

## PLATFORM AUDIT: THE SUPERSONIC TUPOLEV BOMBERS IN SERVICE TODAY

By Craig Paffhausen

With dwindling funds, the Russian Air and Naval Air forces have had to retire aircraft en-masse to the scrap heap. Of all the heavy combat aircraft only the Tu-22M2/3, the Tu-160 and the Tu-95MS16 remain operational today. This article will focus on the Tu-22M2/M3 variants as well as the Tu-160 and what future they hold in the RuAF. As standard, anything in Brackets “[...]” denotes the NATO or USAF designation and follows the Soviet/Russian designation.

The Tu-22M [Backfire], commonly (and probably rightly so) called the Tu-26 Backfire by Western militaries for the past 20 years, was the plane that forced the USAF to re-equip the Air Defense Command with F-15s and F-16ADFs in the mid-to-late 1980s. This plane was supposedly “evolved” from the Tu-22 Blinder. In fact, the evolution claim is even further from the truth than Boeing’s claims that picture the F/A-18E as “just a stretched F/A-18C”. The only parts that were interchangeable between the Tu-22 and the Tu-22M were the ejection seats and the tires! The Tu-22M was developed as an intermediate-range theater bomber with an optional strategic role (with the Kh-22MA [AS-4 Nuclear Kitchen]). In this role, the Tu-22M would carry 2 Kh-22MA for nuclear strikes against European ground targets, or ships in the waters off the land controlled by the then Soviet forces. If enemy defenses were thought not to be prepared for an attack, or the target was at a greater distance away, the Tu-22M would carry only the Kh-22MA on the centerline.



As an intermediate bomber, the Tu-22M would be called to provide support to ground forces in a conventional role only, as per Soviet and now Russian strategic doctrine. Thus the Tu-22M was not designed to carry any free-fall nuclear weapons. All conventional weapons, other than 500kg or smaller bombs, are carried externally on the two underwing pylons and the two multiple ejector racks (MERs) located under the inlets. 16 500kg bombs or 32 250kg bombs can also be carried in the internal weapons bay (according to another source, up to 69 FAB-250 bombs can be carried: 36 externally and 33 internally). It is possible for the internal weapons bay to carry 2 T-type or TN-type tactical nuclear weapons but the aircraft has none of the specialized positive-control equipment (similar to the US/NATO PAL) installed.

As far as missiles go, the Tu-22M2 was designed to carry the second generation of the Kh-22 [AS-4 Kitchen] family: The Kh-22M and the Kh-22MA. The second generation versions differ from the earlier models (Kh-22PSI) mostly in launch modes: they can now be launched at low altitude, at a reduced range. For nuclear attack the Tu-22M2 would still carry the older Kh-22PSI, limiting launch altitude to the high altitude band.



A Kh-22PSI is carried semi-recessed on the fuselage of a Tu-22M2

The fire-control system installed on the Tu-22M2 can control up to two of these weapons. However, there are three carry spots on the aircraft. This is because carrying one Kh-22 under the wing would cause balance problems at full take-off weight. Yes, the Tu-22M2 can carry three at once but the range penalty means that the third missile will not initialize and be able to be fired until the bomber is back over its home base on final approach. This is because the fire-control computer system has to cold-start the weapon, warm up the electronics and then warm up the guidance section. It is estimated that this takes about one hour to complete. It is possible that the attack computer could be replaced with a new system on the Tu-22M2, but funding is such that adding such equipment on such an old aircraft would not be cost effective.

Other missiles were integrated during the design phase of the Tu-22M2. A noteworthy one is the short-ranged portion of the Kh-2000 program. This missile became operational in or around 1988 (sources vary wildly) as the Kh-15 [AS-16 Kickback]. The Kh-15 was developed in 3 versions: conventional anti ship, nuclear short-range land (equivalent to the US AGM-69 SRAM) and passive radar homing anti-radar missile. However, only the nuclear version entered service. The passive-ARM version completed

testing in the late-80s but was not purchased by any part of the Soviet/Russian military. It is possible that the Anti radar version will be sold abroad to countries like India in the future. In the case of the Tu-22M2 however, again the fire control system makes it impractical to integrate this missile operationally. The more modern fire-control system of the Tu-22M3 however is fully compatible with both the 3-missile Kh-22 loadout AND the Kh-15 loadout.



**A pair of Tu-22M3s demonstrate a typical operational medium/long-range load of two Kh-22s each. Notice the different radomes on the missiles: The upper pair is probably an inertial land-attack version (the very slim downwards-facing opening is the window for the altimeter radar). The lower pair is the anti-ship version.**

The Tu-22M3 is now the mainstay of the Russian strategic air arm. It is an intermediate range operational/strategic bomber along the lines of the old US B-47 Stratojet in role. In times of war, it would defend the Russian coast against incursion from enemy ships, perform limited attacks against convoys (though nothing to the scale portrayed in *Red Storm Rising* and other technothrillers) and execute land-attacks against theater strategic targets (e.g. targets at less than 2000nm range that are "hard" strategic targets). As with the Tu-22M2 before it, the Tu-22M3 was fitted with new upgraded versions of the Kh-22 missile family, the Kh-22N and Kh-22NA. Another Kh-22 version, the Kh-22MP passive radar homing missile, was canceled in 1978 before production began. The Kh-22N is a conventional anti-shiping missile with a secondary land-attack role against prominent radar reflectors (i.e. bridges, large buildings etc). The Kh-22NA has an internal guidance system coupled to a TERCOM system (similar to the early AGM-86 ALCM) and a nuclear warhead. The fire control system on the Tu-22M3, unlike that of the Tu-22M2, does allow for the carriage and firing of three Kh-22 missiles in salvo. This is a major improvement over the fire-control systems of the Tu-22M2 and the original Tu-22K [Blinder], where only one missile could be fired at a time, and only two could be kept in an operational readiness.

Other missiles that have been tested on the Tu-22M3 but were not carried operationally include the Kh-31 [AS-17 Krypton] family of anti-radar and anti-ship missiles. Up to 4 can be carried on the external pylons. The Kh-55/RKV-500 [AS-15 Kent] cruise missile has been launched from the same four pylons on test aircraft as well. The previously mentioned Kh-15 [AS-16 Kickback] aeroballistic missile has been operational on the Tu-22M3s assigned to attack strategic targets in Europe and Asia since 1988. Mounting the six-round internal rotary launcher for the Kh-15 precludes carrying the third fuselage-recessed Kh-22, but the two wing-mounted Kh-22s can still be carried. Alternatively, a total of 10 Kh-15s can be carried if the four external pylons are used in conjunction with the rotary launcher. If the Tu-22M family is put back into production, these new missile systems will undoubtedly be featured on the new production aircraft. Since India really, REALLY wants the Tu-22M for its own use, it is highly possible that the



**A Tu-160 releases a Kh-55 cruise missile during trials**

Kazan factory will be re-opened to Tu-22M production in the near future.

The other Tupolev supersonic bomber used by the RuAF is the Tu-160 [Blackjack]. This strategic bomber is bigger than the USAF's B-1B, has a higher speed but is less all-round survivable (although surprisingly it has a lower frontal RCS). The Tu-160 was designed originally to carry the long-range component of the Kh-2000 missile program, the Kh-45. Two weapons bays on the Tu-160 would each carry one Kh-45 internally, with the option of two more externally. However, while the bomber was still in the early design phases, the Kh-45 was canceled in favor of the Kh-55 cruise missile (which was based heavily on compromised US Tomahawk technology). Two 6-round launchers were substituted for the two internal Kh-45 bays, and the external pylons were deleted. Thus a total of 12 of the Kh-55SM [AS-15B Kent] ALCMs can be carried. The Tu-160 is also fully compatible with the Kh-15 SRAM. 12 Kh-15s can be carried in lieu of 6 Kh-55SMs in each launcher, giving a total of up to 24 Kh-15s or (in a mixed load) 6 Kh-55SMs and 12 Kh-15s. Thus the Tu-160 carries a warload roughly equivalent to the B-52G/H (armed with 12



**A Tu-160 approaches the drogue of an Il-78 for a mid-air refuelling sequence**

AGM-69A SRAMs and 8 AGM-86B ALCMs), although it still falls short of the B-1B in both nuclear and conventional payloads. The Tu-160 however is much faster and features advanced penetration aids (Electronic counter measures) to increase its survivability.

The Tu-160 was considered by the RuAF as the replacement for the Tu-95 [BEAR] family in the strategic strike role. However, production was stopped at 35 aircraft built; not enough for a country the size of Russia. Construction of additional Tu-160s has now slowly resumed. About every other year, a new or rebuilt Tu-160 is introduced to the Russian strategic air arm. It is unknown if Kazan will build more aircraft, or if the funding even exists to make them. The future will see the introduction of the Kh-555 precision-strike missile (Kh-55 [AS-15A Kent] missiles converted to a conventional role), the Kh-101 advanced conventional ALCM and the Kh-102, a nuclear version of the Kh-101. Of the Kh-101/102, the only feature known with certainty is that the seeker has new advanced technology, including image reference as well as terrain reference navigation (essentially emission-free terrain-following). The range is rumored to vastly exceed the 2500-3000km offered by Kh-55, reaching up to 4500-5000km. It is unknown what of the four power plant options (Turbofan, Turbojet, Unducted fan or Turboprop) will be used. What can be deduced however is that these missiles will be worthy successors for the Kh-55SM missiles currently used for strategic attack.



**Kh-55 missiles in the internal rotary launcher**

## APPENDIX: OPERATIONAL MEMBERS OF THE KH-22 (AS-4) FAMILY

Below is the latest info developed by the staffs of the Harpoon Headquarters, Harpoon2002, and by Larry Bond on the various members of the highly interesting family of missiles batch-classified by NATO as "AS-4 Kitchen". We would like to thank Larry Bond for allowing us to post this data publicly here first.

### **Kh-22PSI** (Tu-22KD and Tu-22M2)

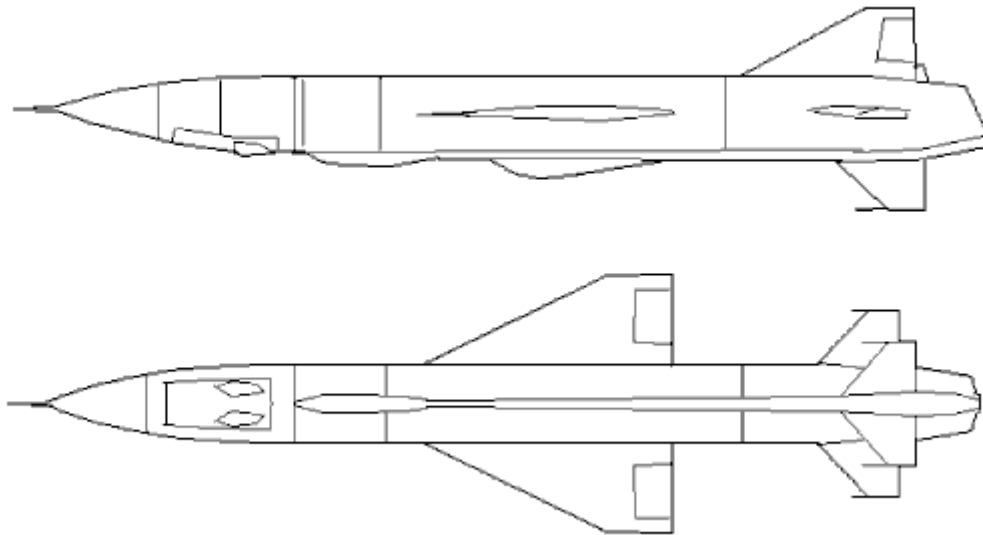
Guidance: Internal Autopilot (Generation 1)

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (depends on launch altitude and speed)

Flight Trajectory: Cruise (at High altitude)

Warhead: 200KT Nuclear



**This diagram depicts one of the land-attack versions of the Kh-22. Notice the radome openings – this may well be the modern NA version.**

### **Kh-22** (Tu-22KD)

Guidance: Internal Autopilot (Generation 1) + PG-type terminal active-radar homing

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (depends on launch altitude and speed)

Flight Trajectory: Cruise (at High altitude)

Warhead: 950 blast-frag (500kg explosives)

### **Kh-22N** (Tu-22KD)

Guidance: Internal Autopilot (Generation 1) + PG-type terminal active-radar homing

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (depends on launch altitude and speed)

Flight Trajectory: Cruise (at High altitude)

Warhead: 200KT Nuclear

### **Kh-22M** (Tu-22M2/3)

Guidance: Internal Autopilot with Terminal Active Radar Homing

Minimum range: 70 nautical miles

Maximum Range: 81 nautical miles (flying at Low altitude)

Flight Trajectory: Cruise (at low altitude)

Warhead: 630kg HE

→There is still some question on the max range of this version!

### **Kh-22MA** (Tu-22M2/3)

Guidance: Internal Autopilot with Terminal Active Radar Homing

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (flying at Low altitude)

Flight Trajectory: Cruise (at High Altitude)

Warhead: 630kg HE

**Kh-22N** (Tu-22M3 and Tu-95K-22) (Note: this is a different missile than the previous "N" – the designation was apparently re-used!)

Guidance: Internal Autopilot with Terminal Active Radar Homing

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (flying at High altitude)

Flight Trajectory: Cruise (at low altitude)

Warhead: 630kg HE

*→The Kh-22N family can launch at any altitude from the 600 meters AGL to 12000 meters AGL. They can also fly at low altitude with a range penalty.*

**Kh-22NA** (Tu-22M3 and Tu-95K-22)

Guidance: Internal Autopilot with Terrain Comparison

Minimum range: 70 nautical miles

Maximum Range: 216 nautical miles (flying at High altitude)

Flight Trajectory: Cruise (at low altitude)

Warhead: 200 KT warhead (sources vary but warhead weight is same as earlier models)

*→The Kh-22N family can launch at any altitude from the 600 meters AGL to 12000 meters AGL. They can also fly at low altitude with a range penalty*