# ARCHIVED REPORT

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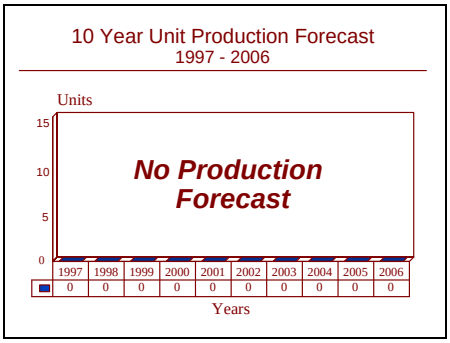
# GRC-213(V) - Archived 7/98

## Outlook

- Production complete
- No future production forecast
- This report will be dropped from future supplements




## Orientation

Description. Lightweight, high-frequency battlefield vehicular radio.

Sponsor

US Navy
Space and Naval Warfare Systems Command
(SPAWAR)
Washington, DC
USA
(USMC/Navy Program Management)

US Army
Communications & Electronics Command
Ft Monmouth, NJ
USA
(Army Program Management)

Hughes Electronics
Hughes Aircraft Co
1901 W Malvern Avenue
Fullerton, California (CA) 92634
USA
Tel: +1 714 732 3232
Fax: +1 714 732 0286

Status. Production complete.

Total Produced. Approximately 3,000 units were produced.

Application. The standard 20-watt vehicular portion of the US Army Improved High Frequency Radio (IHFR) program.

Price Range. Approximately US$22,000.

## Technical Data

| Dimensions | Metric | US |
|---|---|---|
| Size: | 40.6 cm x 20.7 cm x 29.2 cm | 16 in x 8.2 in x 11.5 in |
| Weight: | 19.5 kg | 43 lb |
| Frequency: | 2 MHz to 29.9999 MHz, fully synthesized | |
| Channels: | 280,000 in 100-Hz steps | |
| Modes: | Voice/Data/CW, LSB, USB, Rec only (AM & low-power options) | |
| Frequency Stability: | 1 part in $10^6$ | |

| | |
|---|---|
| Temperature Range: | -46°C to +71°C |
| MTBF: | More than 3,000 hours demonstrated |
| MTTR: | <20 minutes (module replacement) |
| Environmental: | Meets applicable requirements of MIL-STD-810B for shock, vibration, dust, humidity, leakage, and fungus |
| Input Power: | |
| Voltage | 22 VDC to 32 VDC |
| Power | Maximum input power 200 W |
| Receiver: | |
| Input Power | 2 MW minimum from PRC-104B |
| Output Power | 1 W into 600-ohm load<br>100 MW unmuted audio output into 600 ohms<br>0.16 Vrms monitor amplifier output into 150 ohms |
| Transmitter: | |
| Output Power | 20 W PEP/Avg +/- 2 dB into 50 ohms (continuous) |

Design Features. The GRC-213 is the standard 20-watt lightweight, battlefield vehicular radio in the US Army IHFR program. The radio weighs slightly over 40 pounds and integrates the PRC-104's proven, high-technology receiver/exciter and amplifier/antenna tuner into an effective vehicle mount. The manpack portion functions as a pull-out unit for extra-vehicular radio operations.

The GRC-213 demonstrates an increased reliability and tactical flexibility over earlier HF vehicular-base station radios because of the large-scale integrated (LSI) circuits and up-to-date design used in the PRC-104. The basic vehicular system consists of three units: receiver/exciter, power amplifier/antenna coupler, and vehicle mount unit. These units snap together to make up a rugged integral system that can be easily installed in just about any wheeled or tracked military vehicle.

The vehicle mount (AM-7152) supplies full input-power protection, an audio amplifier that drives an LS-454 external speaker, and an effective squelch designed for HF operation. When connected to the standard VIC-1 vehicle intercom system and the VHF-FM radio, the vehicle mount allows for the automatic retransmission of HF SSB signals to VHF-FM, or UHF-FM to HF SSB. Thus, remote operation of local VHF nets is possible at extended distances from command communications centers. The system fits into the same area as the Army's standard UHF-FM series of equipment with power and audio intercom connections being fully compatible.

Operational Characteristics. Operation is simple, with all controls readily accessible even while wearing gloves. The GRC-213 has push-button frequency selection of 280,000 channels from 2.0000 MHz to 29.9999 MHz in 100-Hz steps, selectable voice/data/cw modes on upper and lower sideband and fully automatic antenna tuning. Since the frequency synthesizer is locked to a temperature-compensated crystal oscillator, the need for manual fine tuning following frequency selection is eliminated. The GRC-213 will provide secure voice and data communications when used with the KY-65 voice, KY-84 data, or future COMSEC equipment, in the SSB, compatible AM, CW, and Data modes.

Operational antennas include the standard 16-foot vehicle whip resonant dipoles, certain longwires and the AS-2259 near-vertical-incidence-skywave (NVIS) antennas. The antenna tuner automatically matches the antenna by the use of LSI-controlled digital switching. The GRC-213 has built-in protection against front-end overload from nearby transmitters. The receiver can withstand a continuous 20-watt input without damage. There are also automatic audio alarm signals in case of low battery voltage, transmitter failure, or an antenna tuning fault.

The vehicle radio system is made up of seven modules and three easily accessible circuit cards which are contained in three basic subsystems: the RT-1209 receiver/ exciter, the AM-6874 RF amplifier/coupler, and the AM-7152 audio amplifier/vehicle adapter. Field maintenance is executed in seconds by replacing the subsystems, which are joined together with quick-release clamps and cable connectors. The mean-time-to-repair (MTTR) is less than 30 minutes. On average, the GRC-213 operates more than 3,000 hours between failures.

## Variants/Upgrades

GRC-213A STAJ-Compatible Radio. Proposed as an enhancement to the Army's IHFR program, Hughes has developed the Short-Term Anti-Jam (STAJ) versions of the GRC-213A vehicular radio. STAJ was to provide the Army HF radio operator with a swift response to current and projected threats to tactical HF radio operations from communications jammers. The upgrade consisted of internal modifications to the IHFR radios to accommodate

a frequency-hopping capability and the addition of the STAJ controller module or appliqué, that actually performs the anti-jam function. The STAJ-compatible production contracts were awarded in September 1987. While Hughes has built STAJ-compatible variants of the IHFR family, company representatives have stated that the STAJ module portion of the program was canceled by the US Army.

## Program Review

Background. The Integrated Tactical Communications System (INTACS) Update of 1979, performed by the US Army Signal Corps, established the requirement for nondevelopmental item (NDI) High Frequency radios for the US Army. The Communications Electronics Test Board, Ft. Gordon, GA,. was tasked to evaluate existing NDI HF radios available off the shelf.

In April 1980, the HF radio Concept Evaluation Program (CEP) was initiated. Hughes was selected in 1981 to supply the GRC-213(V). The initial production contract award was made in September 1985, and the STAJ-compatible contract award followed in October 1987.

During Operation Desert Storm, the IHFR family were deployed with various US ground forces, including USAF Tactical Air Control Parties (TACPS), for coordinating air support among allied units. The radios were well received by their users, demonstrating reliability and longer range that proved essential during desert operations. The long-range nature of HF communications gear is well suited for the wide-open areas of the desert, making it particularly attractive to potential Middle East buyers.

## Funding

With the last of the current production contract delivered in 1992, no additional procurement funding has been broken out since the FY92 P-1. Spares and support funding for the GRC-203(V) is included within US Army Operations and Maintenance accounts and is not broken out as an individual line item.

## Recent Contracts

| Contractor | Award ($ millions) | Date/Description |
|---|---|---|
| Hughes | 24.0 | Sep 1988 — Modification to contract for 94 GRC-213s, 503 PRC-104s, and 402 GRC-193As (N00039-87-C-0211) |
| Hughes | 3.7 | Dec 1988 — Provisioned items order for various quantities of seven different spare parts for the IHFR program (N00039-87-C-0211, PA0003) |

## Timetable

| | |
|---|---|
| 1979 | IHFR requirement established |
| 1981 | Development began |
| 1985 | Entered production |
| FY86 | DT/OT II for STAJ |
| FY87 | STAJ developmental testing completed; STAJ-compatible production contract award |
| 1992 | Production completed |

## Worldwide Distribution

The US armed forces are the primary users of the GRC-213, although there have apparently been minor foreign sales that Hughes would not elaborate on.

# Forecast Rationale

Production of the GRC-213 was completed in 1992. Total production of the three IHFR radios, i.e., PRC-104, GRC-193 and GRC-213, through 1992, was 23,000 units. The production breakdown for the three types has not been released by Hughes, but it is believed that the total number of GRC-213 radios produced is about 3,000 units.

Current activity is limited to spares and support. Barring a surge in activity, this report will be omitted from future supplements.

# Ten-Year Outlook

With production complete, the forecast chart has been omitted. This reoprt will be dropped next year.

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