Experience & "Comfort Level" Assessment Performance Factors			
	SE	ME	Make/ Model
Performance			
Shortest runway	2,500	4,500	
Highest terrain	6,000	3,000	
Highest density altitude	3,000	3,000	

Baseline Personal Minimums					
Weather Condition		**VFR**	**MVFR**	**IFR**	**LIFR**
Ceiling					
	Day	2,500		800	
	Night	5,000		999	
Visibility					
	Day	4 miles		1 mile	
	Night	8 miles		3 miles	
Turbulence		**SE**	**ME**	**Make/Model**	
	Surface Wind Speed	10 knots	15 knots		
	Surface Wind Gust	5 knots	8 knots		
	Crosswind Component	7	7		
Performance		**SE**	**ME**	**Make/Model**	
	Shortest runway	2,500	4,500		
	Highest terrain	6,000	3,000		
	Highest density altitude	3,000	3,000		

can modify personal minimums to match growing skill and judgment. When you have comfortably flown to your baseline personal minimums for several months, you might want to sit down and assess whether, and how, to safely push the envelope. If, for instance, your personal minimums call for daytime visibility of at least five miles, and you have developed some solid experience flying in those conditions, you might consider lowering the visibility value to four miles for your next flight.

Two important cautions:

- First, never adjust personal minimums to a lower value for a specific flight. The time to consider adjustments is when you are not under any pressure to fly, and when you have the time and objectivity to think honestly about your skill, performance, and comfort level during last the few flights. Changing personal minimums "on the fly" defeats the purpose of having them in the first place.
- Second, keep all other variables constant. For example, if your goal is to lower your baseline personal minimums for visibility, don't try to lower the ceiling, wind, or other values at the same time. In addition, you never want to push the baseline if there are special conditions (e.g., unfamiliar aircraft, pilot fatigue) present for this flight.

You might find it helpful to talk through both your newly-established personal minimums and any "push-the-envelope" plans with a well-qualified flight instructor.

Step 6 – Stick to the Plan!

Once you have done all the thinking required to establish baseline personal minimums, "all" you need to do next is stick to the plan. As most pilots know, that task is a lot harder than it sounds, especially when the flight is for a trip that you really want to make, or when you are staring into

the faces of your disappointed passengers. Here's where personal minimums can be an especially valuable tool. Professional pilots live by the numbers, and so should you. Pre-established hard numbers can make it a lot easier to make a smart "no go" or "divert" decision than a vague sense that you can "probably" deal with the conditions that you are facing at any given time. In addition, a written set of personal minimums can also make it easier to explain tough decisions to passengers who are, after all, trusting their lives to your aeronautical skill and judgment.

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	If you are facing:	Adjust baseline personal minimums by:	
Pilot	Illness, use of medication, stress, or fatigue; lack of currency (e.g., haven't flown for several weeks)	Add	*at least* 500 feet to ceiling
			at least ½ mile to visibility
Aircraft	An unfamiliar airplane or an aircraft with unfamiliar avionics or other equipment:		*at least* 500 ft to runway length
enVironment	Unfamiliar airports and airspace; different terrain or other unfamiliar characteristics	Subtract	*at least* 5 knots from winds
External Pressures	"Must meet" deadlines, pressures from passengers, etc.		

Baseline Personal Minimums					
Weather Condition		VFR	MVFR	IFR	LIFR
Ceiling					
	Day				
	Night				
Visibility					
	Day				
	Night				
Turbulence		SE	ME	Make/Model	
	Surface Wind Speed				
	Surface Wind Gust				
	Crosswind Component				
Performance		SE	ME	Make/Model	
	Shortest runway				
	Highest terrain				
	Highest density altitude				

	If you are facing:	Adjust baseline personal minimums to:	
Pilot	Illness, medication, stress, or fatigue; lack of currency (e.g., haven't flown for several weeks)	Add	At least 500 feet to ceiling
			At least ½ mile to visibility
Aircraft	An unfamiliar airplane, or an aircraft with unfamiliar avionics/ equipment:		At least 500 ft to runway length
enVironment	Airports and airspace with different terrain or unfamiliar characteristics	Subtract	At least 5 knots from winds
External Pressures	"Must meet" deadlines, passenger pressures; etc.		

Federal Aviation Administration

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Step 2 – Assess Your Experience and Personal Comfort Level

Step 3 – Consider Other Conditions

Step 4 – Assemble and Evaluate

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Category	Ceiling		Visibility
VFR	greater than 3,000 feet AGL	and	greater than 5 miles
Marginal VFR	1,000 to 3,000 feet AGL	and/or	3 to 5 miles
IFR	500 to below 1,000 feet AGL	and/or	1 mile to less than 3 miles
LIFR	below 500 feet AGL	and/or	less than 1 mile

Think of personal minimums as the human factors equivalent of reserve fuel. Personal minimums should be set so as to provide a solid safety buffer between the skills required for the specific flight you want to make, and the skills available to you through training, experience, currency, and proficiency.

Review and record your certification, training, and recent experience history on the chart below.

CERTIFICATION LEVEL	
Certificate level (e.g., private, commercial, ATP)	
Ratings (e.g., instrument, multiengine)	
Endorsements (e.g., complex, high performance, high altitude)	
TRAINING SUMMARY	
Flight review (e.g., certificate, rating, Wings)	
Instrument Proficiency Check	
Time since checkout in airplane 1	
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Time since checkout in airplane 3	
Variation in equipment (e.g., GPS navigators, autopilot)	
EXPERIENCE	
Total flying time	
Years of flying experience	
RECENT EXPERIENCE (last 12 months)	
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Summarize values for weather experience and "comfort level" in the chart below, and enter values for turbulence & performance.

Experience & "Comfort Level" Assessment Combined VFR & IFR					
Weather Condition		VFR	MVFR	IFR	LIFR
Ceiling					
	Day				
	Night				
Visibility					
	Day				
	Night				

Experience & "Comfort Level" Assessment Wind & Turbulence				
	SE	ME	Make/ Model	
Turbulence				
Surface wind speed				
Surface wind gusts				
Crosswind component				

Experience & "Comfort Level" Assessment Performance Factors				
	SE	ME	Make/ Model	
Performance				
Shortest runway				
Highest terrain				
Highest density altitude				