



Rif-M

Mission

The Rif-M air defence missile system (ADMS) is designed to defend naval forces against massed air attacks of aircraft, air-launched cruise missiles, anti-ship cruise missiles, anti-radiation missiles, including manoeuvring missiles and those flying at very low altitudes, as well as to engage enemy missile-carrying aircraft, ECM and long-range AEW&C aircraft in order to push off their weapons delivery and jamming lines.

ADMS composition

- 3Ts-48T or 3Ts-48E.1 guidance system;
- automated launch equipment;
- 3S-48E underdeck drum-type launcher for the 48N6E missiles, or 3S-97.2FE honeycomb launcher for the 9M96E missiles;
- 3Shch-97.2-2 radio correction data link with the 9M96E missiles;
- 48N6E and 9M96E surface-to-air missiles (SAMs) in transport-and-launch containers (TLCs);
- a set of ground support equipment;
- 3R97.2-2 universal firing modules.

Design and combat employment features

The Rif-M guidance system with the 48N6E SAMs has its own antenna post within the autonomous target acquisition, tracking and missile guidance system.

The Rif-M's guidance system can simultaneously track six targets, and guide 12 missiles onto them, within the operating sector of the phased array antenna. The guidance system is equipped with the functional testing subsystem, training facilities and combat data recording system. It also performs data processing and display as well as data exchange with external systems supporting the system operation.

During the whole service life the missiles are stored onboard the ship in their transport-and-launch containers from which they are launched. The missiles are fully combat ready and need no testing of their onboard equipment during the total assigned service time.

The missiles are vertically launched with engines started in the air, and are declined towards the target.

Missile guidance system: inertial navigation + radio correction + semi-active radar homing (9M96E) or semi-active radar homing (48N6E) in the terminal leg of the trajectory. This control method provides high probability of missile meeting the target and destroying it.



Both 48N6E and 9M96E are single-stage solid-propellant surface-to-air missiles. Thanks to their high speed and overload limits as well as high-power fragmentation warheads the missiles can effectively defeat multiple types of targets in a wide range of intercept conditions. The missiles are supplied in the transport-and-launch containers in which they are stored and loaded into the launchers, requiring no tests and adjustments during 10 years.

The missiles are launched vertically and subsequently depressed onto the target by a program activated at the beginning of launch sequence, which makes laying the launcher on target unnecessary.

The 48N6E missile drum-type launcher is mounted below deck. It includes a loading mechanism taking transport-and-launch containers with missiles from the ship's deck to the belowdeck magazine and putting them on the drum guides. The 9M96E missile launcher is a quick-reaction honeycomb vertical fire unit.

The Rif-M ADMS with the 48N6E missiles can be installed on large surface ships displacing 5,000 tonnes and more. The Rif-M ADMS with the 9M96E missiles has much smaller size and weight allowing its accommodation on surface ships displacing 2,000 tonnes and more.

Design and combat employment features of the Rif-M ADMS with the 9M96E SAMs.

The Rif-M ADMS does not have its own antenna post within the autonomous target acquisition, tracking and missile guidance system.

The all-ship radar (which is not part of the ADMS) scans the air space and detects air targets. Data from the all-ship radar is fed to the 3Ts-48E.1 fire control system of the Rif-M ADMS. The fire control system receives and processes primary radar data, detects, tracks and classifies targets, generates launch decisions and commands on preparing and launching missiles, and controls missile guidance onto the target.

The 3Ts-48E.1 fire control system transfers commands to the 3R97.2-2 universal launch module on preparing missile launches, uploading mission assignments (inputs into the missile inertial guidance system to guide it to the point of estimated collision with the target, and depression angles on target of the homing head antenna), controlling missile launchers, and launching missiles. The 9M96E missile performs its flight on commands of the inertial guidance system.

If the target onto which the missile is guided performs an abrupt manoeuvre, the 3Shch-97.2-2 radio correction data links a correction command to change the missile trajectory and bring it to a new collision point. The command is transmitted to the missile by the universal launch module via the radio-correction link. At the terminal leg of the trajectory the active radar seeker of the 9M96E missile is activated. When it locks on the target, the missile switches over to the homing mode. The missile



warhead is exploded remotely by a proximity radar fuse, or directly by a set of impact fuses when colliding with the target.

Main characteristics:

- Engagement zone by relative bearing, deg (48N6E\9M96E): 360
- Engagement envelope:
 - max range of fire, km (48N6E\9M96E): 120\40
 - min range of fire, km (48N6E\9M96E): 8-9\2
 - max altitude, km (48N6E\9M96E): 25\20
 - min altitude, m (48N6E\9M96E): 10\7
- Rate of fire (min interval between launches), s (48N6E\9M96E): 4\2
- Max speed of engaged aerodynamic targets, m/s (48N6E\9M96E): 950\1000
- Number of targets engaged simultaneously, pcs. (48N6E\9M96E): 6\6-8
- Number of missiles guided simultaneously, pcs. (48N6E\9M96E): 12\12-16
- Number of missiles, pcs. (48N6E\9M96E): 64-96\8-96
- ADMS response time, s (48N6E\9M96E): 8-9\8-10
- SAM characteristics: 48N6E\9M96E
- TLC length, m (48N6E\9M96E): 7,8\4,6
- TLC diameter, m (48N6E\9M96E): 10\0,47
- Launch weight, kg (48N6E\9M96E): 1800\333
- Missile guidance in flight: inertial navigation + radio-correction + semiactive\active radar homing
- Warhead type: high explosive fragmentation





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