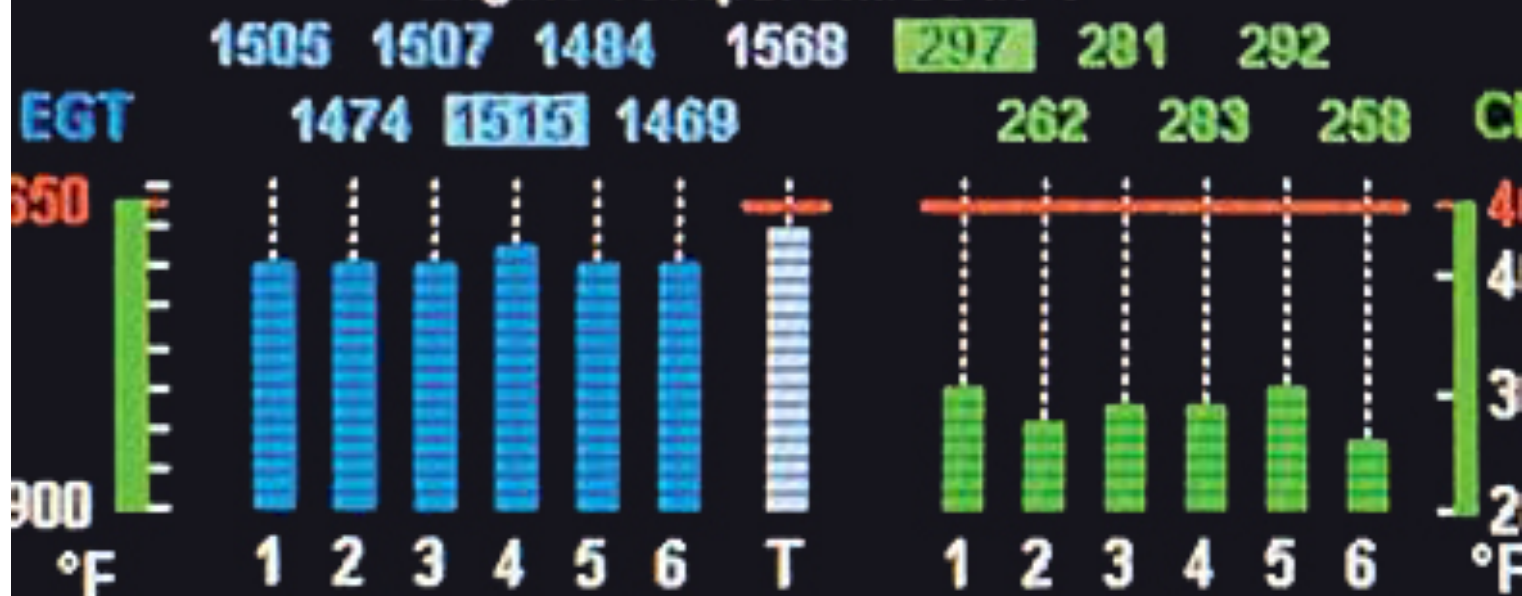


Engine Monitor Shenanigans—

Flying the Red Knob, Part 2

84 % HP

Engine Temperatures in °F



RPM

OIL-T 158 °F

Lean-of-Peak Operations — Flying the Red Knob (Part 2)

By Mike Jones

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“Oh frabjous day!” wrote Lewis Carol, and I second the motion. It’s a rare joy when a reader takes the time to share their reactions to my scribbles. Today is one of those days, and I tip my hat to long-time pilot and CPA member, David Bunin.

Bunin wrote that he enjoyed my exploration of Lean-of-Peak operations (“Fly the Red Knob” in February 2026). But one detail was out of kilter.

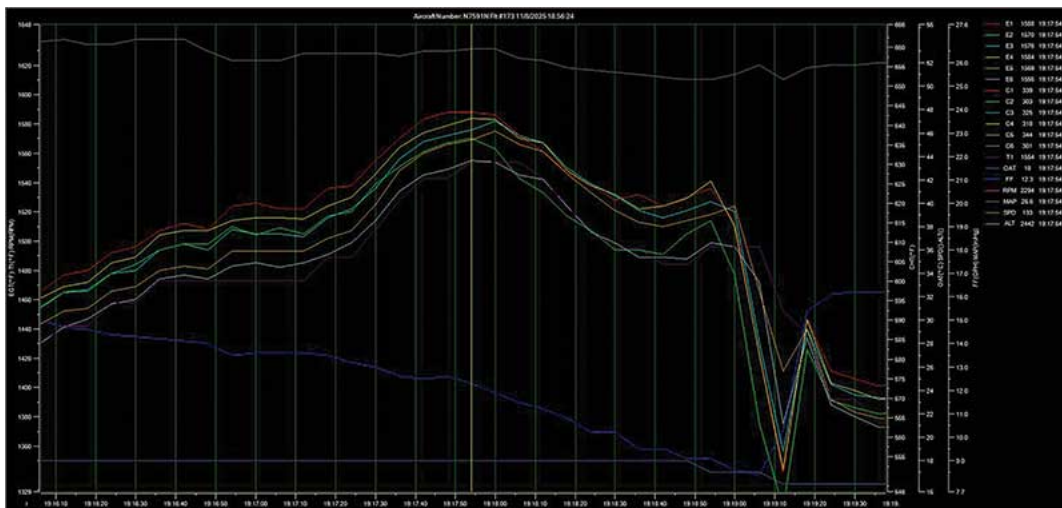
He noted the EDM-930 engine monitor reported I had flown rich-of-peak (ROP) at 75% power, producing 140 knots at 18 gallons/hour. When I flew lean-of-peak (LOP) I achieved the same 140 knots at 85% power at 13.5 gallons/hour. Didn’t happen, he said. Can’t happen.

Huh?

Bunin is no average pilot. He’s an avionics engineer and an A&P/IA. He’s been very active on the CPA Members forums. In addition to his day job, he has personally installed complex avionics into his own plane and from August 2015 to July 2016 he published a series in this journal about those upgrades. Interestingly, his wife provided vital help on that project. Turns out, his bride has “extensive wiring experience in the industry, from Boeing to Beechcraft, and

a little bit of everything in between.” Sounds like an aeronautical “power couple” to me. Invite them to the Christmas party.

Back to the conundrum: Power is the direct result of fuel burned. Bunin wrote, “I submit... that if the speed was the same, the horsepower output from the engine also was the same.” You can’t get something for nothing. Either the EDM-930 was reporting the wrong power levels, or we had invented a perpetual motion machine.



“The percentage-[of]-power displays on the engine monitors are optimized for ROP computations,” Bunin wrote. “When operating LOP the percentage power displays a power value that tends to be incorrect.”

Ponder that for a minute. Can engine monitors mis-monitor?

Both Bunin and I trust our engine monitors. The evidence is overwhelming that all of the directly measured parameters — cylinder temps, fuel flow, oil pressure, amps, etc. — are accurate and precise. Those measurements come from sophisticated sensors buried in and around the engine.

“Everything the engine monitor is telling you (all of the direct measurements) are fine and are reliable data,” he explained. But LOP, he

cautioned me to “disregard the % power display” because the “percentage of power” is a calculation, not a measurement.

The power produced by an engine is directly proportional to the fuel burned. A good rule of thumb is that one gallon of fuel per hour produces 14.7 horsepower. In my tests, I was burning 13.5 gallons/hour. Do the math: 13.5 gallons times 14.7 = 198 horsepower. The engine is rated at 310 horsepower. 198 horsepower is 64% of 310 horsepower. Lean-of-peak, my EDM-930 display is flat-out wrong.

“When you’re flying LOP, the power output varies almost entirely with the fuel flow value,” Bunin coached. “The MP [manifold pressure] and RPM don’t factor much at all in the power calculation.” But the engine monitor apparently is still including the manifold pressure in its computation, leading to unnaturally high power estimates. In fact, Bunin hypothesized JPI doesn’t use the fuel flow in the power computation at all. “I think it’s just pre-mapped combinations of MP and RPM.”

Which brings me to two important conclusions. First, when operating lean-of-peak ignore the percent-of-power display on your engine monitor; it’s probably misinformed. Secondly, write to your favorite authors. We’re always eager to hear from you.

About the Author



Dr. Mike Jones is based in Pinehurst, NC and consults with small airports to improve their performance and sustainability. He’s got 4,000 hours in his logbook and usually flies his 1979 Cessna Centurion. You always can reach him at PilotMike2012@gmail.com.