



# Bell Boeing Tiltrotor Team's Osprey Facts



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## Marines confident MV-22 ready for full-rate production

By Headquarters, US Marine Corps

Marine Corps officials last week expressed confidence that the MV-22 Osprey is ready for full-rate production, despite a recent Department of Defense report that found the tiltrotor aircraft operationally unsuitable as tested.

The Marine Corps cited 118 improvements designed to address concerns raised in the report by the Director of Operational Test and Evaluation (DOT&E). The changes helped the Osprey earn an endorsement Nov. 8 from the Commander of the Navy's Operational Test and Evaluation Force, who found the aircraft both operationally effective and suitable and recommended it for full fleet introduction.

In its own independent assessment, the DOT&E judged the MV-22 operationally effective but not operationally suitable, primarily due to concerns over the aircraft's reliability, maintainability, availability and interoperability.

Still, the Marine Corps is confident that numerous corrective actions incorporated into the aircraft production line during and after the test and evaluation period, which ended in July, will greatly improve the MV-22's reliability, maintainability and availability.

The DOT&E report concurred with the Marine Corps' long-standing assertion that the Osprey's speed, range, payload capacity and self-deployment capability will revolutionize the Corps' ability to conduct assault-support operations.

Further, the report found that live-fire testing conducted during operational evaluation successfully demonstrated the MV-22's survivability. The report also identified characteristics that improve aircrew situational awareness, reduce exposure to threats and enhance shipboard operations.

In addition to recognizing how the MV-22 compares favorably to the aging medium-lift aircraft it will replace—the



*The Marine Corps believes that the Osprey's speed, range, payload capacity and self-deployment capability will revolutionize the Corps' ability to conduct assault-support operations.*

CH-46E and CH-53D—the report made several recommendations, including further research into the aerial phenomenon known as vortex ring state and additional testing of the Osprey's shipboard compatibility.

In these areas, too, the Marine Corps points to efforts already undertaken.

Concern over vortex ring state, a potential danger to any rotorcraft, arose out of a mishap in April that killed 19 Marines. A subsequent investigation determined that a combination of human factors, including an excessive rate of descent, led to the accident. Continuing developmental and operational testing has confirmed that an MV-22 flown within its identified limits is not susceptible to vortex ring state.

To further reduce the risk associated with high rates of descent, the Deputy Commandant for Aviation, LtGen. Fred McCorkle, has asked the Naval Aviation Systems Command to pursue development of an early warning system that would alert air crew to the flight conditions that induce vortex ring state.

Operational evaluation also successfully demonstrated that the Osprey met or

exceeded all key performance parameters, including shipboard compatibility in the conduct of large-scale amphibious assault operations.

Most significantly, the MV-22 achieved twice the speed, five times the range and triple the payload capability of the CH-46E.

Such enhancements, according to the DOT&E report, "provide a major step ahead in tactical flexibility."

The next step for the Osprey program is full-rate production. A decision on whether to proceed is expected in December.

### OPEVAL Photo of the Week



Photo by Maureen Caldwell



The V-22 Full Flight Simulator is the first of 32 training devices that will be delivered to the Marines, Air Force and Navy over the next 14 years. The simulator will help decrease crew and aircraft attrition.

## Acquisition reform saves time, money

By Lt. Col. Ken Fancher  
USMC, V-22 Training

**M**aintainers and pilots of the V-22 Osprey will receive training on the aircraft faster *and* cheaper, thanks to the innovative acquisition reform methods of the V-22 Systems Training Simulation Team.

Successful delivery of the Full-Flight Simulator (FFS) at MCAS New River, N.C., marks the first time delivery of simulation assets were completed on schedule and under budget. The V-22 Systems Training Simulation Team will hold a ribbon cutting ceremony on Dec. 15 to commemorate the addition of the flight simulator to its V-22 training program. This is the first of 32 training devices that will be delivered to the Marines, Air Force and Navy over the next 14 years.

The simulation team made several drastic departures from the conventional ways of doing business. They used performance-based requirements and commercial technologies to maximize the operational capabilities of the V-22.

The V-22 Systems Training Simulation Team is an acquisition reform model that showcases the value of using a Cost as an Independent Variable (CAIV) mindset, the benefit of utilizing Commercial off the Shelf (COTS) products and the advantage of using a government and industry team

approach. Their efforts could significantly improve the war-fighting capabilities of the V-22 and decrease crew and aircraft attrition through combat losses and mishaps. These training systems represent the best capability offered in the commercial aviation venue and employ the full range of military capability required for effective war fighter training.

The team viewed the "C" in CAIV as more than just a focus on decreasing procurement costs. Achieving this level of simulation allowed the team to realize significant Life Cycle Cost (LCC) savings. This not only allows revolutionary advances in the way V-22 maintainers train, but it also significantly reduces the total ownership cost of the V-22.

V-22 simulation assets provide 62 percent of the initial pilot training needs (a 57 percent increase over the platform the V-22 replaces), and they represent a level of simulation technology that is among the finest in the Defense Department. The ability to use this level of simulation (129 hours per student of simulation training) generates approximately \$500,000 in operating and support savings per student. The Marine Corps will train more than 2,000 students over the next 20 years and generate LCC savings for the V-22 program that could approach \$1 billion.

The unprecedented relationship between Bell Boeing, Flight Safety International

and the government also contributed to the simulator's success. This "one team" relationship helped to integrate a COTS procurement approach that has resulted in the successful application of a Level "D" commercial simulator design. The design fully meets the demanding operational user requirements in an airline training venue.

The procurement process required the airframe manufacturer to produce all the software and systems integration relevant to the specific airframe. This provided a level of fidelity in the avionics and the aeroperformance model that has not been achieved in the military simulator environment. The flow of information between government and industry and the adoption of a "no secrets" attitude contributed to the reuse of existing software code, increased capability and reduced cost.

The success demonstrated by the V-22 Systems Training Simulation Team not only validates, but also institutionalizes the importance of using an Acquisition Reform (AR) mindset within the Defense Department acquisition community. A list of AR initiatives below were present throughout the simulation procurement process:

- Military Specification elimination and the delivery of a Statement of Objectives.
- Development of a true Performance Specification, making achievement of the training tasks the motivator, rather than an arbitrary definition of the methods to build a training system.
- Stringent use of CAIV considerations to establish financial thresholds that resulted in under-budget deliveries and significant LCC savings for the V-22.
- Use of Electronic Data Interchange via the Internet provided rapid exchange of critical aircraft data between the prime and subcontractors. This exchange also eliminated the need for paper deliverables.
- Implemented a communication plan to facilitate information flow.
- A model Integrated Product Team process that represented the highest levels of government and industry teamwork.
- Achievement of best value for the government.
- Successful integration of commercial technology into military systems.
- Placed total system performance responsibility with contractor.
- Addressed military requirements by exception and focused on building a device that met FAA Level D standards.

# Straight talk: Bacon, Amos field V-22 questions

*The following is an excerpt from a Nov. 30 press briefing with Mr. Kenneth H. Bacon, ASD PA and Marine Corps Brig. Gen. James F. Amos, deputy assistant commandant for Marine Corps Aviation. The complete transcript can be found at [www.defenselink.mil](http://www.defenselink.mil).*

**Q: Ken, regarding a somewhat critical Coyle report on the MV-22, does the SECDEF believe that the tilt rotor plane is ready for full-scale production and use by the Marine Corps in any situation?**

**Bacon:** Well, first of all, the Coyle report believes that the MV-22 is ready for production. And it says that. So I don't believe the secretary has been briefed on the Coyle report. I know that Mr. Coyle himself has not briefed him. I do also know that the commandant has kept the secretary fully informed about progress on the V-22 Osprey. As you recall, several years ago the secretary went down and saw the Osprey when it landed here next to the Pentagon and went aboard the Osprey with the commandant and some members of Congress. It's a program in which he's been very interested. And he shares the commandant's view that this is an exciting and important new development in Marine aviation and a very worthy successor to the CH-46 helicopter.

**Q: The Coyle report said that it found that it was—that the MV-22 as tested was, quote, “not operationally suitable because of reliability, maintainability, availability, human factors and interoperability issues.” That doesn't sound like a good thing. Can you explain why it's considered to be operationally effective, but not operationally suitable?**

**Bacon:** Well, first I have Brigadier General Amos from the Marine Corps here who will answer specific questions. But let me just say, based on my cursory review of the two-inch thick report—I know you've probably read it all, but I haven't—and a brief conversation with Mr. Coyle and a conversation with the commandant, General Jones, about this, my assessment of this is as follows: that the development of a new airplane is an evolutionary process. You never reach a point where you've achieved perfection with the plane. You are always looking for ways to improve its performance, its maintainability, its reliability and its safety. And that with any piece of technology, particularly a

dramatically new departure from past technology and its introduction into the force, there's a learning curve. And that learning curve continues throughout the life of the airplane.

I think that that's what's happened here. The Marines have already made a number of improvements. I think they've made over 100 improvements—nearly a 120 improvements in the plane since they first started producing it. Those improvements will continue. The new improvements will be made on top of the 120-odd improvements that have been made already.

**Q: A general policy DoD question. The report, which I read several times—two inches—leaves the impression that the O&S [operation and support] costs for this thing in the out years, the years beyond after you and the other Marines leave, is going to be pretty high, more of a burden than the Marines anticipate now. This building, for the last seven or eight years, has talked about how weapons programs must be both effective and cost effective in the out years to be purchased or to be approved. This report raises reasonable doubt that this airplane has O&S costs that may be astronomical right now that the Marines won't be able to pay. Can you address, I mean, the dichotomy here? OSD says one thing. This report applies quite another.**

**Bacon:** Well, I know what the report says, and I know the report makes comparisons between the V-22 and the CH-46 helicopter. To a certain extent, these comparisons overlook, I think, one central fact, which is the CH-46 helicopters cannot remain flying forever and they have to be replaced by something. As the report points out, the V-22 Osprey brings considerably greater combat capability to the Marine Corps than it's currently getting from the CH-46 helicopters, which have been in the force since 1964, I believe.

So they have to replace the helicopters with something. They've chosen a new technology. The report points out that the new technology does bring additional combat capability, and in some respects, in terms of combat survivability, it even exceeds the standards that were initially set for the V-22.

In terms of the cost of making the plane operate, the cost of keeping the plane operating, it does conclude that they could be lower. And the Marines are confident

that the costs will be lower, and that they will get lower as they begin to get this into the force and they begin working on the plane.

The question to be asked is whether the improvements will change this trajectory. The Marines are confident that it will. And I suppose the only way we're going to know this is to come back in a year or two or three, and look at the cost of maintaining the plane, of keeping it operational, and finding out if they have made the type of progress that they think they can make.

**Q: The report also focuses on another possible—potential problem with the V-22, and that is the susceptibility to vortex ring state, which was cited as a casual factor in the accident. Is there any indication that this aircraft is more susceptible to that aerodynamic phenomenon than any—because of its unique technology?**

**Amos:** No, there's absolutely — there is no concern that the airplane is more unforgiving in that environment. Every helicopter has the potential to experience that. I just flew the CH-46 last week, and in the briefing we talked about power settling, vortex ring state in the CH-46. So no, it's not any more susceptible. I will tell you that Lieutenant General McCorkle, who I think everybody in this room knows, who is a deputy commandant for Marine Aviation, has required NAVAIR [Naval Air Systems Command] to put a warning device in the cockpit that warns the pilot that he's approaching a regime that could be potentially—where he could be potentially susceptible to a vortex ring state. But it's a phenomena for all helicopters.

**Q: A layman reading this report, maybe just reading the—a cursory review of this report, and maybe remembering the accident in April might conclude that the V-22 is somehow a troubled program. What would you say to someone who had that impression?**

**Amos:** I don't agree that the V-22 is a troubled program. I think the V-22 is a maturing program right now. And I think it's probably, realistically, where it should be in its maturity. And I'd like to be able to come back in a year from now and be able to answer that question because I think you would be very satisfied with the answer that I gave you a year from now.

# MV-22 full-rate production decision on hold while more data sought

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By Linda DeFrance

United States Navy acquisition chief Lee Buchanan, expected to make a decision this week about whether to begin full-rate production of the MV-22 Osprey for the U.S. Marine Corps, will now wait until he has gathered more data, according to the Pentagon.

Rear Adm. Craig Quigley, Defense Dept. spokesman, said Buchanan met with program officials yesterday and "has asked that more data be provided to him and will reschedule - depending on the receipt of the data and if it is acceptable to him - for later this month." Quigley was unable to comment on the nature of the data Buchanan is seeking. Quigley didn't know if Defense Secretary William S. Cohen, who is currently travelling, had yet been briefed on the findings of the MV-22 operational test and evaluation (OT&E) report, prepared by Philip Coyle, DOD director of OT&E.

The report took issue with reliability and maintainability concerns about the aircraft as tested and found it to be "operationally effective but not operationally suitable" (DAILY, Dec. 1). However, program officials and the Pentagon have been quick to point out that the report did not recommend against going ahead with production.

"The Coyle report believes that the MV-22 is ready for production. And it says that," Pentagon spokesman Ken Bacon told reporters last week. Additionally, Pentagon sources would not characterize the request for more information by Buchanan as a delay. "It is part of the ongoing process," a DOD source told The DAILY. He said there was no specific date a Milestone III decision was due; therefore, there is no delay.

Chief of Naval Operations Adm. Vern Clark yesterday would not give specific comments on whether he believed the MV-22 was ready for production, but deferred to the office of research, development and acquisition.

"I don't make that judgment," Clark said at a Washington breakfast with reporters. Clark was confident that any issues raised

with the aircraft would be assessed by Buchanan before he makes his decision. He did say, however, that "Fundamentally my chance to review that and comment on it will be based upon what the proposed fixes are in those issues."

Brig. Gen. James F. Amos, deputy assistant commandant for Marine Corps aviation, has said the mission-capable rate of the aircraft climbed from 57% during the evaluation to 73.2% on nine aircraft as of Nov. 13. Amos, speaking to reporters during a briefing at the Pentagon last week, conceded that "the V-22 probably is high-maintenance at this point," but explained this is typical of any new airframe. "And why would that be? Because first of all, there is the real lack of experience in maintaining this," he said. "That airframe - those Marines that worked on those MV-22s when we went through operational evaluation saw it for the very first time."

Amos went on to say that he felt the report implied that the aircraft is intrinsically high-maintenance and will continue to be that way. "I think that's absolutely unrealistic," he said.

While Clark said he did not have detailed knowledge on specific shortcomings of the aircraft, he said he was quite familiar with aircraft reliability and maintenance issues. Referring to a recent meeting with naval aviation officials about the MV-22, Clark said, "It is amazing how numbers can get turned based upon the assumptions that can go into the calculations."

Clark pointed out that reliability and maintainability data in the Coyle report was being driven by the lack of access to a spare parts locker during test and evaluation. Parts apparently were not located with the test vehicles as they were going through T&E, which "induced delays into computations that would be altered if you were flying off a ship and the spare parts locker was right there," Clark said.

"The acquisition executive is going to have to take those issues into account and figure out if there is a fix required, what that fix needs to be, and then make a judgment," he added.

## V-22 EMD Flight Test Status as of December 3, 2000

A/C #	Total EMD Hours	Total EMD Flights
<b>7 Fort Worth CV Effort</b>	<b>490.4</b> 87	<b>241</b> 62
<b>8 Pax River</b>	<b>553.7</b>	<b>291</b>
<b>9 Edwards AFB CV Effort</b>	<b>338.7</b> 30	<b>152</b> 12
<b>10 Pax River</b>	<b>490.9</b>	<b>209</b>

<b>Totals</b>	<b>1873.7</b>	<b>893</b>
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### Key Performance Achievements

Total V-22 Flight Time with FSD, EMD and OPEVAL Flights	3863 hrs
Max. Airspeed Attained	342 kt
Max. Altitude Attained	25,000 ft
Max. Take-Off Gross Weight	60,500 lb
Max. Load Factor	3.9 Gs

## Have a great story idea?



We're looking for a few good V-22 stories to publish in the bi-weekly Osprey Facts. If you have a great idea for a story and it materializes into a published piece, you'll win an oversized "Attack of the Osprey" movie poster (shown above).

Please submit V-22 story ideas to Doug Holmes, editor, at [william.holmes@phl.boeing.com](mailto:william.holmes@phl.boeing.com).

Winners will be notified via e-mail.

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