



## Radios in the Russian Ground Forces

**OE Watch Commentary:** Military communications in the Russian Ground Forces have come a long way from simple audio and visual methods for transmitting combat command-and-control orders to advanced multichannel automated systems that provide real-time communication with fixed and mobile facilities at practically unlimited range. In practice, this has meant the Russian Ground Forces' once notoriously unreliable communications (especially at the tactical level) have been much improved. In terms of organizational structure, the radio communication system of the Russian Ground Forces can be provisionally divided into two main parts. The first is High Frequency (HF) systems that operate using the principles of ionospheric radio wave propagation that have transmitters of 500 Watts or more. These systems are designed to provide long-range, over-the-horizon communications for operational and strategic level control.

Although the Ground Forces do have satellite communication capabilities, HF appears to be the primary means of over-the-horizon communications. These radios currently consist of several large families. The R-161 Poisk family was widely fielded in the 1980-1990s, and has since been replaced by the R-166 Artek family, which was developed in the late 1990s. The accompanying excerpted article, from the 12 December 2018 edition of *Krasnaya Zvezda*, discusses the next generation of the Russian Ground Forces' long range, over-the-horizon radios for operational and strategic level control, the R-176 Antey family. Among other technological innovations, the R-176 Antey family, is reportedly a Software Defined Radio (SDR), meaning a radio that is primarily manipulated through software instead of hardware such as mixers, filters, modulators/demodulators, etc. These types of radios are capable of receiving and transmitting different waveforms based solely on the software used, instead of requiring physical modifications of hardware.

The second main part of the Ground Forces' communications consists of low-power mobile, portable, or transportable VHF/UHF radio communication systems that have power up to 100 Watts, which are used for tactical purposes. Currently, the R-168 Akveduk, Russia's fifth generation tactical radio system, is the primary tactical radio in service with the Ground Forces, Airborne, and Naval Infantry. These radios, widely fielded in the late 2000s, provide capabilities for digital data transmission and resilience against jamming. Although the R-168 Akveduk was a major advancement over the previous Arbalet series, the Akveduk man-portable radios were too bulky for convenient dismounted use.

The accompanying excerpted article from the 19 October 2018 edition of *Krasnaya Zvezda*, is by Colonel General Khalil Arslanov, Chief of the Russian Federation Armed Forces Communications Directorate, and Deputy Chief of the General Staff of the Russian Federation Armed Forces. Colonel General Arslanov lays out the architecture and future of the military communications, and concludes by describing Russia's sixth generation of tactical radios, the R-187 Azart family. Aside from other advancements, the R-187 is also an SDR radio that has digital data transmission, encryption, and electronic warfare resilience capabilities. Unlike the R-168 Akveduk family that consists of over 20 different radios, the Azart family has only three radios: the Azart-P (4km), Azart-N (12km), and Azart-BM (40km). The first reports of the R-187 Azart entering service began in 2012, and has reportedly been used in the Crimea, Eastern Ukraine, and Syria. Interestingly, the Russians have reportedly already fielded a UAV-based repeater to extend the range of the system. Although the R-166 and R-168s are still the predominant operational and tactical communication systems in the Russian Ground Forces, the fielding of the R-176 and R-187s will significantly enhance Russian command and control (mission command) capabilities. **End OE Watch Commentary (Bartles)**

*“In contemporary warfare, the role of information, telecommunication, and automated systems is growing, and the means and methods for using them to achieve victory are improving constantly. This makes demands on troop command and control, and consequently the communication system, more stringent.”*



LEFT: Радиостанция Р-166-0,5 (R-166-0,5 radiostation), RIGHT: Портативная радиостанция Р-187П1 Азарт (R-187P1 Azart radio).

Source: Vitaly V. Kuzmin, <https://www.vitalykuzmin.net/Military/270MSBr/i-6JMFxm/A> (left), <https://www.vitalykuzmin.net/Military/4th-Kantemirovskaya-Tank-Division-Open-Day-Part2/> (right), CC BY-SA 4.0 (<https://creativecommons.org/licenses/by-sa/4.0>).

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## Continued: Radios in the Russian Ground Forces

**Source:** Colonel General Khalil Arslanov, “На острие технического прогресса (On the Cutting Edge of Technical Progress),” *Krasnaya Zvezda*, 19 October 2018. <http://redstar.ru/na-ostrie-tehnicheskogo-progressa>

*One of the top-priority tasks in the military communication realm is the creation and deployment of a unified automated digital communication system. At the same time, a key role in increasing the efficiency of troop usage and enabling the combat potential of armaments to the maximum extent possible is played by the Russian Federation Armed Forces' communication system, which is being built based on the latest science and technology achievements in the field of information and telecommunication technologies. An analysis of the wars and military conflicts of modern times argues that conflicting parties employ advanced developments in the armament realm broadly and without delay. In contemporary warfare, the role of information, telecommunication, and automated systems is growing, and the means and methods for using them to achieve victory are improving constantly. This makes demands on troop command and control, and consequently the communication system, more stringent.*

*One of the top-priority building missions in the military communication realm is the creation and deployment of the Russian Federation Armed Forces' unified automated digital communication system (OATsSS) [объединённой автоматизированной цифровой системы связи (ОАЦСС)] based on the use of the latest domestic developments in the field of state-of-the-art digital satellite, radio, radio relay, and tropospheric communication resources, as well as digital information sharing systems employing fiber optic technologies. Serious attention is being devoted to defining unified operating principles for the Russian Federation Armed Forces' unified automated digital communication system, its protection and security. Automated communication control system elements are under development for command posts of all levels...*

*The realization of new types of communication services requires a fundamentally different approach to communication system building. Within the framework of scientific research and experimental design work conducted by Russian Defense Ministry scientific research organizations, principles have been developed for employing advanced communication systems, military communication equipment prototypes using wireless broadband access to communication system resources, software-defined radios, and highly mobile subscriber access to communication system resources...*

*At the same time, radio communication resources play a key role in providing for the command and control of subunits on the battlefield. First and foremost, we are talking about sixth-generation radio sets that allow building increased-capacity cognitive radio communication networks and under conditions of organized and unforeseen interference. Such devices allow for organizing “one-to-one” radio communication in automatic and automated modes with all means and methods for conducting combat. Moreover, they include a continuous automatic radio relay mode that allows for establishing long-distance radio communication during subunit operations in mountainous and rugged terrain without using additional equipment.*

**Source:** Yuriy Avdeyev, “Радио сможет самообучаться (The Radio Will Be Able To Self-Learn),” *Krasnaya Zvezda*, 12 December 2018. <http://redstar.ru/radio-smozhet-samoobuchatsya/>

*The R-176 Antey system (P-176 «Антей») includes field and fixed products for the organization of short-wave communication, which are designed to work as part of Ground Troops communication nodes at the operational and strategic control levels. They provide communication channels to the officials of control points and provide automatic and automated transmission of data, telephone, and telegraph information in the face of interference at distances of several thousand kilometers. The system includes nodal receiving and transmitting hardware, autonomous radio stations, and fixed receiving and transmitting systems. In addition, in order to ensure a complete standardized line of radio facilities, the concern initiated a deep modernization of the serial radio station R-166-0.5 for use in command and control. As a result of the work done, the radio facilities of the Antey system are expected to be used at all levels of Armed Forces management, from brigade to the General Staff...*

*Specialists note that all system elements are built on a modern technological base. They are based on Tishina SDR [software defined radio] modems, which together with the developed special software implement automatic adaptation to the current conditions of radio communication. Due to this, as well as a set of technical solutions, it is possible to form a set of products that function as a single system and provide a high level of automation...*

*According to experts, the Antey system will make it possible to significantly improve the efficiency of military short-wave radio lines when subjected to deliberate enemy interference. It has a good chance of becoming a standardized interbranch and interdepartmental means for organizing radio communication in field and fixed conditions...Among other things, the innovation has good prospects for entering the export market, where there is a great demand for such communication equipment.*

*Speaking about further improvement of the existing fixed system of decameter radio communication [high frequency/HF], it should be noted that one of the main directions is the creation of its automated network covering the entire territory of Russia and providing fixed protected and unprotected facilities of Russian Federation Armed Forces ground, sea, and air echelons with mainline radio channels of required stability and capacity in various operating conditions.*

*There will be changes also to tactical level control radio equipment. Now, as they say, it is near the finish line, namely at the stages of preliminary and state tests there is development of a number of sixth-generation radio station systems. They include mobile, portable, and transportable equipment that make it possible to build self-organizing and self-restoring radio networks with dynamic routing and automatic retransmission of traffic for the troops. Portable equipment from one of these systems has been supplied on a mass basis for some years to brigades and divisions of the Russian Federation Armed Forces...*