

## **FAMILY OF MEDIUM TACTICAL VEHICLES (FMTV)**



### **Army ACAT IC Program**

Total Number of Systems:	83,170
Total Program Cost (TY\$):	\$18B
Average Unit Cost (TY\$):	\$167K
Full-rate production:	FY95

### **Prime Contractor**

Stewart & Stevenson

\* \$135.0K in FY96 constant dollars based on a weighted average of 16 models

### **SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020**

The Family of Medium Tactical Vehicles (FMTV) consists of fourteen variants of tactical wheeled vehicles based on a common truck cab, chassis, and internal components and two tactical trailers. The components are primarily non-developmental items integrated in rugged tactical configurations. The light-medium tactical vehicles are 2.5-ton payload capacity models consisting of cargo, airdrop cargo, and van variants. The medium tactical vehicles are 5-ton payload capacity models consisting of cargo (with and without material handling crane), long wheel base cargo (with and without material handling crane), airdrop cargo, tractor, wrecker, dump, airdrop dump, water tanker, and expandable van variants. The 11,437 trucks produced to date are designated the A0. The Army approved an anti-lock braking system, integrated data bus, and an Environmental Protection Agency 1999 compliant engine for production as model A1.

FMTV supports *Joint Vision 2020* objectives: *focused logistics* through the transport of troops, water and ammunition distribution, and general cargo transport; and *information superiority* by providing mobility of shelters that contain the new generation of automated systems, sophisticated management information systems, and communications links. FMTV also supports *precision engagement* as the prime mover for towed artillery and as the chassis for the High Mobility Artillery Rocket System (a Multiple Launch Rocket System derivative on a wheeled chassis).

## **BACKGROUND INFORMATION**

The acquisition strategy includes the LRIP award in October 1991 for 10,843 vehicles. There was a deferred production and separate R&D effort for companion trailers (2.5- and 5-ton) and a medium tactical vehicle expansible van. The Army made the full-rate production decision for the A0 trucks in August 1995. The Army made a production decision on September 9, 1999 for a minimum of an additional 1,552 vehicles. The second source program has undergone significant revision in FY00. It is now being called the FMTV Competitive Re-buy and is a two-phase program. The first phase is a competitive down-select in FY01. The second phase is a multi-year production contract to be awarded in FY02. The FUE for the production vehicles from the second source contractor is scheduled for FY05.

Operational testing was conducted at Ft. Bragg, NC, in three phases: *Phase I*, September-December 1993, was terminated for poor demonstrated reliability. *Phase II*, conducted June-November 1994, was interrupted and cancelled when the soldiers of the test unit deployed to Haiti. *Phase III*, conducted April-July 1995, was the basis of the DOT&E B-LRIP report.

While the system proved effective and suitable, there were certain safety deficiencies detailed in the report to Congress that needed to be corrected before fielding. The Army made the corrections and confirmed the fixes in an abbreviated operational assessment performed in December 1995.

While FMTV was found to be effective and suitable in operational testing in temperate zones, technical testing under arctic conditions uncovered starting and braking problems and seal leaks. These problems have been fixed and their solutions confirmed with the testing of an A1 wrecker and medium cargo truck in arctic conditions at Ft. Greely, AK, in early 1999.

In early 1998, there were several field incidents (subsequently replicated at Aberdeen Proving Ground) in which the front U-joint on the rear driveshaft of the 2.5-ton variants failed. This failure causes the driveshaft to whip around, severing air-brake lines (which, by design, locks the brakes). Investigation by the Army uncovered a previously unknown driveline resonance that occurs on paved roads at sustained speeds in excess of 40 miles per hour. The Army issued a Safety of Use Message to limit truck operations to 30 mph or less. The solution was a more robust flywheel housing design cast out of nodular iron and a less flexible driveshaft with a more sturdy U-joint design. During this past year, fielded A0 trucks were retrofitted with the power train solution and lifted the 30 mph restriction.

Production Verification Testing (PVT) of the A1 model truck in FY98-99 uncovered several additional problem areas, and new performance and reliability issues arose: leaf spring breaks, electromagnetic interference from the new engine electronic control module, and frame integrity. A new manufacturing process has been developed and tested to remove the cracking centers that lead to leaf spring breaks. The electronic interference has been found to not adversely affect electronic equipment carried on FMTVs. The frame rails on FMTVs manufactured starting in Program Year 3 (Vehicle 1553 and beyond) are being manufactured from higher strength steel without changing truck handling or load

carrying characteristics. On older trucks, the user has accepted the risk that the stresses needed to deform the frame are sufficiently infrequent to be tolerable.

The House Appropriations Committee's Survey and Investigation (HAC S&I) team visited Ft. Bragg in 1999, and received numerous complaints about FMTV dump truck capacity and performance and certain other human-engineering features of the FMTV. The PM instituted fixes to address the complaints and established a soldier feedback mechanism to both encourage soldier input and keep the soldiers informed of changes being made. The suspension system and bed of the dump truck are being strengthened to accommodate loads beyond five tons.

DOT&E approved the FMTV TEMP on July 1, 1999.

### **TEST & EVALUATION ACTIVITY**

OT&E activity in FY00 consisted of an evaluation of an A1 model Maintenance Demonstration and Interactive Electronic Technical Manual verification and user testing of the remaining variants in late FY00. Follow-on Production Testing (FPT) will begin in August 2000 (at Yuma Proving Ground) and November 2000 (at Aberdeen Proving Ground).

There was extensive developmental testing of the proposed fixes for the flywheel housing and driveshaft failures. The final designs were successfully tested and are being retrofitted worldwide. At this time, only two trucks out of the original 11,437 are left to be retrofitted once they are located. Other issues that arose out of PVT were also component tested and underwent successful modeling and simulation. Contractor system-level testing of springs and frames are scheduled to begin in September 2000. The FPT beginning in November 2000 will be the first government test at the system level.

### **TEST & EVALUATION ASSESSMENT**

The operational test of FMTV in 1995 was adequate to provide the information necessary to determine its operational effectiveness and suitability given the user defined mission profile. This mission profile for the truck models is defined to be 20 percent on primary roads, 50 percent on secondary roads, 15 percent on trails, and 15 percent on cross-country. The operational testing was carried out in as realistic an operational environment as could be achieved within the constraints of available test ranges, resources, and safety. The test fleet drove more than 200,000 miles. FMTV is operationally effective based upon the demonstrated fleet-wide probability of mission success of 0.96.

Overall, FMTV is operationally suitable as tested in 1995. The tested FMTV fleet demonstrated better than the required reliability and operational availability. Based on test results, the trucks required less maintenance than allowed.

The failure modes of the flywheel housing and driveshaft have not recurred and the leaf spring, electromagnetic interference, and frame integrity issues appear to have been resolved.

### **CONCLUSIONS, RECOMMENDATIONS AND LESSONS LEARNED**

Many of the HAC S&I findings, based on complaints from soldiers, were also observed during operational testing. The program office agreed to fix 54 complaints. Complaints regarded as "nuisance"

failures, not related to vehicle reliability, were not corrected. Such problems condition the soldiers' attitude towards and respect for his equipment. The perception that the vehicle has lots of problems will result in abuse and failure to properly care for equipment. Much more attention must be paid to soldier complaints during operational testing prior to deployment.