Combat, With Limits, Looms for Hybrid Aircraft



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The V-22 Osprey, a hybrid aircraft, will be deployed to Iraq this September. Critics say its limitations may make it vulnerable to attack.  Michael Temchine for The New York Times

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The Marine Corps said yesterday that the V-22 Osprey, a hybrid aircraft with a troubled past, will be sent to Iraq this September, where it will see combat for the first time.

But because of a checkered safety record in test flights, the V-22 will be kept on a short leash.

The Pentagon has placed so many restrictions on how it can be used in combat that the plane — which is able to drop troops into battle like a helicopter and then speed away from danger like an airplane — could have difficulty fulfilling the Marines’ longstanding mission for it.

In Iraq, the V-22 will begin to replace the Vietnam-era helicopters that are increasingly facing enemy fire. The limitations on the V-22, which cost $80 million apiece, mean it cannot evade enemy fire with the same maneuvers and sharp turns used by helicopter pilots.

As a result, the craft could be more vulnerable to attack, and may result in the Marines keeping it out of the thick of battle, using it instead for less dangerous tasks.

“They will plan their missions in Iraq to avoid it getting into areas where there are serious threats,” said Thomas Christie, the Pentagon’s director of operations, test and evaluation from 2001 to 2005, who is now retired. The V-22’s debut in combatends a remarkable 25-year struggle for the Marines to build a craft they could call their own.

In announcing the Iraq deployment yesterday, Gen. James T. Conway, the Marine Corps’ commandant, referred to those efforts as “a road marked by some setbacks, lots of sacrifices and the success of these Marines standing before you.”

The V-22 has been the Marines’ top priority — the Pentagon has spent $20 billion so far and has budgeted $54.6 billion for it. The money has bought a craft that is half-helicopter, half-airplane and whose speed, say the Marines, will save lives.

But the V-22 has also suffered some of the deadliest test crashes in Marine history. It has claimed 30 lives, 26 of them marines, in three test flight crashes. A fourth V-22 crashed, but there were no deaths then. Many more have been damaged in lesser incidents involving fires, stalled engines and software glitches.

Critics say the V-22’s unusual design can create deadly problems that the Marines have minimized in their single-minded pursuit of the craft.

“It’s like a bad poker hand, and the Marines have been investing in it for 20 years,” said Philip Coyle, the Pentagon’s top weapons tester from 1994 to 2001. “They might have been better if they invested in brand new helicopters.”

The plane’s most widely cited design problem is that one of its propellers can get caught in its own turbulence as it comes in for a landing, and that can cause the V-22 to roll over and head into the ground.

For that reason, V-22 pilots are trained to steer clear of their own turbulence by rules prohibiting them from making the quick maneuvers used by helicopters to evade enemy fire. Instead, the V-22 must land at speeds as slow as nine miles an hour and in a fairly straight line.

A 2005 Pentagon report said these limitations “may prove insufficient” in protecting the V-22 from ground fire. As a result, that Pentagon evaluation said the V-22 was suited only for low- and medium-threat environments, and is not “operationally effective” in high-threat environments.

Some critics say that in the heat of battle, V-22 pilots could forget these restrictions and move in ways that could bring the craft down.

“The V-22 cannot do radical evasive maneuvers” said Lee Gaillard, author of a report critical of the V-22, “Wonder Weapon or Widow Maker” for the Center for Defense Information, which studies weapons programs. “But that’s what it will need for combat.”

The Marines defend the V-22 by saying it provides a margin of safety a helicopter cannot because it can fly faster, farther and higher.

They say it can get to wounded troops quicker and speed them to medical care in what is called the “golden hour” when life can hang in the balance. Because the V-22 flies with a lower “acoustical signature,” it can enter a battlefield less noisily than a helicopter.

Officials add that the Osprey can do more evasive maneuvers than currently permitted — and further testing will prove that.

“If flies twice as fast as the CH-46 that it is replacing,” said Lt. Gen. John Castellaw, head of the Marine aviation program. “It carries three times the payload; it goes five times as far; it’s six times as survivable. So what you’re deploying is an asset that increases the combat capability of the Marines.”

“That’s what you want to do,” added General Castellaw. “Give them the best you can.”

Col. Mathew Mulhern, the Pentagon’s V-22 program officer, whose Patuxent River office has an “Osprey Country” sign, says marines cannot wait to get on board.

“Every marine who sees one, when they do, a light bulb comes on,” said Colonel Mulhern. “They say, ‘my God.’ ”

Each V-22 costs about three times the price of a modern helicopter and nearly the same as a fighter jet. The Marines will get 360 Ospreys, Air Force Special Forces will get 50 and there will be 48 for the Navy.

The program’s high cost and uncertain technology led Vice President Dick Cheney, when he was secretary of defense under President George H. W. Bush, to try four times to cancel the program.

But, from 1989 to 1992, Mr. Cheney was beaten back by Congress. Work on the project — the Boeing Company and Bell Helicopter Textron are the main contractors — is spread across 40 states and 2,000 subcontractors, giving the V-22 broad support. More than 100 members of Congress even formed a Tiltrotor Technology Coalition to protect it.

“We have proven conclusively that this is an extraordinarily fine craft,” said Robert Leder, a spokesman for the Bell-Boeing V-22 program. “It is a very safe craft and will be of tremendous service. ‘’

All new weapons have problems in testing. But critics say the V-22 is plagued with basic design problems.

Should the V-22 lose power, it can not “autorotate” like a helicopter and allow the updraft of air to rotate its propellers for a hard, but survivable, landing. Because of this, according to the 2005 Pentagon report, emergency V-22 landings without power at altitudes below 1,600 feet “are not likely to be survivable.”

“If you lose power on a V-22, you just burn and crash,” said one Pentagon official involved in testing the craft but who was not authorized to speak publicly. “There is no way to survive. ”

The cabin is not pressurized, even though the craft can fly at altitudes of 10,000 feet and above, where breathing is difficult and it is not climate-controlled.

Pentagon reports also say the V-22 is too cramped for the 24 marines it can carry. The marines are so packed into the windowless cabin that they can become airsick, their legs can grow numb and leaving the plane quickly is difficult.

There is no bathroom on board and marines have criticized the “piddle packs” they are to use as insufficient. And, there is no place on board to store them once they are full.

V-22 downdraft is so strong, and moves in so many directions that it can create “brownout” conditions, making it difficult for pilots to see and potentially knocking down marines on the ground.

As a result, when rope ladders are used, the V-22 must hover at higher altitudes, making marines more vulnerable to fire.

“Safety is a big issue,” wrote one V-22 crew chief, in a questionnaire filled out for the Pentagon’s 2005 operational evaluation. “If we had went down in the water we would have most likely lost at least 24 troops because of restricted egress. I felt like I was in a coffin.”

These are more than theoretical concerns. On April 8, 2000, 19 marines were killed in a training exercise when a V-22 descended too fast and crashed near Tucson. It was the third V-22 to crash — seven people were killed in two previous crashes.

In December 2000, four more marines, including the program’s most experienced pilot, were killed in a crash caused by a burst hydraulic line and software problems.

These accidents led to program delays to make design changes. But as tests resumed, so have the problems.

Three engine fires occurred recently because of problems related to hydraulic lines. In March 2006, a computer problem led an idling V-22 to suddenly take off on its own. It then slammed into the ground, breaking off its right wing. All 54 V-22’s were grounded for weeks in February because of a faulty computer chip.

In preparation for deployment, the Pentagon ran tests last year in the New Mexico desert, similar to the climate of Iraq. In January, the Pentagon wrote about frequent failures with various parts and systems. The reason: “Extended exposure to the desert operating environment.”

Because of these problems, Mr. Coyle, the former Pentagon weapons tester, predicted the Marines will use the V-22 to ferry troops from one relatively safe spot to another, like a flying truck.

“They don’t want to have a ‘Black Hawk down,’ ” he said. “That would kill the program. Of course, it was not designed to be a truck. It was designed to be used in combat.”

The Marines say the V-22 will prove the critics wrong.

“Ask all the naysayers how many hours they have flown,” said Colonel Mulhern, the V-22 program manger.

“They are just sitting around a desk and crunching numbers,” he added. “Go talk to the Marines. The V-22 has come of age. The first marine it saves makes it worth what we paid for it. And I have real confidence that the V-22 will do it.”

Fans include General Castellaw, a Vietnam helicopter pilot, who has flown the V-22.

“I came in at a high altitude and then did a tactical ingress,” said General Castellaw. “Yankin’ and bankin’ to avoid simulated fire, came in low, streaked into the zone. The aircraft is nimble, agile. You can yank and bank with the best of them.

“I believe absolutely that this is the most survivable craft for the Marine Corps’ most precious assets,” he added. “ If I did not believe that, I would not deploy it. I have absolute faith in the craft to do the mission.”