FLIGHTCHECK

Gulfstream IVSP: 4220 nm, M.88, FL450 for $32 million

Honeywell SPZ8400 replaces GIV's SPZ8000, higher max weight for longer nonstops, EVS available soon. Same RR Tay 611-8s as GIV.

By Clay Lacy
ATP/CFII/Helo/Sea. Gulfstream II/III/IV, Learjet & Citation series, HS125, Boeing 747 and 25 misc. type ratings

With more than 438 Gulfstream IVs in service—about double the individual unit numbers of GIs, GIIs or GIIIs ever built—this aircraft has certainly withstood the test of time. While the GIV has the same cabin diameter of all previous models, the length has increased from the GI through the GIV and Gulfstream remains one of the most popular large-cabin jets on the market. While the longevity and success of the $32-million GIV have something to do with the fact that a supersonic business jet has not yet eclipsed it, this executive transport holds its own against other long-haul, large-cabin contenders.

I received my Gulfstream rating in 1978, when Allen Paulson purchased the Gulfstream divi-

sion of Grumman and created Gulfstream Aerospace. In those days, GIIs were selling for about $4.5 million and the GIII was about to come out at about $7.5 million. The price of the GIII increased during the years it was produced to about $12 million.

About halfway through the production life of the GIII Paulson inked a deal for 100 ship sets of the then-proposed Rolls-Royce Tay engines, which led to development and certification about 1986.

Gulfstream brought a GIVSP demonstrator (s/n 1388) for the flightcheck to VNY (Van Nuys CA). Onboard were Demo Captains Bob McKenney and Capt Ray Welling-ton, Sales Engineer Kelly Hudgins and Flight Attendant Debbi Gaston, daughter of my longtime friends Dan and Jerri Sabovich, who have managed Mojave airport for more than 30 years.

McKenney, a former Air Force One pilot under Presidents Reagan, Bush and Clinton and later an Atlas Air Boeing 747 captain, joined Gulfstream 6 yrs ago. From his perspective, GIVs and GVs are small aircraft. Wellington, a former Cessna Citation demo pilot, came to Gulfstream a little less than a year ago. Gaston's role includes maintaining relationships with passengers and prospective buyers throughout the world, while Hudgins' expertise lies in a comprehensive understanding of the GIVSP sales and marketing program.

Roundtable

After delivering 213 GIVs, Gulfstream introduced the GIVSP in 1993. Since then, it's delivered 225 GIVSPs, including a record 43 placements in the past year. Hudgins explained that the GIV fleet has logged more than 1.6 million flight hrs and is currently operating with 99.6% dispatch reliability. With a MTOW of 74,600 lbs and a max fuel weight of 29,500 lbs, the GIVSP has a Mach .80 range of 4050 nm, an initial cruise altitude of FL410 and a balanced field length of 5450 ft. Rolls-Royce Tay engines, used on the GIVSP, power more than 750 aircraft including the Fokker 70, Fokker 100 and a few re-engined Boeing 727s.

Improvements from the GIV to the GIVSP include a 1000-lb increase in MTOW and a 7500-lb increase in max landing, which allows more flexibility and saves time on multistop trips by eliminating a number of refuelings. A wide interior gives the GIVSP about 1 in additional head and shoulder room. For the GIVSP, Gulfstream abandoned the GIV brake-by-wire system and went back to tried and proven ABS hydro-mechanical brake technology. An upgraded avionics suite features a Honeywell SPZ8400

Photo courtesy Gulfstream

As popular with *Fortune* 500 companies as it is with Hollywood entertainers and offshore sultans, the Gulfstream GIVSP is a leader in its class.

Photo by Grant McLaren

Pilot Author Clay Lacy takes the GIVSP through its paces over southern California. Here, Lacy makes the 1st of 3 touch-and-gos at BFL (Bakersfield CA).

(L–R) Lacy and McKenney discuss the GIVSP program, and product changes from the GIV to the GIVSP, during a roundtable discussion at Clay Lacy Aviation VNY (Van Nuys CA).

Other upgrades on the GIVSP include an extended warranty, with 15 yrs or 15,000 hrs on primary and secondary structures and a maintenance steering group (MSG3) program beginning with s/n 1400. MSG3 is based on statistical analysis rather than a calendar-based system and eliminates some inspections altogether while achieving a 10–20% overall savings in scheduled maintenance costs. Increasing time between maintenance, getting away from calendar-based procedures and eliminating some inspections are things I believe Gulfstream should have done a long time ago. I hope Gulfstream expands MSG to all GIVs and extends at least some of these benefits back to the GII and GIII fleet.

Sometimes described as the Bentley of business aircraft, the GIVSP, at just over $32 million, is not inexpensive. However, all business jets are expensive and there is not a significant competitive price difference between a GIVSP and a Dassault Falcon 900EX. So far, at least, nobody has hit a magic formula to make a business jet for half the price. Choosing an aircraft is a question of determining how far you want to fly and the type of cabin you want. Gulfstream's largest customer segment is fractional ownership companies. Hudgins told me that 1 out of 4 GIVSPs built is headed to a fractional ownership program. Altogether, including orders and options, Gulfstream has sold a total of 98 GIVSPs and GVs to fractional providers.

Preflight

McKenney and I walked out on the ramp to preflight N4SP and inspect the passenger cabin. I've always felt that one of the really great features and one of the best selling points of a Gulfstream is the entry airstair. The airstair folds out to a comfortable 45 angle and rests on the ground such that the first step is always the same height despite imperfections or bumps on the ramp surface. GIVSP's 12 large oval passenger cabin windows are another great feature.

The only real negative aspect about the GIVSP, in my opinion, is the avionics bay, which takes up about 5 ft of space behind the flightdeck. On the GVSP, Gulfstream has reduced the avionics bay to about 3.5 ft on the starboard side of the cabin and this is a step in the right direction. However, I'm surprised that, with all the modern and miniaturized avionics on the market today, Gulfstream hasn't developed a way to get rid of the avionics bay completely. It eats up valuable space in the cabin and I think Gulfstream is missing a real opportunity by not eliminating the avionics bay and adding another window.

While our particular flight test aircraft was not outfitted with HUD, McKenney explained that about 50% of new GIVSP orders include Honeywell's HUD system. While adjusting to the GIVSP's Honeywell SPZ8400 digital flightdeck can be a hurdle for pilots without previous FMS experience, it's a highly automated system which pilots who complete the 28-day initial transition course can easily grasp.

With a Mach .80 range of 4050 nm, the GIVSP is a comfortable 2-stop aircraft to just about anywhere in the world. Longest GIVSP nonstop flight to date was a Tokyo–Las Vegas leg. McKenney personally flew a GIVSP from Buenos Aires to Miami nonstop with 10 passengers, landing with good reserves. If you want to fly further and go just about anywhere in the world nonstop or 1 stop, you'll need to spend the extra $10 million for a $42-million GV-class transport.

Flying the GIVSP

McKenney and I taxied out to runway 16R at VNY at 68,400 lbs GW (88% of MTOW) with 23,400 lbs of fuel and 3 passengers. At our weight, Vr was 138 kts with a balanced field length requirement of 5050 ft. As we taxied for takeoff, I noted the responsiveness of both the steering and brakes. I prefer hydromechanical brakes to the previous brake by wire system. They're much more user friendly.

Gulfstreams have a lot of guts and you've always got plenty of power reserves on takeoff. Gulfstreams are also designed with a heavy control pressure feel, much like a Boeing 747, and this helps you fly more smoothly, as former Air Force One Pilot McKenney can attest.

With a flightplan filed to FL410, and an intended destination of MHV (Mojave CA), we used an autoclimb profile of 250 kts to 10,000 ft then 300 kts to Mach .75.

Angular winglets on the GIVSP differ somewhat from the wider-sweep curved winglet design used on the GV.

As we passed through FL380, I observed a climb rate of 1500 fpm. Subtracting a 3.5-min level-off at FL280, we reached FL410 in 22.5 min with a 2850-lb fuel burn under ISA +11 conditions.

At FL410, and with a stabilized cruise of Mach .80, McKenney and I verified book figures with an observed fuel burn of 1500 lbs per side. As weather conditions did not look great for going into MHV, with surface winds of 35 kts from the west, we altered our flightplan for landing on runway 30 at BFL (Bakersfield CA). Descending with spoilers through FL200, we planned for a 147-kt Vref approach into BFL at a weight of 64,600 lbs.

Staying in the pattern at BFL, I did 3 touch-and-gos followed by a full-stop landing. With no leading edge devices, takeoff and landing speeds are somewhat high on a Gulfstream. But excellent acceleration produces good balanced field lengths. The GIVSP also has such effective braking and thrust reverse that you never require a whole lot of runway. Despite applying heavy braking pressures at BFL on the full stop, brake temperatures peaked at 312 , just about half the limit.

On departure out of BFL, at a weight of 63,400 lbs and a Vr of 132 kts, McKenney pulled the right engine at Vr. I found it easy to maintain directional control without using full rudder and we were climbing so well at 1500 fpm that we decided to bring the right engine up to power at 1000 ft AGL.

McKenney and I flew back VFR to VNY at 17,500 ft, landing on 16R with a Vref of 144 kts. Total fuel burn for our 1 hr 38 min flight was 6500 lbs.

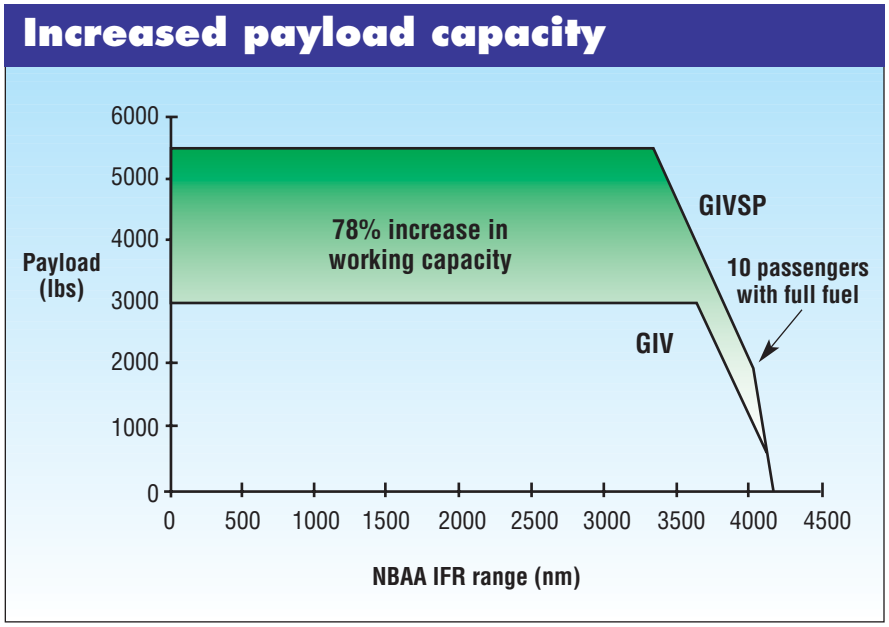
Systems

The GIVSP has a spacious 1525 cu ft, 45-ft-long cabin. Baggage storage, accessible in flight, totals a generous 169 cu ft. Our flight test aircraft featured an aft galley and a cabin outfitted with Rosen flat panel monitors, Airshow, a MagnaStar satphone system and a Thales Puritan Bennett video system including 1 glareshield and 3 externally mounted cameras. Purchase price of a GIVSP includes interior completion at 1 of Gulfstream's 6 company-owned outfitting centers, which offer a combined completion capacity for 80 aircraft a year.

Systems on the GIVSP are simple and reliable. All fuel is contained in the wing with a 2-tank system, 4 booster pumps and easy fuel management procedures. Flight controls are hydraulically boosted with full manual reversion. A full-time yaw damper is standard together with stick shaker, pusher auto ground spoilers and Horizontal Stabilizer, which adjust with flap position.

The GIVSP electrical system involves 2 engine-driven 30kVA AC generators plus a flight-rated 30kVA APU. A standby hydraulically-driven AC generator, powered by the combined hydraulic system, provides 5kVA AC and 50 amp DC at max altitude. The GIVSP has dual automatic charging 24V/40 amp/hr batteries as well as 6 amp/hr dual emergency batteries.

Rolls-Royce Tay engines, with a 3.03:1 bypass ratio and 13,850 lbs of static thrust flat rated to ISA+15 , are efficient for both short-hop and long-range missions, with excellent takeoff, climb and cruise capability. These rugged 8000-hr TBO powerplants are also quiet and rated 6 to 11.5 dB below Stage 3 noise regs. Pressurization control is automatic, with manual back up, providing a 6500 ft cabin at FL450 along with 100% fresh air.



Range/payload improvements on the GIVSP over the GIV include a 1500-lb enhancement in MTOW and a 7500-lb greater max landing weight.

Crew training for 2 pilots and a 28-day initial type-rating, can be scheduled at FlightSafety Long Beach CA, Dallas TX, Wilmington DE and Savannah GA or SimuFlite in Dallas. Personally, I feel the length of the initial course for pilots with previous Gulfstream experience could probably be reduced.

Gulfstream has developed a strong worldwide service network and accomplished 1500 GIV/IVSP and GV service visits last year alone. A comprehensive warranty provides 15 yrs or 15,000 hrs on primary and secondary structures, 5 yrs or 2500 hrs on engine and engine spares, 30 months on avionics and all other production aircraft components and 2 yrs on interior completions.

Summary

When the GV was introduced in 1995 there were many who thought this might spell the end for the GIV. However, with its $10 million cheaper acquisition cost and great performance on LRC nonstop legs of up to 4100 nm, the GIVSP has proven the naysayers wrong. Out of its total production, Gulfstream is building and selling as many GIVSPs as it is GVs. In my opinion, they'll be selling GIVSPs for years to come because the range, speed and cabin are such a great combination.

Gulfstream IVSP specifications

Price	
Basic equipped ($mil US)	$32.0
Powerplants (2)	Rolls Royce Tay Mk 611-8
Rated takeoff thrust ea.	13,850 lbs
Dimensions	
Wingspan (ft)	77.8
External length	88.3
External height	24.4
Internal cabin length	45.1
Internal cabin width	7.3
Internal cabin height	6.2
Internal cabin vol (cu ft)	1,525
Baggage comp vol (cu ft)	169.0
Normal seating, crew/pax	3/14
Weights and loading	
Max Landing weight	66,000
MTOW (lbs)	74,600
Zero fuel weight	49,000
Basic operating weight	42,500
Max payload	6,500
Max fuel (lbs)	29,500
Performance	
Max Range, NBAA IFR (nm)	4,220
Takeoff distance (SL,ISA,MTOW)(ft)	5,450
Mmo	0.88
normal cruise speed (KTAS)	459
Landing distance (SL,ISA,MLW)(ft)	3,190
Initial cruise altitude	41,000
Max cruise altitude (ft)	45,000

Figures supplied by Gulfstream

GIVSP features Honeywell's SPZ8400 integrated avionics suite with 6 cathode ray tube displays. Gulfstream plans to offer its new Honeywell Primus Epic-based PlaneView cockpit as an option.

GIVSPs are typically outfitted for 14 pax and 1 flight attendant, though custom configurations are common.

With 9 steps at an easy 45° angle, the GIV has one of the best airstairs in the industry, Lacy says.

GIVSP power comes from 2 Rolls-Royce Tay MK611-8 turbofans with each producing 13,850 of thrust.

Gulfstream is like Learjet in terms of strong brand recognition and has earned a reputation for quality in the operator community. In Aug 2001 Gulfstream came out ahead of the pack in *Pro Pilot*'s corporate aircraft product support survey. *Fortune* 500 CEOs like their Gulfstreams and talk about them in their country clubs while the Hollywood crowd works harder so they can buy a Gulfstream. The aircraft's brand identity is so strong that, even if competitors build comparable aircraft, it takes those manufacturers a long time to build a similar market presence and image.

One advantage Gulfstream enjoys is that its products have been around for so long that costs have become predictable. DOCs run about $1763 per flight hr. The GIV is a rugged and reliable performer that holds its value.

Hudgins mentioned that Gulfstream is fond of the number 200. The company built 198 GIs, 258 GIIS, 205 GIIIs, 213 straight GIVs and 225 GIVSPs. If history is any indication, we can probably expect a new-generation GIV at some point. Lessons learned and technology incorporated on the GVSP program will likely find a way into the GIV production line. If there is a next-generation GIV, it will probably feature new avionics, along the lines of the GVSP—slated for certification in the 4th quarter of 2002—and a reduced requirement for in-cabin avionics racks. A new and improved GIV could benefit from the aerodynamic enhancements on the GVSP. Blended winglet technology on the ~~SV~~ would probably give additional range to the GIV. Other GVSP drag reduction improvements, including conformal antennas and changes to engine pylons, could offer reduction in overall drag.

For the corporation with $850

million in annual sales, a GIVSP is definitely an aircraft to consider. Gulfstream doesn't envision any end to the GIV production line and they'll probably still be building and selling GIVs 10 yrs from now. There is just such a demand for this great aircraft.

Clay Lacy, founder of Clay Lacy Aviation at VNY (Van Nuys CA), is a highly-experienced pilot who has been performing flightchecks and writing various editorials for Professional Pilot *since May 1997.* Pro Pilot *readers have voted Lacy most popular writer for the past 2 years.*