

Hi James,

This is a follow-up to our phone conversation on 6 January...please forgive the delayed response. My background is Air Force, 23 years, fighter weapons school instructor/operational test and evaluation. I currently fly 777's for FedEx. ATP/CFI Instrument and Multi-engine. I conduct flight test in my RV-4 to assist with training and test plan development and have a requirement for a turn and slip indicator.

I recently installed a radiant turn and slip indicator in my RV-4 to replace a conventional electric gyro/slip and skid indicator. The un gimbed, single-axis gyro is the only reliable instrument indication of spin direction if a departure from controlled flight occurs, and can be of great assistance during conditions causing pilot disorientation (e.g., inadvertent inverted spin). The radiant indicator only weights 3 oz, requires no maintenance (other than software upgrade) and draws only 1/10th of an amp. It replaced a 1.3 pound instrument, 5 amp breaker, associated connectors and wiring.

Overall, the needle performs quite well during normal flight and auto-rotation—reliably indicating the direction of yaw. The accelerometer-based “gyro” cannot be “tumbled” and proved to be reliable during multiple spin tests. The digital yaw rate roughly approximates turn rate (in degrees per second) at small bank angles (equal to or less than standard turn rates of 3 degrees per second). As the instrument measures only yaw rate, the indication does not measure high turn rates. For example, if accomplishing a standard rate, IFR turn, the indication is quite accurate; but if accomplishing a maximum-performance, symmetric 4-6 G turn, the indication is not accurate. If, however, a hammerhead is flown (i.e., maneuvering only about the vertical axis), then the instrument reliably shows actual yaw rate. Yaw rate indications during spins exceeded the instrument's ability to measure, but needle indications are color coded, with high and higher yaw rates displayed as yellow and red, assisting with visual interpretation. It would be helpful if documentation included the parameters for color coding, so as to assist with proper interpretation. The instruments also displays system voltage. A minimum of 10 volts is required for proper operation.

The bottom line is that the needle performs quite well in all flight regimes and, most importantly, serves as an accurate indication of yaw direction under all conditions. For those pilots still familiar with needle/ball/airspeed instrument flight, the instrument represents an improvement over a typical mechanical gyro in terms of reliability and the additional display of “turn rate” in degrees per second, with the color coded needle also providing better feed back than conventional instrumentation. The daylight readability of the instrument is excellent, although it requires installation of a (provided) potentiometer. A slightly more robust potentiometer (allowing fitting of a proper adjustment knob) or, alternatively, internalizing the potentiometer within the instrument case and eliminating the need for the additional hole in the instrument panel would be desirable for permanent installation.

Flight test showed inclinometer performance to be lacking. The electronic indication was not on a par with the electronic ball displays on the dual Dynon D-10A's with which my airplane is equipped, or a conventional, mechanical inclinometer. Although the ball deflected in the proper direction, computational/sensed rates were insufficient to allow use of the ball for coordinating rudder input during maneuvering flight—ball response is simply too slow. In my case, it will be necessary to retrofit a mechanical inclinometer under the instrument to provide the full utility of a conventional turn and slip instrument.

Overall, I'm quite pleased with the instrument and believe with further software enhancements, it may be practical to improve inclinometer performance, and, perhaps, displayed yaw rate. As time permits, I would like to return the instrument to see if the newer software load improves performance; and I'll be happy to help with testing if you chose to improve inclinometer or displayed yaw rate performance.

If you have any questions, or would like to discuss this further, please don't hesitate to drop an e-mail. Thanks much for the innovative product line, and best wishes for your continued success!

Cheers,
Mike Vaccaro
Niceville, Florida