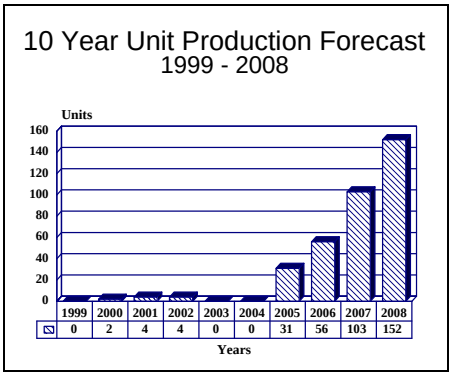
XM2001 Crusader 155 mm Self-Propelled Howitzer and XM2002 Crusader Resupply Vehicle - Archived 4/2000

Outlook

- The Crusader is the United States Army's designated follow-on to the M109A5/A6 with an associated high priority
- Technical problems related to the now-abandoned liquid propellant technology have delayed program
- Procurement objective is 824 units for complete system
- Increasing concern over cost of restructured program
- Bar graph to the right is for the XM2001 Crusader fire unit



Orientation

Description. A tracked 155 millimeter self-propelled artillery system including ammunition resupply vehicle

Sponsor. The development of the Crusader (formerly the Advanced Field Artillery System-Cannon) is being sponsored by the United States Department of Defense through the US Army; the present executive agency is the Armament Research and Development Center at Picatinny Arsenal, New Jersey.

Contractors. Although the definitive production contract has yet to be awarded, United Defense Limited Partnership/Armament Systems Division, Minneapolis, Minnesota, is the designated prime contractor for this enhanced self-propelled artillery system. Subcontractors include General Dynamics Land Systems Division, General Dynamics Defense Systems, Honeywell Defense Avionics, Perkins Engines Limited, Zahnrad-fabrik Renk, and Teledyne Continental Motors/Vehicle Systems.

Licensees. None

Status. The Crusader program is in the concept demonstration and validation phase of development. While the development of the previously favored XM300 regenerative liquid propellant cannon and XM47 propellant technology is continuing on a technology base level, it was decided in March 1996 to use the new XM297 cannon and its Modular Artillery Charge System on the Crusader. Several US Army agencies are pursuing these development programs. In May 1991, the then FMC Corporation was awarded a contract to fabricate the Advanced Technology Transition Demonstrator for the Advanced Field Artillery System-Cannon development program; this vehicle has been delivered and is undergoing tests with both the contractor and user. The design of the first prototype system is underway.

Total Produced. As of January 1, 1999, no definitive XM2001 Crusader systems had been manufactured. A single XM2002 ammunition resupply vehicle (albeit without the ammunition storage and handling

equipment) had been fabricated and was being used for automotive tests.

Application. Mobile medium-to-long-range artillery support for the field army.

Price Range. Knowledgeable sources tentatively estimate the unit price of the Advanced Field Artillery System-Cannon at $10.202 million in Fiscal 1999 dollars. In those same dollars, the XM2002 resupply vehicle unit price is $9.756 million.

Technical Data

Design Features. The Crusader is the first combat vehicle being developed for the Army's digitized battlefield of the 21st Century. As the restructured program is presently envisioned, the system will incorporate an advanced design conventional cannon, state-of-the-art computerized fire control, and other advanced electronic components. Ammunition upload and transfer from the XM2002 resupply vehicle as well as the loading in the XM2001 fire unit are to be fully automated. The vehicle is to incorporate drive by wire technology.

Crew. A main design criteria is a reduction in personnel required to operate the system. Integrated with the other advanced technologies desired for this system, a three-man crew in the XM2001 and a three-man crew in the XM2002 are specified.

Muzzle Brake. The XM297 cannon is fitted with an integrated pepper pot type muzzle brake.

Recoil System. The XM297 cannon uses a hydro-pneumatic (Schneider-type) modular design recoil system.

Breech Mechanism. While the details are unknown at this time, the breech assembly of the XM297 cannon is a multi-lug sliding type.

Ammunition. The Crusader is expected to be compatible with all United States/NATO standard 155 millimeter ammunition; this will include the latest technology rounds now in development. The Crusader will carry a total of 60 projectiles in two 30-round magazines and 63 propellant charges in two magazines. The XM2002 Crusader resupply vehicle will hold 130 rounds and XM231/XM232 modular charges.

Dimensions. At present, other than the planned use of a 56-caliber cannon, no detailed technical specifications regarding the proposed Crusader system's dimensions have been released. Some proposals are based on the M1 tank chassis, others on the M2/M3 Bradley fighting vehicle chassis, while still others on a totally new chassis.

Performance. No definitive performance data requirements have been released other than that the system be able to outrange the comparable threat systems and have a desired range of 50 kilometers (54,680 yards). A sustained firing rate of three to six rpm is desired, as is a burst rate of 12 to 16 rpm for five minutes. Further details appear below. Regarding automotive performance, a maximum speed on a metalled road is expected to be 67 kmh (41.61 mph) while the cross country speed is expected to be 48 kmh (29.81 mph).

Engine. Various engine options were proposed for both vehicles of the new Crusader self-propelled artillery system. These were a variety of engines ranging from the 8V-71T and VTA-903 diesels to the diesel (Cummins) and vehicular gas turbine (General Electric) contenders for the Advanced Integrated Propulsion System to other automotive gas turbines such as a derivative of the AGT 1500. The power ratings were equally diverse. A General Electric LV100 vehicular gas turbine mounted in the front of the vehicle powers the automotive test rig that was developed and tested in relation to this program.

In January 1995, United Defense announced that the Perkins Engines Limited Condor CV12 diesel engine had been selected for the Crusader vehicles. This 12-cylinder supercharged diesel engine, which powers the British Challenger and Challenger 2 tanks, is rated at 1,118.6 kW (1,500 hp) for the Crusader application. The Caterpillar firm will be manufacturing the engine under license and will be involved in the integration and product support of the Condor engine for the Crusader requirement.

Gearbox. The gearbox selected for the XM2001 and XM2002 Crusader system vehicles was announced along with the engine selection. The advanced design HMPT 1250-EC automatic unit supplied by General Dynamics Defense Systems will be used in the Crusader.

Subsequently, developmental problems in the HMPT 1250-EC program prompted a review of the selection decision. In late 1997, United Defense reviewed the options and in March 1998, officially sought alternative sources – Allison, Twin Disc and Renk. In July 1998, the Army received $5 million to test the Renk HSWL 295 automatic gearbox with five forward and three reverse gear ratios. As of early 1999, the Renk gearbox seems to be the preferred solution for the XM2001 and XM2002.

Suspension and Running Gear. An as yet unspecified externally mounted hydropneumatic suspension system will be used on the Crusader vehicles A lighter version of the T158 track, the T158LL, will be used.

Fire Control. While the system details have not yet been released, the Crusader will use an advanced computer-based system, which is a component of the US Army's digitization effort. The fully automated fire control system will include an integrated command and control component, an advanced navigation and position system, ballistic computer, and gun laying system. Fully embedded decision and training aids are to be incorporated into the system.

Variants/Upgrades

Variants. Not applicable at this time although the XM2002 ammunition resupply vehicle will be based on the chassis and automotive components of the XM2001 Crusader.

Modernization and Retrofit Overview. Not applicable at this time.

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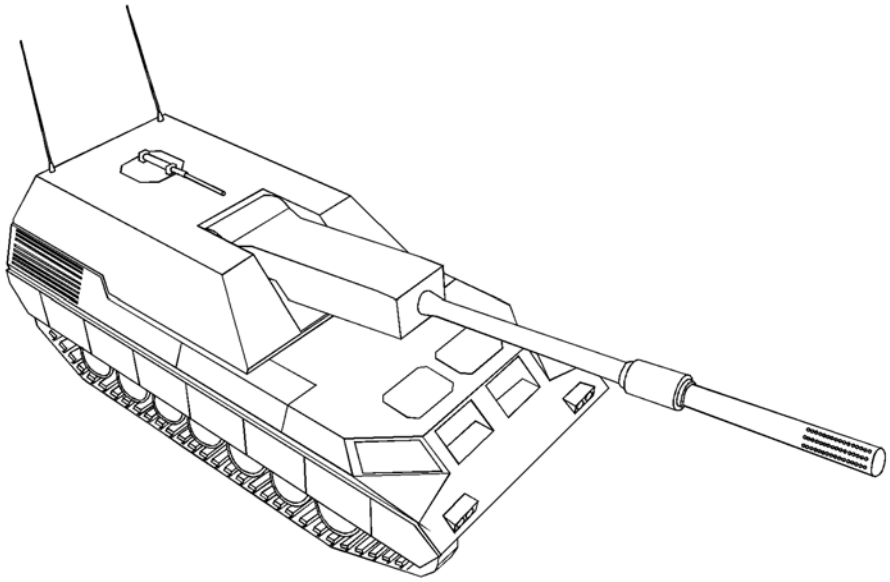
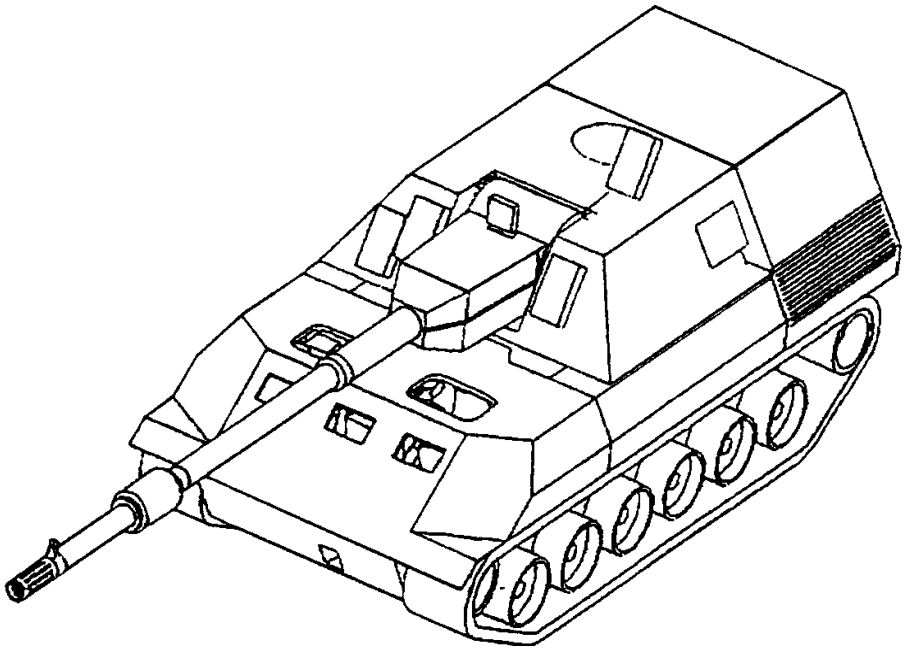
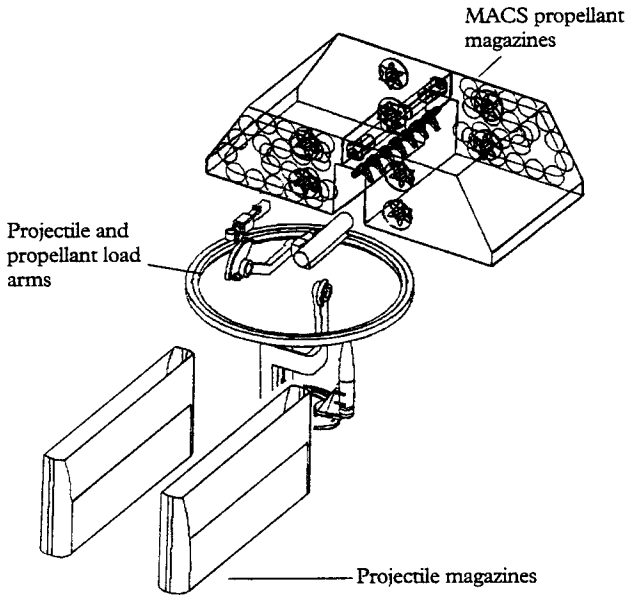


CRUSADER 155 mm Self-Propelled Howitzer

Source: US Army



Source: United Defense



Crusader Loading System

Source: U.S. Army