

# SINGLE-CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINGGARS)



## Army ACAT II Program

Total Number of Systems:	246,845
Total Program Cost (TY\$):	\$4,623M
Average Unit Cost (TY\$):	\$13K
Full-rate production:	1QFY85

## Prime Contractor

International Telephone and Telegraph

## SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Single Channel Ground and Airborne Radio System (SINGGARS) is a very high-frequency, frequency modulation combat net radio developed by the Army supporting the *Joint Vision 2010* operational concepts of *dominant maneuver, precision engagement, focused logistics, and full-dimensional protection*. SINGGARS provides secure, jam-resistant communications primarily for units conducting land battle. It enables secure communications by transmitting tactical voice and data using communications security and frequency hopping techniques. SINGGARS is also capable of operating in the single-channel (single-frequency) mode for interoperability with older radios.

Recently, the SINGGARS System Improvement Program radio has been used with the Tactical Internet to support Army digitization of the battlefield program. The SINGGARS System Improvement Plan radio is the same physical size as the previous radio, but incorporates forward error correction, higher data rates, packet technology, and the Internet Controller. The Tactical Internet is the network of radios and routers that provide connectivity across the battlefield. The Tactical Internet comprises the

Enhanced Position Location Reporting System, SINCGARS System Improvement Plan radios, and the Internet Controller router.

The second major modification to the radio is the current Advanced System Improvement Plan. The Advanced System Improvement Plan radio is a new manpack radio adapted from the SINCGARS airborne radio. Advanced System Improvement Plan radios will replace the System Improvement Plan radios in the Army Force Package 1 and 2 units. The Advanced System Improvement Plan radio incorporates programmable digital signal processing technology and is significantly smaller than the existing radio. The Advanced System Improvement Plan radio reduces the weight of a manpack SINCGARS radio from 18 to 8 pounds, improves reliability, and extends battery life by incorporating low power technology. The Advanced System Improvement Plan radio incorporates a redesigned and more user-friendly, man-machine interface via flat-panel technology.

## **BACKGROUND INFORMATION**

The Army began SINCGARS development following approval of a requirements document in December 1974. International Telephone and Telegraph was awarded a contract to produce SINCGARS in 1983. International Telephone and Telegraph produced two versions of SINCGARS. The current SINCGARS has an integrated communications security (ICOM) module and is designated SINCGARS ICOM. The original design, the non-ICOM radio, uses existing KY-57 using communications security devices.

The International Telephone and Telegraph integrated communications security IOT&E was conducted in 1990 at Ft. Hood, TX. A SINCGARS Follow-on Operational Experiment was conducted in October 1990 at Ft. Hood. The experiment investigated changes to the International Telephone and Telegraph radio to improve data message completion rates during jamming and mutual interference. IOT&E and Follow-on Operational Experiment data supported Defense Acquisition Board approval of full-rate production for the International Telephone and Telegraph integrated communications security radio. SINCGARS second-source IOT&E was conducted at Ft. Hood from 1992-1993. The results of the second-source IOT&E supported a Milestone IIIB full-rate production decision for General Dynamics, which built international communications security radios with different internal designs and interchangeable form, fit, and function.

In April 1995, the Army initiated a SINCGARS System Improvement Plan to the OSD C3I Committee. The System Improvement Plan included several enhancements: (1) improved data performance; (2) position locating and reporting (with an external Global Positioning System); (3) reduced weight; (4) simplified operations; and (5) interface to the common user system.

The SINCGARS Systems Improvement Plan radio and Internet Controller were part of the Tactical Internet supporting the Force XXI Advanced Warfighting Experiment, which began at Ft. Hood in June 1996 and culminated at the National Training Center in March 1997. There were a number of performance problems traced to the SINCGARS System Improvement Plan/Internet Controller role in the Tactical Internet, and poor message completion rates and speed-of-service were the result. The corrections to these problems will be in the SINCGARS System Improvement Plan and Advanced System Improvement Plan variants.

An Advanced System Improvement Plan Customer Test was conducted during FY98 with a battalion from the 82nd Airborne Division, Ft. Bragg, NC. This test was a two-week event designed to

test the SINCGARS Advanced System Improvement Plan radio in a non-digital environment and ensure SINCGARS compatibility with legacy systems in the secure-voice, frequency hopping mode.

The new Tactical Internet architecture for the Force XXI Battle Command, Brigade and Below (FBCB2) Program was tested in the May 1998 Development Test 1, employing approximately 60 SINCGARS System Improvement Plan radios. During the August 1998 Limited User Test for FBCB2, approximately 200 SINCGARS System Improvement Plan radios were employed by a Battalion Task Force at Ft. Hood, TX. These two tests were conducted to confirm fixes to many of the Tactical Internet problems identified during the Force XXI Advanced Warfighting Experiment and assess progress towards the objective capability. The Tactical Internet will also be tested in the October 1999 FBCB2 IOT&E, in which 1,500 Advanced System Improvement Plan radios will participate.

### **TEST & EVALUATION ACTIVITY**

All test and evaluation activities involving SINCGARS radios are within the framework of the Tactical Internet and completely aligned with the FBCB2 Program. The primary activity during this reporting period was the evaluation of Tactical Internet performance during the August 1998 Limited User Test for FBCB2.

### **TEST & EVALUATION ASSESSMENT**

The SINCGARS Integrated Communications Security radio is operationally effective and suitable for combat, based on operational tests employing International Telephone and Telegraph/General Dynamics designs.

In its role as a critical element of the Tactical Internet, in conjunction with the Enhanced Position Location Reporting System radio, the data for the SINCGARS Systems Improvement Plan collected during the 1997 Force XXI Advanced Warfighting Experiment indicated that the message completion rate and speed-of-service were below expectations. Development Test 1 results demonstrated significant improvements over Advanced Warfighting Experiment results: command and control message completion rates increased from approximately 30-80 percent and speed of service decreased from approximately 3 minutes to less than 4 seconds. Although these results were reflective of performance in a technical environment, similar improvements were also observed during the more operationally realistic Limited User Test, albeit with a smaller network than in the Advanced Warfighting Experiment. Whether these results are “scalable” from a battalion task force to a brigade task force will be examined during the FBCB2 Limited User Test/Force Development Test and Experimentation in April 2000.

Testing and evaluation from FY00-02 for the FBCB2 Program will determine whether SINCGARS System Improvement Plan improvements adequately support the Tactical Internet requirements of the Digital Battlefield.

