

FLYING

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.R66 Robinson



Approaches

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More details emerge about Robinson's intriguing turbine-powered five-seater.

BY ROBERT GOYER



IT WAS ONE OF THOSE THINGS THAT I KNEW I'D REMEMBER. I was a guest of Robinson Helicopter at a reception for customers and the press in a large, immaculate hangar at the company's factory in Torrance, California, when we all heard it, the unmistakable sound of a turbine helicopter approaching. It was, of course, none other than the Robinson R66 prototype coming in to land. Along with a hundred or so other guests, I hurried out the hangar door to the ramp edge and just watched as the pretty white ship came to a low hover and touched down.

The reception was one of Southern California-based Robinson Helicopter's activities in conjunction with Heli-Expo 2009 in Anaheim, and the eagerly anticipated turboshaft-powered five-seat R66 was one of the stars of the show.

At a press conference at the gathering Robinson founder and CEO Frank Robinson gave a progress report on the R66. The bad news is that it has taken longer for the company to get the helicopter ready for certification than had been expected. Certification and first deliveries are now slated for early 2010.

And the struggling world economy isn't helping matters, as Robinson, coming off a long series of record years, was seeing its orders, both domestic and international, decline sharply. The drop in business has resulted, not surprisingly, in a cut in production, from 17 to 12 helicopters a week, and layoffs. Once it's ready for market the R66, Frank Robinson said, would greatly help his company's fortunes.

Even before Robinson formally announced the R66 last year, it was no big secret that Frank Robinson had been thinking about building a turboshaft-powered ship for some time. After all, he'd already followed up on his ubiquitous two-place R22 with the even more popular four-seat R44, a model that has been developed extensively over the past many years, with packages for police surveillance and news gathering. The Raven II, announced and delivered in 2002, featured fuel injection and hydraulically boosted controls. Where do you go from the most popular helicopter in the world? You go to turbine power, of course.

But there were problems with such a plan. For starters, there wasn't, in Robinson's estimation, a suitable turboshaft engine for his needs. So Robinson asked Rolls-Royce to come up with a whole new model of engine for him, which it did: the RR300.

It's safe to say that without the RR300, there wouldn't have been an R66. The newly certified Rolls engine is an outgrowth of

its iconic 250 model that has over the years grown into a number of variants, some of which are capable of producing more than 700 shp. The 300 is a compact model, boasting good fuel efficiency (though not compared to a piston engine) and very light weight, just 176 pounds dry, about a third the weight of the piston six-cylinder Lycoming engine that powers the R44.

Early flight test results with the new Rolls engine show that it is giving Robinson everything they'd hoped for, including the fuel performance it was banking on, lots of power (225 hp continuously and 270 for takeoff) and relatively quiet operation. It's also incredibly light (176 pounds) and compact, two traits not shared by the big 400-plus-pound, six-cylinder Lycoming engine in the R44. The R66 will be certified to 14,000 feet, the same as the R44, because, Frank Robinson explained with some resignation, that's the ceiling the FAA will approve. But with its ability to produce rated power to high altitudes, the RR300 will surely give the R66 much improved hover ceilings and hot and high performance compared with the R44.

Frank Robinson explained the delay in the certification program by talking quite candidly about the differences between fixed-wing aircraft development and that of helicopters. Much of the flight envelope of fixed-wing aircraft, he said, can be explored using computerized flight simulation, whereas helicopters still need to be flown in the real world to test design changes. This phase involves designing, building and then flying new components, a painstaking, time consuming and hard to predict process. The good news is that, although it took longer than anticipated, the process worked, and Robinson was happy with the design results.

Robinson also announced that shortly before the show a second R66 had joined the flight test program. The company was also ready, he said, to turn the new model over to the FAA so it could begin certification flight testing. By the time of the show, Robinson pilots had put more than 70 hours on the first R66, including around 20 hours with the certified engine. The second ship, which was outfitted with a standard paint scheme and full interior, was just getting started in flight test. The second helicopter, Robinson said, was "very close" to what he expected the final configuration to be.

Robinson declined to address performance figures in much detail, saying that he'd wait until the FAA had a chance to fly the



The under-development Robinson R66 was the star of a reception for customers and the press at Robinson's factory in Torrance, California, during Heli-Expo 2009. Next to the turbine-powered helicopter on prominent display was the newly certified Rolls-Royce RR300 turboshaft engine, developed specifically for the R66.

helicopter first. Still, he's clearly pleased with the numbers the helicopter was putting up in company flight testing. In his remarks to reporters at Heli-Expo, Robinson said that the R66 should be about as fast or slightly faster than the R44 Raven II (117 knots cruise), which, he said, was a "pretty fast" helicopter to begin with, and he said the R66's climb performance should be "very good."

The R66, to no one's surprise, looks a lot like an R44. Indeed, with its two-blade main and tail rotors, T-bar cyclic and hydraulically boosted controls, the '66 shares much of its basic design with the piston-powered R44 Raven II. Which is to say that the R66 is a simple, elegant and efficient package, perhaps simple to a fault in some respects. It will feature electromechanical instruments, making it one of the only new-production aircraft we know of, along with the R44 and R22, to stick with old-school gauges. It also won't offer fadec engine controls, an option that many operators, especially flight schools, would love, as it takes the manual calculations out of overspeed calculations.

Like other Robinsons, the R66 will have overhaul limits on all of its components, a figure that Robinson expects to be set at 2,000 hours initially for both the airframe and engine, with that growing slightly as the fleet gains experience.

The construction of the new model, likewise, is typical Robinson. That is to say, it is built from a variety of materials, from advanced composites to good old sheet metal and chromoly steel, depending on what best fits the bill. Robinson manufactures nearly all of its machined and composite parts itself. The R66, scheduled to go into preliminary production next year and

into full production in 2011, will coexist nicely with the two-place R22 and the four-seat R44, both of which Robinson will continue to produce after R66 deliveries go into high gear.

In fact, Robinson expects the R44 Raven II to continue to be the company's bestselling helicopter, in part because of its price—just over \$400,000. Robinson has not yet officially named its price for the R66, though the founder said tongue-in-cheek that he expected it to cost between \$400,000, roughly the price of an R44, and \$1.2 million, the approximate price of the going-out-of-production Bell JetRanger. The actual price of the R66 is widely expected to be just under \$1 million.

And there's tremendous interest in the new model even with that price tag. Despite its relatively diminutive stature, the R66 will offer a great deal of utility, which is another one of the big advantages of turbine power. With room for a pilot plus four—the cabin is eight inches wider than the R44's—and a very good-sized baggage hold into which several sets of golf clubs will fit nicely—the R66 will be a helicopter that offers a lot of the kind of utility that one expects with turbine power.

The empty weight of the R66 is 1,270 pounds, giving it a useful load of right around 1,300 pounds. This is where the Rolls engine earns its keep, keeping weight down while offering a lot of power. Of course, it will burn more and heavier fuel, around 23 gph of jet-A, compared to around 15 gph of 100LL for the Lycoming IO-540 piston six-cylinder engine in the R44 Raven II. With full fuel (around 75 gallons for the R66 compared to just under 50 for the R44) the R66 will still have enough capacity for about five 160-pound occupants or, more realistically, four 200-pound adults, or three people and all their bags.

This kind of useful load will sell a lot of R66s for the company, something that wasn't always a given. Before the program got started, there were big questions about what the target market would be for such a helicopter, doubts that Frank Robinson shared. That much has changed. Today when asked what the market for his helicopter was going to be: sightseeing, training, personal use, news gathering or police work, Robinson simply replies, with his trademark wry smile, "Yes, all of those."

To learn more about the R66, visit robinsonhelicopter.com. And check out our web tour of Robinson's factory at flyingmag.com.