February 11, 2009

Honorable Neil Abercrombie
Chairman
Subcommittee on Air and Land Forces
Committee on Armed Services
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

At your request, the Congressional Budget Office (CBO) has analyzed the Army's
plans for equipping its forces with networks for exchanging information using wireless
communications systems. The enclosed report describes the content of the Army's
wireless communications programs and how that content has changed during the past
several years. It also examines the past and projected costs of the Army's wireless pro-
grams and the extent to which the Army's plans for one of the most expensive of those
programs—the Joint Tactical Radio System—are consistent with the service's plans
for equipping its future forces.

If you would like further details, we would be pleased to provide them. CBO's
point of contact for this assessment is J. Michael Gilmore, who can be reached at
(202) 226-2900.

Sincerely,

Douglas W. Elmendorf
Director

Honorable Neil Abercrombie
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Enclosure

cc: Honorable Roscoe Bartlett
Ranking Member
Subcommittee on Air and Land Forces
House Armed Services Committee

Honorable Ike Skelton
Chairman
House Armed Services Committee

Honorable John M. McHugh
Ranking Member
House Armed Services Committee

Honorable Carl Levin
Chairman
Senate Armed Services Committee

Honorable John McCain
Ranking Member
Senate Armed Services Committee

Honorable John M. Spratt, Jr.
Chairman
House Budget Committee

Honorable Paul Ryan
Ranking Member
House Budget Committee

Honorable Kent Conrad
Chairman
Senate Budget Committee

Honorable Judd Gregg
Ranking Member
Senate Budget Committee

The Army's Wireless Communications Programs

The Army's plans for operating its forces rely on the ability of those forces to rapidly process and exchange large amounts of information during battle. The availability of new, high-capacity radios purchased by the Army under a number of wireless communications programs is key to the service's achieving that capability. (Capacity refers to the rate at which a radio can transmit and receive data measured in bits per second.)

The Army divides its wireless communications efforts into two sets: tactical programs and strategic programs. Tactical programs enable Army units in the field to communicate among themselves when deployed to conduct a particular military operation. For the most part, strategic programs provide Army units with long-range communications capabilities using satellites. In particular, strategic programs enable units in the field to communicate with higher headquarters (above the division and brigade headquarters level, for example) located outside the vicinity of the units' operations; they also enable communications among higher headquarters and other Army facilities and installations.

In this report, the Congressional Budget Office (CBO) summarizes the content of the Army's wireless communications programs and how that content has changed during the past several years. CBO also examines the past and projected costs of those programs and the extent to which the Army's plans for one of the most expensive of its tactical wireless programs—the Joint Tactical Radio System—are consistent with the service's plans for equipping its future forces.

The Army's Tactical Wireless Programs

The Army's tactical wireless programs develop and purchase radio transmitters and receivers that enable Army units to communicate among themselves, with the forces of the other military services, and with headquarters when deployed to a theater of operations. Those programs are described below.

Warfighter Information Network-Tactical

The Warfighter Information Network-Tactical (WIN-T) program allows Army headquarters units operating in the field, such as division and brigade headquarters, to communicate among themselves by voice and by exchanging data and images. (WIN-T will not be fielded to companies, platoons, or individual soldiers.) In effect, it provides Army units with a version of the Internet implemented using equipment mounted in trucks. The program was structured originally to give that capability to Army units when they were either on the move or at rest. As a result of cost overruns and schedule slippage, the Army restructured WIN-T in June 2007 into four so-called increments, providing progressively greater capabilities, as follows:

■ **WIN-T Increment 1** incorporates the former, separate Joint Network Node (JNN) program and improvements to the equipment procured under JNN. Through 2008, JNN bought existing, off-the-shelf equipment providing limited Internet-like communications capability to Army units operating in Iraq and Afghanistan when they were not on the move. From 2004 to 2007, the Army bought about 1,100 JNN equipment sets at a total cost of about $2 billion, funding the purchase

primarily with supplemental appropriations. (All funding discussed in this report is in 2008 dollars of budget authority; the amounts are derived from data provided in the Department of Defense's [DoD's] Selected Acquisition Reports and other budget justification material provided to the Congress by DoD.)

■ **WIN-T Increment 2** will extend a subset of the Internet-like capabilities provided by JNN to Army units on the move. Beginning in 2009, the Army plans to purchase 1,837 Increment 2 equipment sets at a total cost of more than $3 billion.

■ **WIN-T Increment 3** will provide the full set of on-the-move Internet communications capabilities sought by the Army for its headquarters units under the original WIN-T program, before it was restructured. The Army needs the full set of capabilities to support units equipped with the Future Combat Systems (FCS), which it currently plans to begin fielding in 2015.[1] The Army is still defining the content and estimating the costs and schedule of WIN-T Increment 3, so CBO cannot calculate definitively the costs for the program. Nonetheless, executing WIN-T Increment 3 is likely to require budgetary resources similar to those the Army had estimated for the original WIN-T program, which had the same goal now assigned to WIN-T Increment 3. In developing its budgetary projections, CBO includes the Army's cost estimates for the original WIN-T program.

■ **WIN-T Increment 4** will enable Army headquarters units on the move to communicate over long distances using satellites. CBO has no information regarding the potential costs or schedule of this increment.

Bridge to Future Networks

Before 2008, the Bridge to Future Networks program incorporated both the Army Common User System Modification (ACUS Mod) program and the Joint Network Node. The ACUS Mod program procured and fielded upgrades to existing communications systems used by Army headquarters units. The Army has now moved its management of those kinds of capabilities to WIN-T Increment 1.

Joint Tactical Radio System

All four military services are participating in the Joint Tactical Radio System (JTRS) program, although at different funding levels. The program's goal is to produce a family of software-programmable radios that can communicate with one another and with the military's existing, or "legacy," radios. Software-programmable radios use the speed and computational power of modern microprocessors to perform functions

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1. The FCS program is the Army's principal system for modernizing its forces. The Army initiated that program to develop a new generation of combat vehicles that would be as lethal and survivable as the heavy weapons it now fields but that would weigh much less, be easier to transport, and require far less logistical support. The elements of the FCS program and the structure of FCS-equipped units in the Army are described in Congressional Budget Office, *The Army's Future Combat Systems Program and Alternatives* (August 2006).

Table 1.

Subprograms of the JTRS and the Army's Planned Purchases

Subprogram	Application or Product	Number of Radios	Unit Cost[a] (2008 dollars)
Ground Mobile Radio	Radios for ground vehicles	86,209	172,000
Multifunctional Information Distribution System	Radios for manned fixed-wing aircraft	304	258,000
Airborne Maritime Fixed	Radios for manned rotary and fixed-wing aircraft, ground installations, ships, and submarines	5,845	N.A.
Handheld, Manpack, Small Form Factor	Handheld and manpack radios and small radios for use in sensors	74,512	22,000
Network Enterprise Domain	Software for use on all radios developed under the Joint Tactical Radio System program	n.a.	n.a.

Source: Congressional Budget Office calculations based on data from the Department of Defense.

Notes: Data are consistent with the Army's plans in the Future Years Defense Program for fiscal year 2009.

   JTRS = Joint Tactical Radio System; N.A. = not available; n.a. = not applicable.

a.   Unit costs are calculated by dividing total funding planned for procurement, including funding for all engineering and other support activities, by the total number of radios to be purchased.

such as signal demodulation (that is, extracting information from a radio signal) using software rather than hardware. Such radios can be more easily upgraded because making the upgrades does not necessarily require changing the radio's internal hardware. JTRS is composed of several subprograms that are developing radios—and the software that operates them—for use in different applications and on different types of weapon systems (see Table 1).

The Department of Defense has encountered a number of problems in developing the JTRS ground mobile radio (GMR) and the handheld, manpack, small form factor (HMS) radio. The agency issued stop-work orders on contracts for those systems in 2005 and, in 2006, restructured the entire JTRS program and revised the associated contracts to incorporate a reduction in the capability of the radios to be purchased. That decision was made to lower costs and because DoD realized that not all of the originally planned capabilities were technically feasible. Despite those modifications, cost estimates for the GMRs have increased, and its production has been delayed from 2005 to 2009.

Table 2.

Reductions in Planned Purchases of the JTRS Between December 2004 and 2007

Service	Ground Mobile Radio			Handheld, Manpack, Small Form Factor Radio		
	Planned Purchases		Percentage Reduction	Planned Purchases		Percentage Reduction
	December 2004	December 2007		December 2006	December 2007	
Army	106,512	86,209	19	221,029	74,512	66
Navy	n.a.	n.a.	n.a.	5,250	1,477	72
Marine Corps	2,347	210	91	27,800	8,882	68
Air Force	811	93	89	22,272	10,680	52
Special Operations Command	n.a.	n.a.	n.a.	52,163	0	100
Total	**109,670**	**86,512**	**21**	**328,514**	**95,551**	**71**

Source: Congressional Budget Office calculations based on data from the Department of Defense.

Notes: The dates shown are for the prior and most recent changes to planned quantities of each radio to be purchased.

JTRS = Joint Tactical Radio System; n.a. = not applicable.

Because of the cost increases, technical problems, and delays, some of the military services have reduced their plans for purchasing the GMRs and HMS radios. Between December 2004 and December 2007, total planned purchases of GMRs declined by 21 percent; between December 2006 and December 2007, total planned purchases of the HMS radios declined by 71 percent (see Table 2). The Marine Corps and Air Force have substantially reduced the number of GMRs that they will purchase, and the Special Operations Command is no longer participating in the HMS program.

The Army, however, is continuing its plans to procure the radios. According to DoD's Selected Acquisition Reports submitted in 2008, the Army will provide about 80 percent of the funding for JTRS and will purchase more than 95 percent of the radios produced under the program through 2026 (see the top panel of Figure 1).[2] More than 90 percent of the Army's investment in JTRS will be used to purchase the GMRs and HMS radios (see the bottom panel of Figure 1). Over the 2016–2024 period, when the Army plans to purchase almost 9,000 GMRs each year, the service's budget for JTRS will average $1.4 billion annually.

Single-Channel Ground and Airborne Radio System
This system, known as SINCGARS, consists of a family of single-channel, low-bandwidth radios that provide voice and data capabilities for a variety of applications, including use on aircraft and ground vehicles. Production of SINCGARS for use on ground vehicles began in December 1983. About half of the more than 581,000 SINCGARS radios that the Army now plans to field have been purchased since Operation Iraqi Freedom began in 2003 (see Figure 2), including about 50,000 radios purchased in 2008 (the majority using supplemental appropriations at a unit cost of about $11,000) and 5,300 radios to be purchased in 2009.[3]

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2.   In the near term, however, most of the funding for JTRS will be budgeted by the Navy because of a decision DoD made to consolidate funding, beginning in 2007, for developing JTRS hardware and software in each budget year within Navy accounts.
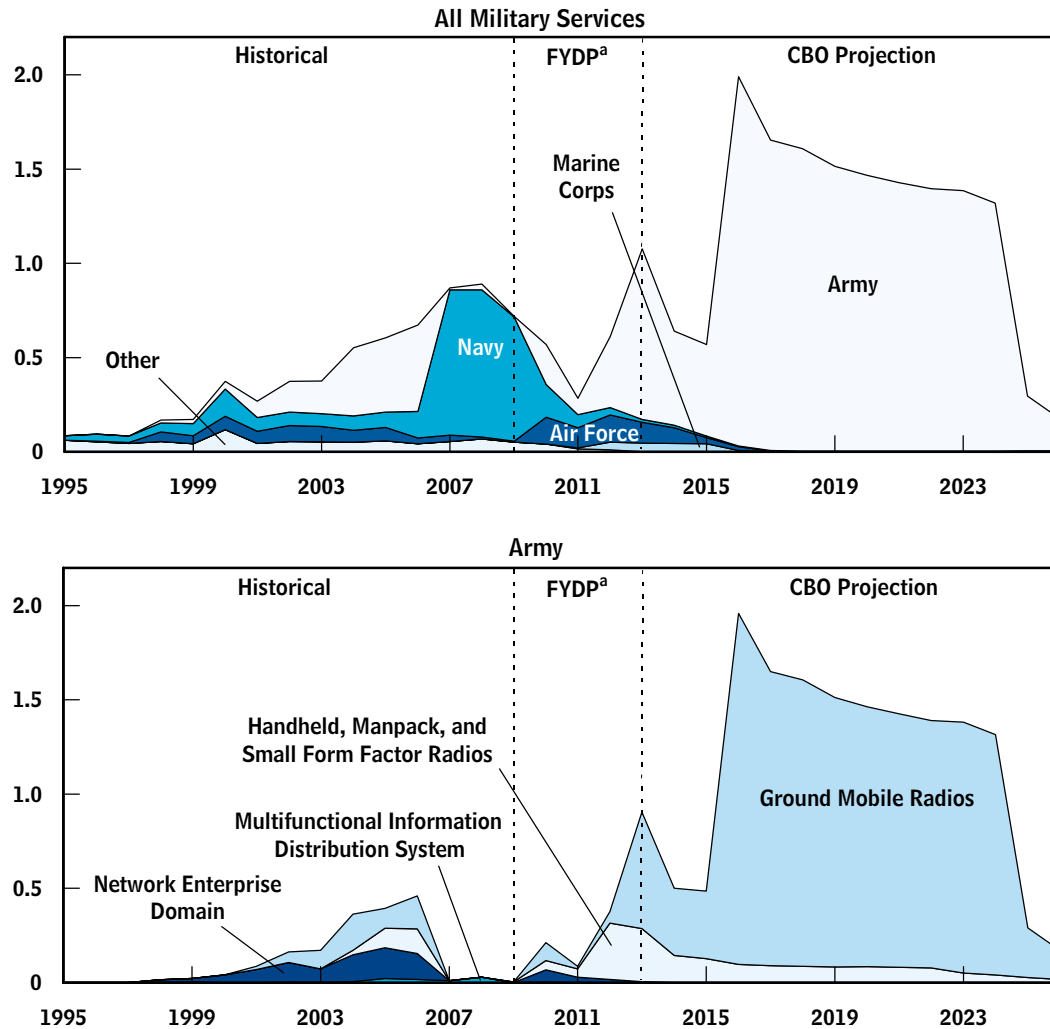
3.   CBO has calculated all unit costs in this report by dividing total funding planned for procurement, including funding for all engineering and other support activities, by the total number of radios to be purchased.

Figure 1.

Past and Projected Funding for the JTRS

(Billions of 2008 dollars)

All Military Services

Army

Source: Congressional Budget Office based on data from the Department of Defense.

Note: The funding displayed is the sum of appropriations for procurement and for research, development, test, and evaluation.
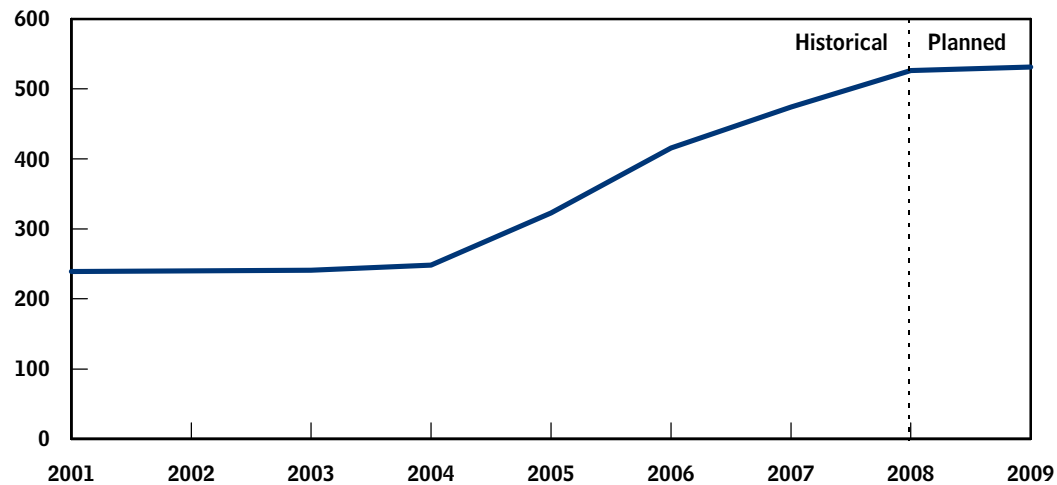
JTRS = Joint Tactical Radio System.

a. For a description of the Future Years Defense Program (FYDP), see Congressional Budget Office, *Long-Term Implications of the Fiscal Year 2009 Future Years Defense Program* (January 2009).

Figure 2.

SINCGARS Radios Purchased by the Army

(Cumulative number, thousands)

Source: Congressional Budget Office based on data from the Department of Defense.

Note: SINCGARS = Single-Channel Ground and Airborne Radio System.

For several reasons, the Army has increased war-related purchases of SINCGARS radios. Before Operation Iraqi Freedom, the Army had not purchased enough of those radios to fully equip its National Guard and Reserve units. Many of those units had older radios, including some from the Vietnam era, that were not able to transfer data using the Army's tactical Internet. Because the National Guard and Reserve units are being used heavily in operations in Iraq and Afghanistan, the Army has increased its procurement of SINCGARS to more fully equip those units. Those operations have also prompted the Army to begin purchasing enough SINGCARS radios to equip vir-tually all of its vehicles involved in combat, including each of its trucks. The Army's planned inventory of medium and heavy trucks exceeds 120,000 vehicles, and its planned inventory of high-mobility multipurpose wheeled vehicles (classified by the Army as a light truck) exceeds 140,000. The Army has also purchased about 13,000 mine-resistant ambush-protected vehicles for use in Iraq, and those vehicles will also need SINCGARS radios.

Two other factors that have caused the Army to buy more SINCGARS radios are its initiative to field modular brigade combat teams and its plans to increase the number of combat brigades from 70 to 76. A modular brigade is intended to be more flexible, more self-contained and more capable of independent operations, and faster to deploy. Fielding modular units and adding more brigades means that additional vehi-cles in the Army's force structure—especially trucks—need to be equipped with radios. The Government Accountability Office reported recently that fielding modu-lar units has increased the Army's needs for SINCGARS radios by more than 66,000.[4]

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4.   Government Accountability Office, *Defense Acquisitions: Department of Defense Needs Framework for Balancing Investments in Tactical Radios*, GAO-08-877 (August 2008).

Family of Improved High-Frequency Commercial Off-the-Shelf Radios

These single-channel radios can be handheld, carried in a pack, or mounted in a vehicle; they support a variety of modes of communication used by the U.S. military, including line-of-sight and satellite radios. (Because they already existed and required no new funding to be designed and tested, the radios are called commercial off-the-shelf, or COTS, radios.) The Army began purchasing them in 2002 to fill a number of needs, including equipping its Stryker brigade combat teams. The Army bought substantially more COTS radios in 2005 and, through 2008, will have bought several tens of thousands of them at unit costs ranging from about $5,000 to more than $20,000. At the lower end of that range of costs, the COTS multiband intrateam handheld radio (MBITR) enables individual soldiers to communicate with vehicles and units equipped with SINCGARS. At the upper end of the range, two MBITRs together with amplifiers and other equipment can be mounted in a rack and installed in a vehicle to provide voice and data communications capabilities similar to those of a vehicle-mounted SINCGARS radio.

FCS Network Software and Hardware

This initiative develops and tests software and hardware providing communications and data-processing capabilities for the suite of sensors and manned and unmanned combat vehicles that the Army plans to field under the Future Combat Systems program. According to the Army's plans, the funding to develop the FCS network will range between 10 percent and 20 percent of the total budget for FCS development over the next five years; the total budget will average about $2.6 billion annually. The network will enable the FCS sensors and vehicles to exchange data using several versions of the JTRS and WIN-T. For example, FCS unmanned aerial and ground sensors will broadcast data using the JTRS handheld, manpack, small form factor radios. Those broadcasts will be received, processed, and shared among units via the FCS network using other radios, such as the JTRS ground mobile radio and the communications sets to be fielded under WIN-T Increment 3.

Other Tactical Wireless Communications Programs

The Army is funding other tactical radio programs but at lower levels than the six programs described above. Those programs include the following:

- The **Army Data Distribution System (ADDS)** equips the Army's forces with two legacy data radios used in the Army's tactical Internet—the Enhanced Position Location Reporting System (EPLRS) and the Near-Term Digital Radio. During the past two years, the majority of the funding for ADDS has been provided through supplemental appropriations and used to purchase EPLRS radios and associated equipment. Including past, recent, and future purchases, the Army will field at least 16,000 and as many as 30,000 EPLRS radios at unit costs averaging about $30,000.

- The **Combat Survivor/Evader Locator** is the Army's portion of an ongoing joint program led by the Air Force to provide special operations forces and downed aircrews with multiple modes of communicating with search-and-rescue teams. Including past and planned purchases and depending on the availability of funding, the Army will field between 14,000 and 21,000 of those radios at a unit cost of about $20,000.

- The **Tactical Internet Management System (TIMS)** program purchases equipment used to manage and control the Army's tactical Internet. In 2003, TIMS superseded the Integrated System Control program, which had served the same purpose for the Army as TIMS. Since 2000, funding for the two programs has averaged about $33 million annually.

The Army's Strategic Wireless Programs

The Army's strategic wireless programs consist almost exclusively of those that develop and purchase radio transmitters and receivers to provide Army units with long-distance communications capabilities using satellites. The radios produced under those programs are used primarily by headquarters units, but some of the radios can be used by special forces and other small teams. Strategic programs enable units in the field to communicate with higher headquarters (above the division and brigade headquarters level, for example) located outside the vicinity of the units' operations; they also enable communications among higher headquarters and other Army facilities and installations. Those programs are described below.

Defense Enterprise Wideband Satellite Communications System (and Related Programs)

Previously called the Defense Satellite Communications System (DSCS), this system is part of a long-standing set of communications programs funded by all of the military services. (Each service funds its own needs under the program, which is still commonly known as the DSCS program.) DSCS was and is a constellation of communications satellites in geosynchronous orbits (orbits at an altitude of about 22,000 miles above the equator that cause the satellite to remain at the same position above the surface of the Earth) and ground terminals and control stations that provide long-distance and relatively high-capacity communications services for all of the military services.[5] The Army's portion of the program has developed and purchased new and upgraded ground terminals and satellite operations centers and associated software and training equipment for use with the DSCS. The program has also purchased equipment for use with the Wideband Gapfiller communications satellites, the first of which was launched into geosynchronous orbit in October 2007.

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5. For a description of the DSCS constellation, see www.af.mil/factsheets/factsheet.asp?id=95.

Navigation Satellite for Timing and Ranging Global Positioning System

Known as NAVSTAR GPS, this system is a constellation of satellites in medium-altitude orbits (about 11,000 miles, or one-half of the altitude of geosynchronous orbits) that provides precise information to the military about local time and the location of its units and their position relative to enemy units and targets. The Army's portion of the program procures and supports a family of handheld and vehicle-mounted GPS receivers and data displays. The Army purchased more than 120,000 GPS receivers before 2007 and plans to purchase 100,000 more through 2009 at an average unit cost of about $3,000.

Secure Mobile Anti-Jam Reliable Tactical Terminal

This program, known as SMART-T, procures, upgrades, and maintains terminals that provide the Army's forces with high- and low-capacity long-distance communications capabilities. The terminals employ modes of communication that are hard for an enemy to detect and to disrupt by jamming.[6] They are used in conjunction with the Military Strategic and Tactical Relay (Milstar) communications satellites launched and managed by the Air Force.[7] Upgrades to the SMART-T terminals will enable their use with the Advanced Extremely High Frequency (AEHF) satellites that are being developed by the Air Force and are scheduled for launch beginning in early 2009 to replace Milstar.[8] In 2008 and 2009, the Army plans to purchase about 180 SMART-T upgrade kits at a unit cost of about $750,000.

Global Broadcast Service

The Global Broadcast Service (GBS) is a one-way, high-capacity communications service that uses electronics packages on military and other communications satellites to transmit intelligence, weather, and other data (including video from cameras on unmanned aerial vehicles) over long distances. The Army's portion of the program develops and procures the terminals, ground stations, and other equipment that Army units use in the field to receive and transmit information over GBS. In 2008 and 2009, the Army plans to purchase 343 GBS receivers at an average unit cost of about $205,000.

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6. Jamming refers to an enemy's attempt to broadcast noise into a radio receiver, thus obscuring the reception of intended communications signals.

7. For a description of the Milstar satellites, see www.af.mil/factsheets/factsheet.asp?id=118.

8. For a description of the AEHF communications satellites, see www.aviationweek.com/aw/generic/ story.jsp?id=news/aw04078p1.xml&headline=USAF%20Plans%20First%20AEHF% 20Launch%20Early%20Next%20Year&channel=awst.

Other Strategic Wireless Communications Programs

The Army invests in a number of other programs that provide long-distance communications capabilities to its forces but that are funded at lower levels than the four programs described above. Those programs include the following:

- The **Enhanced Manpack Ultra-High Frequency Terminal** program procures radios that are carried in a pack and provide relatively low-capacity, long-distance communications capabilities when used in conjunction with several constellations of communications satellites.

- The **Single-Channel Anti-Jam Man-Portable (SCAMP) terminal** provides low-capacity, jamming- and detection-resistant long-distance communications capabilities in a small, portable terminal. SCAMP is used primarily in conjunction with the Milstar communications satellites.

- The **Combat Service Support Satellite Communications** program procures and maintains satellite communications terminals for use by Army units that provide logistics and other support to combat forces.

- The **Secure Enroute Communications Package** program procures communications terminals and other equipment for use by senior Army commanders while they and their staffs are deploying to a military operation.

- The **Joint Communications Support Element** program, which is managed by the Army, procures, upgrades, and maintains mobile communications capabilities for use by headquarters staff in charge of the deployment and operations of forces from all four military services.

Past and Projected Funding for the Army's Wireless Communications Programs

Since the beginning of Operation Iraqi Freedom in 2003, the Army's annual funding for its wireless communications programs has averaged about $3.3 billion, more than triple the funding during the previous eight years (see Figure 3). The Army has obtained most of that additional funding through supplemental appropriations and has used it to purchase tactical radios for its forces deployed to operations in Iraq and Afghanistan. Those purchases include SINCGARS, the Joint Network Node (now WIN-T Increment 1), and COTS radios.

Figure 3.

Past and Projected Funding for the Army's Wireless Communications Programs

(Billions of 2008 dollars of budget authority)
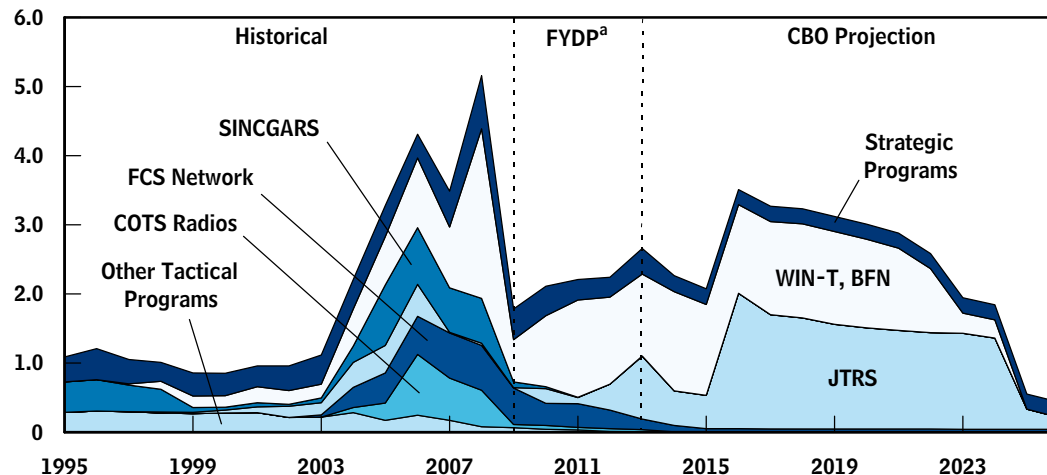
Source: Congressional Budget Office based on data from the Department of Defense.

Note: FYDP = Future Years Defense Program; SINCGARS = Single-Channel Ground and Airborne Radio System; FCS = Future Combat Systems; WIN-T = Warfighter Information Network-Tactical; BFN = Bridge to Future Networks; JTRS = Joint Tactical Radio System; COTS = commercial off-the-shelf.

a. For a description of the Future Years Defense Program, see Congressional Budget Office, *Long-Term Implications of the Fiscal Year 2009 Future Years Defense Program* (January 2009).

CBO projects that if the Army's plans are fully implemented, the service's funding for its wireless communications programs would total about $42 billion from 2009 to 2026. That amount implies roughly double the annual funding appropriated during the 1995–2002 period but less than the amounts appropriated during the past several years. From 2009 to 2013, the Army's plans indicate that most of its funding for wireless communications programs will support four activities:

1. Development of the FCS network,

2. Purchases of ground mobile radios for JTRS,

3. Purchases of WIN-T Increments 1 and 2, and

4. Development of WIN-T Increment 3.

Planned funding during that period averages about $2.2 billion annually, as follows: 15 percent of total funding is allocated to the FCS network, 14 percent to JTRS, 50 percent to all increments of WIN-T, about 4 percent to other tactical wireless programs, and about 17 percent to strategic wireless programs.

CBO projects that after 2013, which is the last year of the 2009 FYDP, the majority of the Army's funding for its wireless programs (averaging about $2.4 billion annually) will support purchases of JTRS ground mobile radios (49 percent of total funding) and WIN-T Increment 3 equipment sets (39 percent of total funding). Because the Army indicates that the capability provided by WIN-T Increment 3 for networking among units on the move is essential, the projection assumes that the Army will structure WIN-T Increment 3 to be consistent with its plans for fielding its FCS-equipped units.

The Joint Tactical Radio System and the Army's Future Forces

The Army indicates that successful fielding of both JTRS and WIN-T Increment 3 is needed to ensure that its FCS-equipped units and other combat and support units are able to exchange information, or network, on the battlefield. The Army is fielding modular brigade combat teams (BCTs) that are more capable of independent operations than its divisional combat brigades and wants those teams to have some of the networking capabilities that its FCS-equipped brigades have.[9] Through 2026, the Army plans to field 11 modular BCTs equipped with the Future Combat Systems and to provide FCS networking capabilities for 69 modular BCTs, including heavy brigades, Stryker brigades, and infantry brigades (see Figure 4).[10] Another 89 multi-functional support brigades (which provide various types of support to combat brigades, such as artillery fire and airlift using helicopters) will also be equipped with improved capabilities for networking.

Do the Army's plans for purchasing JTRS and WIN-T Increment 3 match its plans for fielding FCS brigades and providing improved capability for networking to its modular combat brigades and support brigades? CBO cannot answer that question with regard to WIN-T Increment 3 because the Army is still developing its plans for executing that program. It can, however, make such an assessment for JTRS purchases.

To calculate the number of JTRS ground mobile radios that the Army would need through 2026 to equip combat and support brigades on the schedules displayed in Figure 4, CBO used the results of an analysis conducted for the Army by the MITRE

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9. The modular BCTs replace the Army's divisional combat brigades. For more information about the modular force structure, see Congressional Budget Office, *Options for Restructuring the Army* (May 2005).

10. Army briefing, "FCS Team Signal Meeting," November 8, 2007. Heavy brigades have tracked armored vehicles, Stryker brigades have wheeled armored vehicles, and infantry brigades do not have armored vehicles. These and other differences among the three types of brigades are described in more detail in Congressional Budget Office, *Options for Restructuring the Army.*

Figure 4.

The Army's Plans for Fielding Combat and Support Brigades That Have Improved Capabilities for Exchanging Information

(Cumulative number)
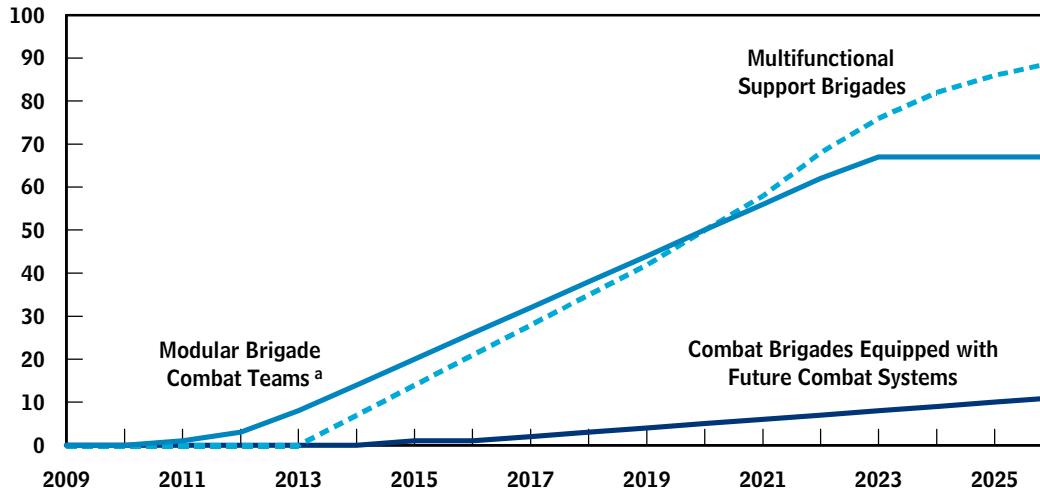
Source: Congressional Budget Office based on data from the Department of Defense.

a. The modular brigade combat teams (BCTs) will have networking capabilities similar to those of the combat brigades equipped with Future Combat Systems. The modular BCTs include heavy brigades, Stryker brigades, and infantry brigades.

Corporation in early 2007.[11] MITRE's analysis determined the number of GMRs that the Army would need to equip an FCS brigade and to provide its modular BCTs and support brigades with several, increasingly better levels of communications capability. That analysis used various assumptions about which components of the BCTs should have the JTRS radios. CBO calculated that fully equipping 11 FCS brigades and providing the maximum level of communications capability to 69 modular combat brigades and 89 support brigades would require about 83,000 GMRs through 2026 (see Figure 5). That estimate closely matches the Army's planned purchase of 86,209 GMRs as reported in the program's December 2007 Selected Acquisition Report.[12]

Through 2016, however, the Army's planned purchases of JTRS ground mobile radios would provide only the minimum level of improved communications capability to the Army's modular combat brigades considered in MITRE's analysis and would fully

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11. MITRE Corporation, "Recommendation for an Army JTRS Migration Strategy '66.6% Solution'" (briefing for the Department of Defense, March 26, 2007).

12. Section 2432 of title 10 of the U.S. Code requires that the Secretary of Defense submit Selected Acquisition Reports annually to the Congress. Those reports summarize DoD's latest estimates of costs, schedules, and quantities to be purchased for each major defense acquisition program.

Figure 5.

The Army's Current Plan for Equipping Its Brigades with JTRS Ground Mobile Radios

(Cumulative number, thousands)
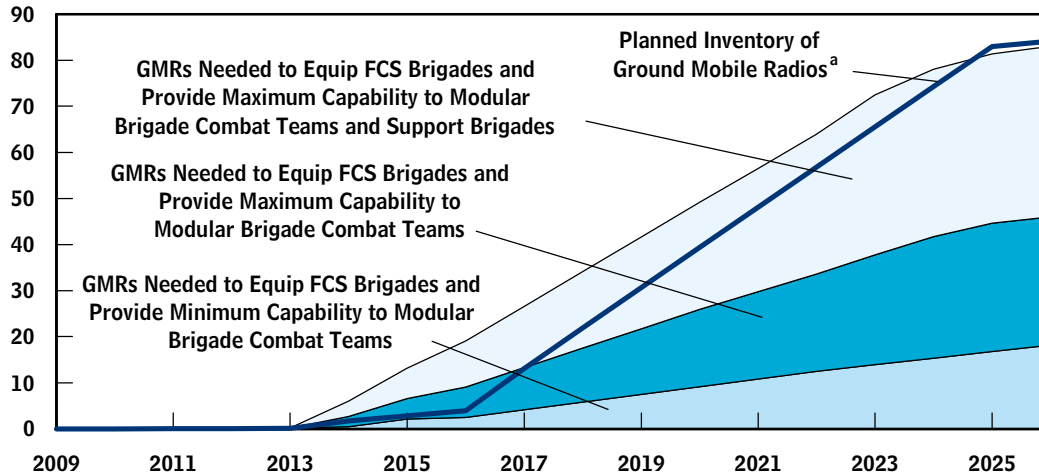
Source: Congressional Budget Office based on data from the Department of Defense.

Note: JTRS = Joint Tactical Radio System; GMRs = ground mobile radios; FCS = Future Combat Systems.

a. The projection assumes that JTRS ground mobile radios would be in the Army's inventory and available to be provided to brigades one year after funding was appropriated for purchasing the radios.

equip the single FCS combat brigade the Army plans to field through that time. Thereafter, when planned deliveries increase to about 9,000 radios annually, the Army would be able to provide all of its combat brigades with the maximum level of improved communications considered in the MITRE study. And by 2025, cumulative purchases of ground mobile radios would be sufficient to also give the Army's multifunctional support brigades the maximum level of improved capability that MITRE considered for those units in its analysis (see Figure 5).

Notwithstanding its plans to field 86,209 JTRS ground mobile radios, the Army will probably retain tens of thousands of less capable SINCGARS, the Enhanced Position Location Reporting System, and other legacy radios for many years. The Army plans to equip virtually all of its vehicles involved in combat, including each of its trucks, with at least one SINCGARS radio. CBO calculates that nearly three-quarters of the Army's requirement of 581,000 SINCGARS receiver/transmitters can be accounted for by tallying the vehicles the Army plans to have in its inventory in 2030 and assuming that each vehicle is equipped with the average number of receiver/transmitters

Table 3.

The Army's Planned Inventory of Vehicles and SINCGARS in 2013 and Its Potential Needs for JTRS Ground Mobile Radios in 2030

Type of Vehicle	Army of 2013			Army of 2030				
	Estimated Total Vehicle Inventory	SINCGARS Inventory		Estimated Total Vehicle Inventory	GMRs Needed to Replace All SINCGARS		GMRs Needed to Replace All Radios	
		Average per Vehicle	Estimated Total		Per Vehicle	Estimated Total	Average per Vehicle	Estimated Total
Tracked Armored Vehicles and Wheeled Armored Vehicles	17,550	1.3	26,325	16,510	1.0	16,510	1.3	22,150
Light Trucks	144,000	1.5	252,000	144,000	1.0	144,000	1.5	215,750
Medium and Heavy Trucks	121,820	2.0	121,820	122,215	1.0	122,215	2.0	243,485
Mine-Resistant Ambush-Protected Vehicles	13,590	1.5	23,785	13,590	1.0	13,590	1.5	20,360
Total	**296,960**		**423,930**	**296,315**		**296,315**		**501,745**

Source: Congressional Budget Office estimates based on data from the Department of Defense.

Notes: Numbers of SINCGARS are receiver/transmitter pairs; one or two pairs are used in configurations of the radio installed in vehicles. CBO estimated the average number of receiver/transmitter pairs installed in vehicles of different types by examining the Army's plans for equipping the vehicles assigned to a subset of its combat and support units and assuming that the subset was representative of all of the Army's units.

Numbers of JTRS ground mobile radios are for four-channel versions of the radio.

SINCGARS = Single-Channel Ground and Airborne Radio System; JTRS = Joint Tactical Radio System; GMRs = ground mobile radios.

currently installed in similar vehicles (see Table 3).[13] About half of the SINCGARS purchased through 2009 will be no more than five years old in 2009 (see Figure 2). Thus, those radios and the many thousands of other radios that the Army has purchased since 2003 may not need to be replaced for reasons of age for some time.

The JTRS ground mobile radio will, however, be more capable and more flexible than the SINCGARS and other radios currently installed in Army vehicles, which is why the Army plans to use JTRS to equip its FCS brigades. If the Army decided to replace the radios currently installed in its vehicles with JTRS ground mobile radios, replacing only SINCGARS radios would require buying more than three times the planned purchase of 86,209 GMRs and replacing all of the radios would require almost six times that number (see Table 3). The Army's current $15 billion estimate of the cost of buying those radios would increase accordingly.[14]

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13. The 581,000 includes radios mounted in vehicles, helicopters, and other aircraft and radios used in manpacks. CBO estimated the average number of receiver/transmitters installed in vehicles of different types by examining the Army's plans for equipping the vehicles assigned to a subset of its combat and support units and assuming that the subset was representative of all of the Army's units.

14. CBO's estimate of the number of JTRS ground mobile radios needed to replace the radios currently installed in each type of Army vehicle is based on the MITRE Corporation's analysis of the number of those radios needed to fully equip all of the manned vehicles, including trucks, in an FCS brigade. See MITRE Corporation, "Recommendation for an Army JTRS Migration Strategy '66.6% Solution'."