= Ground Combat Vehicle =

The Ground Combat Vehicle (GCV) was the US Army 's replacement program for armored fighting vehicles in Armored and Stryker brigade combat teams . The GCV was organized under the Follow On Incremental Capabilities Package of the BCT Modernization program . The first variant of the vehicle was to be prototyped in 2015 and fielded by 2017 . It replaced the canceled Future Combat Systems , manned ground vehicles program . The Ground Combat Vehicle program was cancelled in February 2014 .

= = Design = =

Specific design elements of the GCV were contracted out , though the Army designed the architecture and retained overall responsibility for synchronization . This contrasted with the former FCS manned ground vehicles program where contractors had more control over the design . The GCV was to be networked and offer improved survivability , while using the state @-@ of @-@ the @-@ art mobility and power management functions . The military released classified details of the FCS Manned Ground Vehicles program to interested contractors to be utilized in design proposals for the GCV . The GCV family was to be built around a common chassis .

= = = Network = = =

The GCV was to be operable with the current battle command control and communications suite but would gradually use a more state @-@ of @-@ the @-@ art networked integration system known as the BCT Network . It would provide exportable electrical power , and a battery charging capability for external hardware including vehicles and electronics from the BCT Soldier subsystems . The system would be capable of integration with unmanned systems and dismounted soldiers .

= = = Mobility = = =

The GCV must have been transportable by cargo aircraft , rail , and ship . The Army required it to meet the availability rates of the current Stryker . The Army did not limit the vehicle by the dimensions of the C @-@ 130 Hercules , which , in the past , constrained many designs . Air mobility would be provided by the more spacious C @-@ 17 Globemaster III . The GCV was to have good cross @-@ country mobility , with a baseline requirement of 30 mph off @-@ road speed . The GCV should have delivered higher sustainability levels and consume less fuel than the Bradley or other vehicles of similar weight and power . The military was accepting both tracked and wheeled designs . The operational maintenance cost requirement of the GCV was up to $ 200 per mile , compared to $ 168 per mile for the M2 Bradley .

= = = Offensive capabilities = = =

The type and caliber of the weapons were classified or open to interpretation by the industry . The IFV variant was notable for having a non @-@ lethal weapon requirement .

= = = Countermeasures = = =

The Army wanted the GCV to have a passive blast protection level equal to the MRAP and would utilize hit avoidance systems . The Army wanted to install an active protection system on the Ground Combat Vehicle . BAE tested the Artis LLC Iron Curtain and General Dynamics demonstrated a version of the Israeli Trophy system . By incorporating an APS , the GCV would only need 18 tons of ballistic armor protection , compared to 52 tons of armor required without it . Developers were considering modular armor technology , with the ability to add @-@ on and remove armor plates depending on threat levels and mission requirements .

= = Development = =

In June 2009 , a blue @-@ ribbon panel met in Washington , D.C. , to discuss requirements for the Ground Combat Vehicle . In October and November 2009 , more than 100 defense contractors turned up for two U.S. Army @-@ organized industry day events in Michigan to express interest in bidding on the vehicle . A review required for continuation was held and passed in February 2010 in Washington D.C. A request for proposals (RFP) was issued on February 25 , 2010 to which companies had 60 days to respond , but was extended an additional 25 days . A committee examined the schedule for the GCV to " shave a little time off " . For fiscal year 2011 , the U.S. Army wished to spend $ 934 million of the $ 2 @.@ 5 billion allocated for BCT Modernization to develop the GCV .

Up to three competitive contracts were to be awarded by early fall . A prototype development contract decision would have followed by 2013 . The Technology Development Phase (or Milestone A) would begin in the fourth quarter of Fiscal Year 2010 with the award of up to three vehicle contracts . This was to be followed by an Engineering & Manufacturing Development (EMD) phase and Low Rate Initial Production (LRIP) phase before full production could start .

Nine vehicles were evaluated in the Analysis of Alternatives (AOA) . The four primary vehicles included in the AOA were the M2A3 Bradley II , a modernized Stryker , an M2A3 Bradley variant used in Iraq , and a XM1230 Caiman Plus MRAP . The five secondary vehicles included two unnamed foreign @-@ made platforms , the M1126 Stryker Infantry Fighting Vehicle , the M1A2 SEP TUSK Abrams , and a modernized M1 Abrams . Vehicles included the AOA were determined to be inferior to the planned GCV .

On 25 August 2010 , the U.S. Army canceled the original RFP to revise the requirements . A new RFP was to be issued 60 days later . When Peter Chiarelli was asked if the Army was developing an alternative to the GCV , Chiarelli replied " We 're totally committed to GCV . " The National Commission on Fiscal Responsibility and Reform suggested deferring development of the GCV until after 2015 .

In August 2011 , technology development contracts were awarded to BAE Systems Land & Armaments for $ 449 @.@ 9 million and General Dynamics Land Systems for $ 439.7M.

= = = Budget concerns and proposed cuts = = =

In December 2012 , it was reported that the Army may need to cut $ 150 million from the GCV program in 2014 , with deeper cuts between $ 600 million- $ 700 million between 2014 and 2018 . This put the program , one of the Army 's highest priorities , at serious risk . With the drawdown of the War in Afghanistan and budgetary concerns , the expensive development of a new combat vehicle was not seen as feasible . BAE Systems and General Dynamics were each awarded engineering and manufacturing development (EMD) phase contracts in August 2011 . The EMD phase was to last 48 months for both contractors , but there were arguments for only one to proceed as a cost @-@ saving measure . This would present the problem of selecting a vehicle based on design outlines , rather than on real prototypes . Another suggestion was to lengthen the EMD period to allow for smaller contract awards over time . This might delay the operational deadline beyond the planned 2018 date . The underlying concern is the fact that the Army plans to spend 80 percent of its ground combat vehicle budget on GCV development from 2013 @-@ 2018 . With 1 @,@ 847 GCV Infantry Fighting Vehicles expected to be acquired , they would make up only 10 percent of the Army combat vehicle fleet . Redirected funds could be shifted to modernization efforts for the combat @-@ proven Stryker , M1 Abrams , and Bradley families of vehicles .

= = = Revision = = =

The GCV acquisition strategy was revised on 17 January 2013 to further reduce risk and maintain affordability of the program . The revision extended the technology development phase by six

months to give industry more time to refine vehicle designs . Milestone B would occur in 2014 , with the selection of a single vendor for the engineering and manufacturing development (EMD) and production phases of the program . This would initiate critical design and testing activities in anticipation of vehicle production . Budgetary pressures caused the reduction of number of vendors to be selected from two to one .

= = = CBO report = = =

On 2 April 2013 , the Congressional Budget Office (CBO) issued a report on the progress of the GCV program . The report questioned the program , estimated to cost $ 28 billion from 2014 ? 2030 , with the possibility of alternate vehicle options . While none met overall Army goals desired in the GCV , they offer advantages in being less costly and delayed . Planned GCV prototypes were heavy , weighing up to 84 tons , to be better protected and seat a 9 @-@ man squad . Officials said that a vehicle of that size would not be well suited to operations faced in Iraq or Afghanistan . Alternate vehicles would be cheaper and more maneuverable in urban settings . The CBO report analyzed four alternative options :

Purchase the Namer APC ? Seats 9 soldiers with combat survival rates expected slightly higher than the GCV , and costs $ 9 billion less . The Namer has less ability to destroy other enemy vehicles and is less mobile . Production would be conducted in part domestically , but fielding would require collaboration with foreign companies and governments .

Upgrade the Bradley IFV ? An upgraded Bradley would be more lethal than the GCV against enemy forces and would probably survive combat at about the same rates as would the GCV , saving $ 19 @.@ 8 billion . Upgrading the Bradley would make it " significantly more capable " than the GCV . The Bradley still only carries a 7 @-@ man squad and has less mobility .

Purchase the Puma (IFV) ? More lethal than the GCV , combat survival and protection at better rates , and just as mobile . Purchasing the Puma would save $ 14 @.@ 8 billion and was considered the most capable of the vehicles . Puma IFVs only carry six infantrymen , which would require five vehicles to replace every four Bradleys . Development and production would require collaboration with foreign companies and governments .

Cancel the Ground Combat Vehicle ? If the Army reconditioned its current Bradley instead of replacing them , the current capability of the IFV fleet could be maintained through 2030 . The Army could continue to investigate ways to improve the current Bradleys , but it would not field any new or improved vehicles . The $ 24 billion saved in funding could be used on other programs .

General Dynamics and BAE Systems , who received contracts in the Ground Combat Vehicle program , criticized the CBO report , saying they used the wrong vehicle in its analysis . Officials from both companies said they used the wrong notional model of the GCV that did not account for the change in requirements made by the Army or the advancements made in the technology development phase of the program . They also criticized the comparisons of the other vehicles . The report factored cost , survivability , mobility , and lethality , ranking the GCV 's capabilities as lower than all others . The Army 's response was that none of the vehicles meet the requirements to replace the Bradley . An Army test of currently fielded vehicles in 2012 revealed that some met critical GCV requirements , but none met enough without needing significant redesign . They also note that lethality was judged with a 25 mm cannon for analysis , before the Army planned to mount a 30 mm cannon . The CBO report did give credit to cost , assuming the Army 's goal of $ 13 million per vehicle . However , Pentagon cost assessments estimated the price at $ 16 ? $ 17 million per vehicle .

= = = Funding cut and prioritization = = =

On 29 July 2013 , Army Chief of Staff General Ray Odierno warned that the Ground Combat Vehicle program might be delayed or possibly even cancelled because of the sequestration budget cuts . Although he specifically said it could be delayed , he did not rule out the possibility of cancellation . The GCV was high @-@ priority for the Army to give better protection than the M2

Bradley , but because of the sequester cuts everything was being considered . On 1 August 2013 , Defense Secretary Chuck Hagel outlined two basic results if the effects of sequestration continued : modernization programs like the GCV would be cut to maintain troop levels , or high @-@ end capability efforts like the GCV would be preserved to continue modernization and keep equipment technologically advanced with troop levels being cut . Odierno was committed to balancing soldiers , readiness , and modernization , and was intent on the need for the Ground Combat Vehicle . Suggested alternative options , such as further upgrading the Bradley and buying currently available infantry fighting vehicles like the German Puma , were recommended as cost @-@ saving measures . Army leaders said the Puma 's low troop @-@ carrying capacity would require buying five vehicles to replace every four Bradleys , and that upgrading the Bradley would essentially be engineering a new vehicle . While these options would offer no improvement over the fleet 's current capability , not pursuing the GCV would allow the money to be spent elsewhere .

Some reports suggested that the Armored Multi @-@ Purpose Vehicle program to replace the M113 family of vehicles was being favored over the GCV program . While procurement of the AMPV fleet would cost over $ 5 billion , the Government Accountability Office estimated the GCV fleet would cost $ 37 billion . In April 2013 , the Congressional Budget Office said the AMPV would be a better buy because analysts had asserted that the vehicles the GCV was slated to replace should not be first . The GCV would replace 61 M2 Bradley IFVs per armored combat brigade , making up 18 percent of the 346 armored combat vehicles in each armored brigade . A 24 September 2013 Congressional Research Service report suggested that given budgetary constraints , the GCV program may be unrealistic , and that one potential discussion could focus on a decision by the Army to replace the GCV with the AMPV as their number one ground combat vehicle acquisition priority .

Army leaders say having a large ground army is still necessary for deterrence and " regime change " operations . They also realize that their equipment will be mostly modernized versions of current equipment for the rest of the decade . Technologies from the GCV program are being explored , although development and procurement of a vehicle is not . By mid @-@ November 2013 , both BAE and General Dynamics designs had passed Preliminary Design Reviews (PDR) , but neither company had commenced building prototypes . The Army was increasingly willing to slow down the GCV program or push it back from EMD to research and development . While the Army had said previously that it was their highest priority acquisition program , they had since shifted their main modernization priority to an integrated electronic command network . Short @-@ term incremental upgrades will be applied to existing weapons systems to keep them from becoming obsolete , and advanced technologies available in the future will be used to build entirely new systems when funding is restored .

On 15 January 2014 , a spending bill passed by the House appropriated $ 100 million for the GCV program , even though the Army had requested $ 592 million for the program for FY 2014 . The Army planned to spend 80 percent of its ground vehicle modernization budget on the GCV over the next 5 years , with costs ranging from $ 29- $ 34 billion depending on overruns and setbacks . Several options were being considered to make the program more affordable , including reducing the squad size from their optimum goal of nine men and using new emerging , and undeveloped , technologies to reduce the weight of the vehicle to 30 tons for operations in urban environments . The two contractors were to run out of money for development of their prototype vehicles by June 2014 unless the Army funded the rest of the technology development phase . The Pentagon and Army tried to find ways to continue the program , without actually starting vehicle production , through new technologies like advanced fire control systems and hybrid engines . Prematurely ending the GCV program before the start of the EMD phase to select one vendor would result in owing money to the contractors for cancelling the contract . The Army could complete the technology development phase and conduct the milestone decision in June , then say they wouldn 't move on to the next phase of the program . Although the Army wanted 1 @,@ 894 Ground Combat Vehicles with a target price of $ 9 ? 10 @.@ 5 million per unit , the Pentagon 's Office of Cost Assessment and Program Evaluation estimated a unit cost of up to $ 17 million . The 83 @-@ percent cut in funding essentially scaled back the GCV program to a research effort . The program

had declined in support over the past months with the Army determining that the desired vehicle was no longer feasible in the near term due to budget reductions , suspicion from the contractors that the program would not move past technology development , and Congress 's believing it would not succeed . The Army could have tried to save the GCV by delaying it , or could reset its modernization priorities with more emphasis on the AMPV program to replace the outdated M113 .

In a speech on 23 January 2014 , General Ray Odierno confirmed that the Ground Combat Vehicle program was being put on hold due to budget difficulties . He said that the Army needed a new IFV but that they could not afford one at the time . Odierno said that he was pleased with the requirements for the vehicle and that progress and development with the contractors was good . " Leap @-@ ahead technologies " that make the vehicle light and mobile while still being protected against RPGs and roadside bombs are still desired . In the past decade , mobility was traded for protection , but Army war games have caused the service to decide it will need small , mobile formations to be deployed quickly in the future . Recent conflicts have shown the need for expeditionary forces to be transported quickly to remote areas in small packages with as little support as possible . Weight estimates of 70 tons for the GCV IFV did not make it easily deployable . The Army may direct some funds for technology development so it can start another program within " three to four years . " Science and technology investments are to be made to address the size and weight of armored ground vehicles . The Army reviewed the components of the GCV IFV to find areas to save weight . Reducing the weight of the vehicle would allow it to fit into the Army 's expeditionary view by making it easier and cheaper to transport greater numbers of them across the world .

= = Termination = =

The Pentagon FY 2015 budget proposal unveiled on 24 February 2014 cancelled the GCV program . Army acquisition executive Heidi Shyu said that criticism of the program was " unfortunate " and cancelling it had nothing to do with vehicle performance . She said the program had been doing " remarkably well " and wasn 't having technical issues , and that the contracts were being executed well . The decision to cancel development was based entirely on budget calculations , with no possible way to come up with funds no matter how many other areas were reduced . Money will be redistributed to engineering change proposals (ECP) on existing platforms until budget difficulties pass to allow investment in next @-@ generation capabilities in about seven years .

The decision had to be made to either exclusively fund the GCV or ECPs , so upgrades were chosen for the Bradley , Abrams , Stryker , and M109 Paladin fleets to have them more combat @-@ capable in the near @-@ term , should they be needed for an international situation . Vehicles like the Bradley and Abrams have been upgraded since the 1980s with new armor , sensors , and other gear that have maxed out the platforms for further horsepower and electrical advances , so the requirement for an entirely new ground combat vehicle built from the outset from lessons learned in combat from the previous decade remains . The Army 's own budget proposal unveiled on March 4 discontinued the program , and instead funds were shifted to the AMPV program as the main vehicle priority and to improving the Bradley IFV in the interim until more resources become available . Incremental improvements will be made to current vehicle fleets to improve protection and networking abilities . $ 131 million will be directed into science and technology to look at the feasibility of future combat vehicle technologies , and Secretary Hagel has directed the Army , as well as the Marine Corps , to deliver " realistic " visions for vehicle modernization by the end of FY 2014 .

The cancellation of the GCV is the second time in 15 years an Army program to replace the Bradley has failed . FCS ran from 1999 to 2009 , with the Manned Ground Vehicles portion for replacing several armored vehicle classes costing " hundreds of millions " of dollars out of $ 20 billion total . From 2010 to 2014 , the Army spent over $ 1 billion on the GCV . Although there was criticism that vehicle weight could not be kept at a reasonable level while meeting its size , weight , and power requirements , the Army maintains the official reason for the cancellation was budgetary pressures . BAE Systems and General Dynamics will each receive $ 50 million in FY 2015 to continue

technology development . The next follow @-@ up IFV development program is currently named the Future Fighting Vehicle (FFV) .

= = = Continued technology development = = =

On 18 July 2014 , BAE and General Dynamics were awarded $ 7 @.@ 9 million study contracts for technical , cost , and risk assessments to salvage subsystems and other technologies created under the GCV for use in the FFV system . General Dynamics will utilize the GCV integrated propulsion and mobility subsystems Automotive Test Rig (ATR) , and the conventional drive integrated propulsion subsystem , while BAE will utilize the GCV TD phase integrated hybrid @-@ electric propulsion and mobility subsystems ATR and the hybrid @-@ electric integrated propulsion subsystem (Hotbuck) .

= = Variants = =

The Army was using an incremental approach to combat vehicle modernization , centered on the Ground Combat Vehicle . The deployment was to be synchronized with upgrades , reset , and divestiture of existing vehicles . Vehicles displaced by the IFV may then replace selected M113 family of vehicles such as command and control , medical evacuation , and mortar carrier , allowing the Army to begin divestiture of the M113 family of vehicles . Upgrades to existing Bradley and Stryker vehicles may have been considered as risk mitigation based on the rate at which the GCV was introduced . Although upgraded , the Bradley and Stryker would also be replaced in the midterm .

= = = Infantry Fighting Vehicle = = =

The Infantry Fighting Vehicle superseded the previous infantry carrier replacement effort , the XM1206 Infantry Carrier Vehicle of the FCS MGV program . It was the U.S. Army 's intention that the IFV replace the M113 APC by 2018 , the M2 Bradley later , and the Stryker ICV in the midterm . The IFV was to hold a crew of three and a squad of nine .