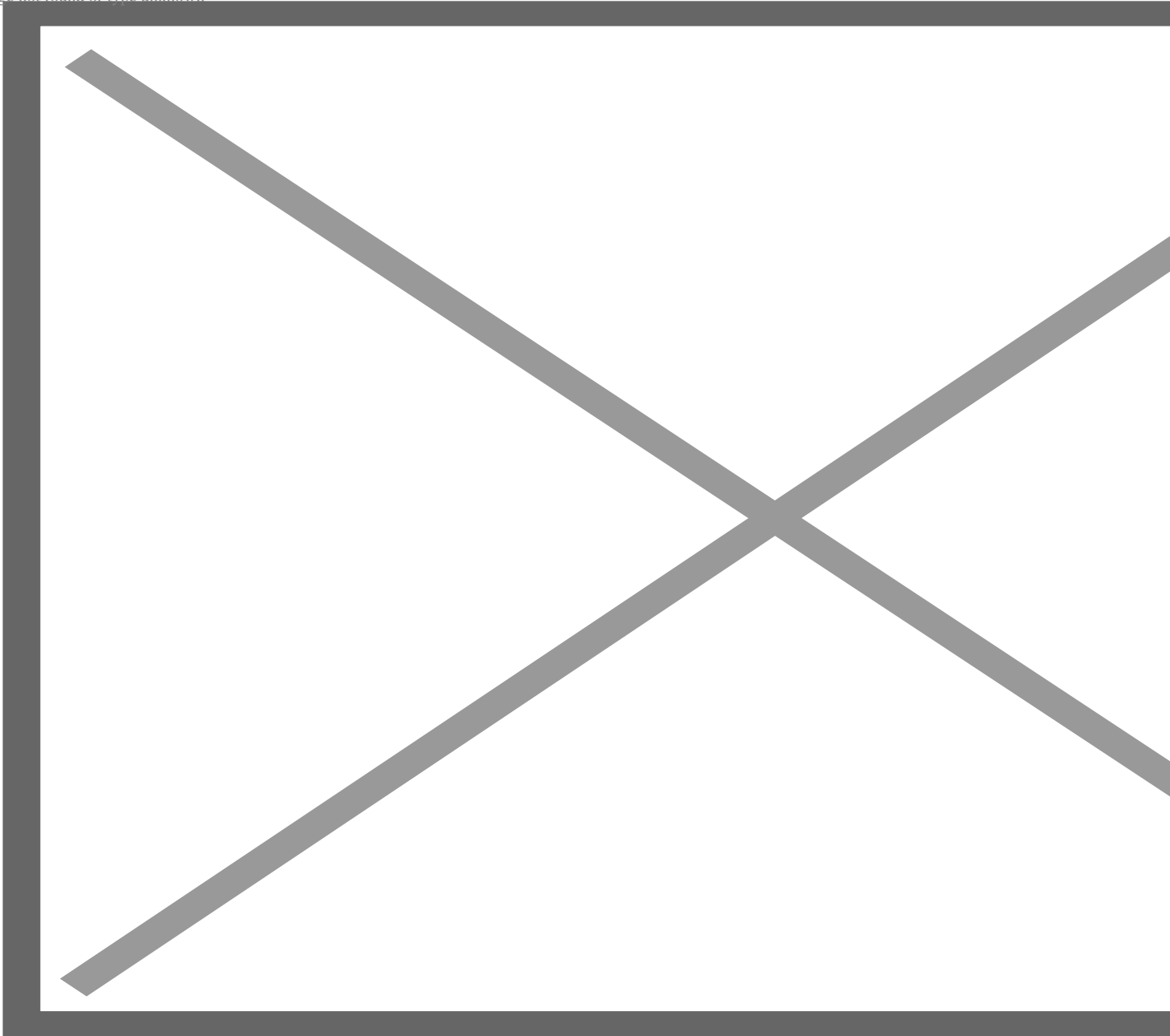

11-Feb-17 – The New MiG 35 Fighter Jet Performs Like the F-16 C / D

Description

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On January 26, 2017, the Russian Air Force began testing a pre-production batch of the new MiG-35

aircraft, which is a derivative of the MiG-29. The MiG-35 prototype was first flown in 2007; now the aircraft has been totally changed and equipped with new avionics. The earlier MiG-29 is a light aircraft produced by the Russian Aircraft Corporation MiG ("RAC MiG," originally the Mikoyan and Gurevich Design Bureau), with outstanding aerodynamic qualities and the highest rate of climb of any multirole aircraft (330 m / s). The MiG-29 entered service in 1982. There have been 1,600 units produced. In military combat, the MiG-29 was surpassed by the F-15 and F-16 due to its inferior avionics system. The reason for that was that until 2004, Russia lacked the funds necessary for research in the avionics field in order to improve and replace the old equipment.

Unlike RAC MiG, Lockheed preferred to make continual improvements to the F-16, especially in avionics, instead of designing another 4th++ generation aircraft. Since 1978, they built 4,500 of the planes, in all the models: F-16A/B (Block 1/5/10/15/20) and F-16C / D (Block 25/30/32 / 40/42/50/52), with the F-16E/F (Block 60) being the latest version — it features much of the equipment on the 5th generation F-35 aircraft. The US Air Force has 900 F-16s.

To get the performance of the MiG-29 close to that of the F-16, RAC MiG's Sokol aircraft factory in Nizhny Novgorod (400 km east of Moscow) created upgraded models such as the MiG-29M / M2, MiG 29 SMT and MiG 29 K / KUB (carrier-borne). The MiG-35 is the latest version of the MiG-29 and is not intended as an interceptor jet, as it is inferior to the F-22, F-35 and F-15. With the MiG-35 C, the Russians are aiming to reduce the cost of flying by 2.5 times, increase the MiG-29's ability to strike ground targets, and to defend themselves from 4th++ generation aircraft such as the F-16 C / D, Saab Gripen, Rafale, Eurofighter Typhoon and the F-18C / D.

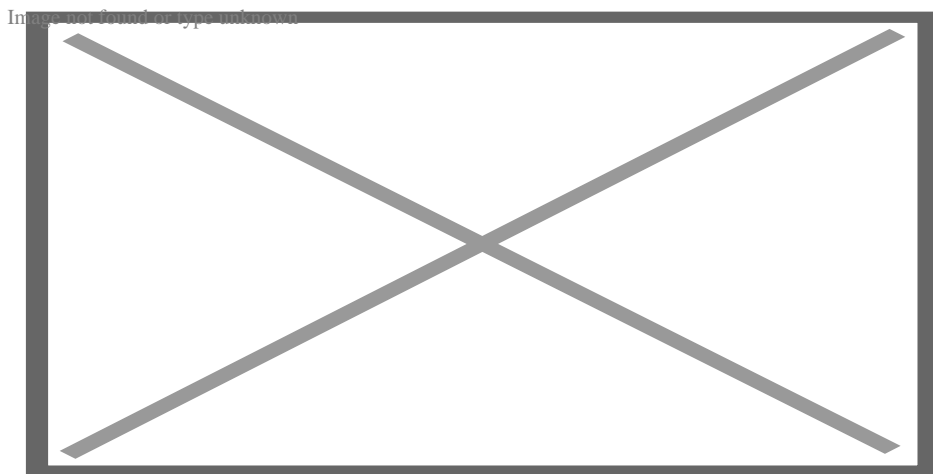
Upgrades

The MiG-29's cabin has been redesigned. The MiG-35 has an EFIS (Electronic Flight Instrument System) containing three MFD (multi-function display) color LCDs that display navigation data as well as readings on the tactical situation, motor control, fuel, and special equipment. Additionally, it has HMTDS (Helmet-Mounted Target Designation Systems) equipment and it has HUD (Head-Up Display) displays on the windshield. It uses a fly-by-wire flight control system with three channels. The MiG-35 communication system includes two new radio stations, one of them serving as a secret data line as well. The data line transmits, via satellite, information from ground-based and ship-based command and control points, and from Airborne Warning and Control System aircraft (AWACS / AEW). This gives the MiG-35 additional and reliable information about the situation in the air, which increases the likelihood of fulfilling its mission.

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The two RD-33 TVN engines have increased thrust at 9,000 kg. each. Unlike the MiG-29, the MiG-35's engines were fitted with BARK (digital monitoring and control systems), have a low specific consumption, do not emit smoke and have a very small infrared footprint. The RD-33 TVN engines have vectored thrust nozzles that enable it to move up–down and left–right by 15–30 degrees. These enhancements “enabled the MiG-35 to fly at very low speeds without angle-of-attack limitations, and ensured that it will also remain controllable in zero-speed and ‘negative-speed’ (tail-forward) areas for sustained periods.”^[1] Vectored thrust allows execution of brusque maneuvers with large overloads to avoid air-to-air or ground-to-air missiles. In addition, there are fuel tanks fitted dorsally (behind the cockpit) and where the wings meet the fuselage. The internal fuel capacity was increased to 950 liters, increasing the normal flight range to 2,000 km.



Zhuk-AE radar

The main source of ground and aerial data is the Zhuk-AE radar. An AESA radar (active electronically scanned array), it can spot air targets at a distance of 160 km, and at 300 km for surface ships. The radar can track 30 targets simultaneously and attack 6 of them. Radars of the earlier type, PESA (passive electronically scanned array), had a cone-shaped antenna rotated 360 degrees to direct the radar waves into a narrower beam. The antenna panel of the AESA radar on the MiG-35 is composed of 1,000–2,000 TR modules (transceivers). The modules are arranged in the nose, wing or fuselage, and operate independently of each other. The radar beam is digitally modeled and shaped into a very narrow delineated space by a computer. The computer selects the power of radiation emitted by each TR module in a few millionths of a second. In addition, each TR module can be programmed to operate either only as a transmitter or only as a receiver, running different functions in parallel. Two CIP computers (Common Integrated Processor) help the radar.

Optoelectronic equipment

The MiG-35 has one targeting/navigational system combining inertial, radio, and GPS equipment. The BINS-SP2 inertial navigation equipment is produced by KRET in cooperation with SAGEM Defense-France and is based on three laser gyros and three quartz accelerometers. This equipment is connected to the subsystem for low visibility conditions and for directing weapons. On America's 5th

generation F-22 and F-35 planes, the navigation equipment and precision weapons guidance systems are no longer installed on snap mounting points; the MiG-35 copies the 5th generation solution and these devices are incorporated into the plane. An OLS-35 fire control system of theIRST type (infrared search and track) is mounted in the nose and is used in air combat. OLS-35 can locate an aircraft after discovering a heat emission at 50 km in the “front hemisphere” and at 90 km “facing up to rear hemisphere.” The MiG-35 is equipped with a FLIR (forward-looking infrared) internal pod mounted under the right engine of the plane. This is for night-time navigation and it displays an image of the terrain being overflown, allowing identification of targets. The FLIR pod also provides autonomous guidance of precision munitions, as in American military aircraft. The FLIR pod has a laser rangefinder to measure the distance to the target (up to 20–30 km) and a laser projector for guiding bombs and missiles.



Having moved away from using mounting points for the optoelectronic equipment, the MiG-35 has increased the number of hard mounts from 6 to 9, with the maximum payload increasing from 4,800 to 7,000 kg.

Radio-electronic Battle Equipment

The EW Equipment (Electronic Warfare) comprises a broadband warning radar receiver with an antenna arranged over the entire surface of the wings and fuselage. The MiG-35 has MAWS-type (missile approach warning system) optical sensors, in the ultraviolet spectrum, mounted on the fuselage, tail and wings, which warn the pilot of any approaching air-to-air missile. The EW system also can detect the launching of MANPADS (man-portable air-defense system) or a short range surface-to-air system (10 km), a medium- or long-range surface-to-air system (30–50 km). The EW microprocessor estimates the time to impact of enemy missiles and it controls the active or passive electronic countermeasures equipment. The EW equipment is supported by the Italian firm Elettronica (it incorporates the ELT / 568-V2 device, the “self-protection jammer for self-defense from radar controlled anti-aircraft artillery”).

The MiG-35 testing is to be completed in 2018, with the first batch of 37 MiG-35s being delivered to the Russian military in 2019. The Russian Air Force operates about 250 MiG-29s and plans to replace them with 170 MiG-35s. The first foreign order for the MiG-35 is from Egypt, who signed a contract in 2015 for the purchase of 50 MiG-35 planes, worth \$ 2 billion.

[\[1\] MiG-35 Fulcrum-F Multirole Fighter, Russia.](#)