

## Platform Audit: TORNADO

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This is the first in a series of articles that will discuss in-depth different aircraft, their real world weapon systems and how they are built in the Harpoon3 and Harpoon2002 Databases.

### Panavia Tornado MRCA (Multi Role Combat Aircraft)

Aircraft History:

The Tornado was designed originally as a Low level Terrain Following attack aircraft. Later after a major modification (the fuselage was lengthened and re-profiled) a bomber interceptor version was created. The attack versions of the Tornado (the IDS and the GR.1) used a special engine that was developed for the purpose of a very low flying aircraft at high speeds. The interceptor version (ADV or F.2/F.3) has a modified version of these engines that adds a little bit to the dismal high altitude performance of the IDS versions. In the late-1980s/ early-1990s the German and Italian air forces ordered a new version of the IDS the ECR. The ECR was developed for anti radar attack missions (Suppression of Enemy Air Defenses or SEAD in US military lingo). The ECR flies missions at a higher altitude than the normal IDS and thus was fitted with yet another modified engine version.



**The GR.1/IDS strike variant of the Tornado**

What this means in the computer simulations:

First off, an audit of all Tornado versions in both the Harpoon 2002 database (the EC2000 DB to be exact) and that of the Database 2000 for Harpoon2/3 turned up an astonishing fact... NONE of the different performance specifications were included in ANY database. That means all planes were flying like they were the IDS ground attack variety. Worse still is the fact that everyone assumes that the Tornado can fly at high Supersonic speeds at altitude. Yet during in flight refueling they routinely have to "plug in the Afterburner" to keep up with the in-flight refueling tankers! On further research it turns out the RB.199 engines tend to fall off rapidly in performance above 7000 meters (23,000 feet) above sea level. This is because the RB.199 was developed for higher fuel efficiency at low altitudes than normal jet engines for fighter aircraft. The Mk.104 version of the RB.199 has been modified to give greater thrust at altitude but still precludes much more than Mach 1 above the 7000-meter mark. This is very important because the best place for a bomber or missile interceptor is at very high altitudes (in excess of 8000 meters).

What does all of this mean? It means that in both the DB2000 for Computer Harpoon2 and Computer Harpoon3 and for the new database for Harpoon2002 (name to be announced in the future) that the Tornado will lose a lot of high altitude performance. No longer will players be able to "turn tail and run" to outrun enemy Air-to-Air Missiles (AAMs) launched at extreme ranges. Other changes dictated by this recent revelation include a complete change of the sensor suite on the ADV variants of the Tornado. Lastly the Tornado is still not capable of launching the AIM-120B AMRAAM missile to its full effect. As it stands right now the AMRAAM is no more effective than the AIM-9M Missiles carried. This has been updated in both databases. All these changes will be present in future editions of both databases. They are presented here for public comment before the changes take place.



**The ADV (F.1/ F.3) version**

As the various dedicated scenario & database editors strive for a realistic database with what information that is released to the public, they tend to break a lot of how people think a platform should behave. Some of the things done are due to current limitations in the game engine. Others on the other hand are due to the simple fact that is how the platform acts in real life. However, no DB editor claims infallibility; please [E-mail us](mailto:) if you think we are erroneous on something. Common sense is always a good start, although some tangible evidence/proof definitely helps (preferably more than one source).

Proposed changes to Tornado Family in H3 databases: (These speeds are adjusted to altitude)

- RB.199 Mk102 engines 650kts above 7000 meters. 792kts at Sea level (IDS/GR.x Variants)
- RB.199 Mk103 engines are barely supersonic at 7000 meters Speed 650kts Flank at 10000 meters speed is 481kts in Flank! Low/Vlow speed is 680Kts Flank (F.2 ADV)
- RB.199 Mk104 (F.3 ADV) Low/Vlow speed is 680kts Speed at 8500 meters is 680kts At 12000 meters is 515 kts
- RB.199 Mk104+ (F.3 ADV) Low/Vlow speed is 682kts Speed at 8500 meters is 700kts At 12000 meters is 540 kts
- RB.199 Mk106 (Tornado ECR) Low/Vlow speed is 680Kts Flank. At 7000 meters Flank speed is 650kts. At 12000 meters is 520 Kts.
- The Mk 104+ and the Mk 106 are the least fuel-efficient versions of this family of engines.
- Tornado F.3 loses AMRAAM capability until 2004 version IOCs. Until then the Skyflash Super Temp Mod is carried.
- ATA rating of all Tornados is reduced to 2.5/2 as per H4.1 data annex

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