



- *Introduction*

Northrop developed the F-20 Tigershark in response to a U.S. Government call for the private development of a tactical fighter specifically tailored to meet the security needs of allied and friendly nations.

DSB Design brings you this excellent rendition of the F-20A Tigershark airframe and adds some spice to the mix with the addition of DSB Design's artistic impression of the F-20B twin seat airframe.

The F-20 Tigershark product provides you with an enjoyable flight model and numerous external configurations to suit your flying needs as well as a fully functioning 3D virtual cockpit in both the F-20A and Twin Seat F-20B.

Featuring the latest in graphic effects and XML gauge technology, we are sure that the F-20 will provide you with hours of enjoyable flying.

If you have any requests or questions regarding the DSB Design F-20 Tigershark, or other products available from DSB Design, please drop us an e-mail at support@dsbdesign.com or alternately you can visit our forums at <http://www.dsbdesign.com/forum>

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- *Credits*

Project Manager _____	David Brice
Visual Models _____	David Brice, Darren Taylor
Aircraft Textures _____	David Brice
Gauges Programming _____	David Brice
Panel Textures _____	David Brice, Herbert Pralle
Specialist XML Gauges _____	Rob Barendregt
Flight Dynamics _____	David Brice, David Friswell
Beta Testing _____	Jon Watkins, Shane Shrenaski, Chris Larvin
Manual _____	David Brice

Northrop F-20 Tigershark History

Origins

The first flight of the Tigershark was made August 30, 1982. The Mach 2 class F-20 Tigershark's basic single-seat configuration was formally designated the F-20A. The F-20 combined propulsion, electronics and armament technologies with improvements in reliability to sustain high sortie rates in adverse weather.

The F-20 incorporated a combination of advanced technology features. The F-20 could carry more than 8,300 pounds of external armaments and fuel on five pylons. It could carry six Sidewinder missiles on air-to-air missions. For air-to-ground missions, more than 6,800 pounds of armament could be carried. Two internally mounted 20mm guns were standard equipment on the Tigershark.

The avionics system features a General Electric multimode radar, Honeywell laser inertial navigation system, General Electric head-up display, Bendix digital display and control set and Teledyne Systems mission computer.

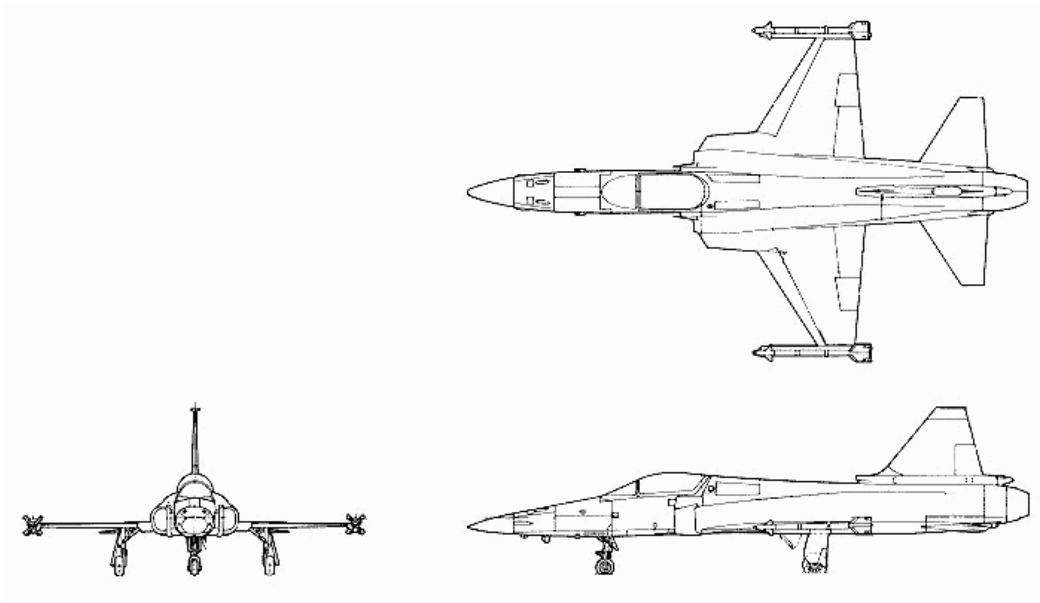
The F-20 is powered by a General Electric F404 engine, with 17,000 pounds of thrust. The F404 is recognized as one of the world's most reliable advanced technology engines. It is also used to power the U.S. Navy/Marine Corps F/A-18A Hornet strike fighter.

Once airborne, the F-20 pilot utilized his multimode radar, which could detect and track targets at ranges of up to 48 nautical miles "look up" and 31 nautical miles "look down." The F-20 mission computer coordinated the aircraft's weapons systems. The head-up display placed critical weapons, target and flight data at the pilot's eye level. This allowed him to fight without having to look down. Northrop designed a new panoramic canopy for the F-20 that gave the pilot a 50 percent increase in rearward visibility over previous Northrop fighters. An improved seat and headrest design combined to substantially expand over-the-shoulder visibility, which is critical in air-to-air combat.

Aerodynamic features of the F-20 included an enlarged leading edge extension to the wing, which generated up to 30 percent of the lift maneuvers. The "shark-shaped" nose allowed the F-20 to maneuver at much higher angles of attack than current operational fighters. The F-20 airframe could withstand nine G's.

The F-20 was reliable and easy to maintain. Based on comparisons with the average of contemporary international fighters, the F-20 consumed 53 percent less fuel, required 52 percent less maintenance manpower, had 63 percent lower operating and maintenance costs and had four times the reliability.

- *Aircraft Specifications*



Crew: One

Dimensions: Length 46 ft 6 in; Height 13 ft 10 in; Wing Span 26 ft 8 in;

Engines: One F404 GE 100 rated at 18,000lb with afterburner.

Weights: Empty Equipped 8,005 lb; Normal Take-off 11,100 lb; Maximum Take-off 27,500 lb

Armament: Two AIM-9 missiles, Five pylons, more than 8,300 lbs external armaments including Bombs, Air to Surface Missiles and BVRAAM Air to Air Missiles.

Performance: Maximum level speed Mach 2+ at 11,000 ft (3355 m); Maximum rate of climb at sea level 52,800 ft/min; Service ceiling 54,700 ft; G-Limits 9G.

- *System Specifications*

- Pentium II 500
 - 128 Mb RAM
 - 140 Mb of free available hard disk space
 - Sound Card
 - Microsoft Flight Simulator 2002 (Professional or Standard Version)
- OR*
- Microsoft Flight Simulator 2004
 - Microsoft Windows 98(SE), Windows ME, Windows 2000 or Windows XP
 - Adobe Acrobat Reader to view and print this manual*
 - Video Card with at least 32mb on board RAM

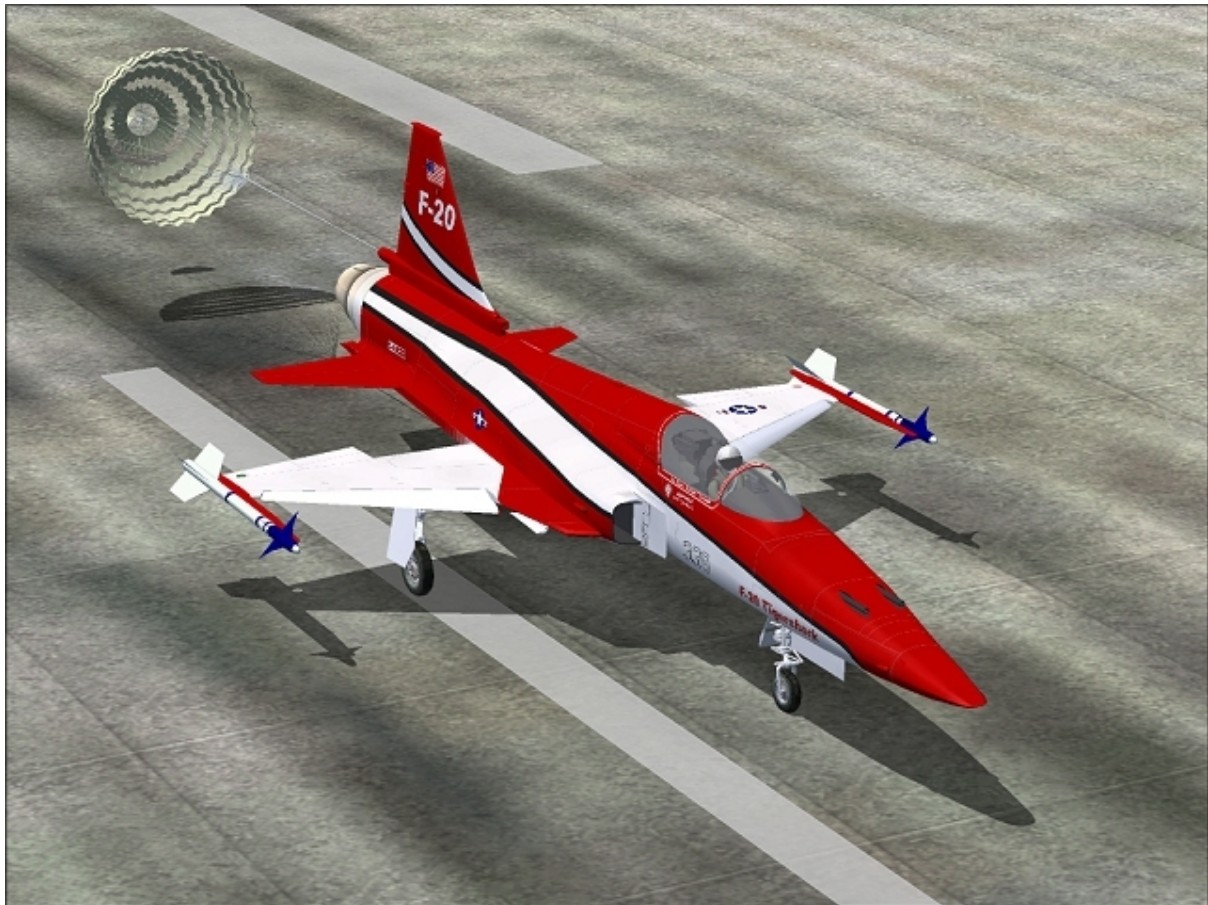
*Adobe Acrobat Reader is available for free from
<http://www.adobe.com/products/acrobat/readstep2.html>

- *F-20 Key Assignments*

Operating the Drag Chute

Operation of the Drag Chute is controlled by the Wing Fold function in Flight Simulator. When the aircraft is above 40 knots and on the ground, pressing Shift + F will open the drag chute and slow the aircraft down with no need for additional braking.

When the aircraft reaches 40 knots, the drag chute will automatically break away from the aircraft.



F-20 Tigershark Glass Cockpit

The DSB Design F-20 Tigershark comes with a custom made Multi Mode MFD's which are expandable for easier reading in flight. These systems link effectively with the Up Front Controller (UFC) which controls lighting, avionics and autopilot functions.

The following section details the DSB MFD's and HUD with full operating controls.



F-20 Tigershark Main View.

The Main View consists of 2 multi mode MFD's (from left to right), HSI, which is switchable to the communications screen and the **Primary Flight Display**.

The Screen to the right of the PFD is the **EMP**, (Engine Management Panel). The EMP provides information on the Tigershark's Engine and Fuel Status.

The analogue displays below the MFD's are from left to right; **Backup Airspeed**, **Backup Altitude**, **Backup Vertical Speed Indicator**, **Standby Attitude Indicator** and the **Radar Warning Receiver** (static). The digital display to the right of the Radar Warning Receiver is the **Digital Clock** showing local time.

The pushbutton panel below the HUD is the **UFC** or **Up Front Controller**. The UFC handles the autopilot and all electrical and avionics controls.

Multi Function Displays

Each MFD is expandable via the top left button on the MFD which allows the MFD to expand to a larger size to make reading easier and provide additional controls. In addition, the button below the expand/shrink MFD option will switch MFD modes.



RMI Screen on Left MFD

The RMI shown above is similar to that of most FS aircraft. The four numerical values at the top show aircraft heading, altitude, speed and distance from dialed in VOR/TACAN on NAV1.

The three arrows on the compass dial indicate the following; A - ADF, T - TACAN/NAV1, V2 - NAV2

The yellow stripe and boxes display the current autoheading.



Comms screen on Left MFD

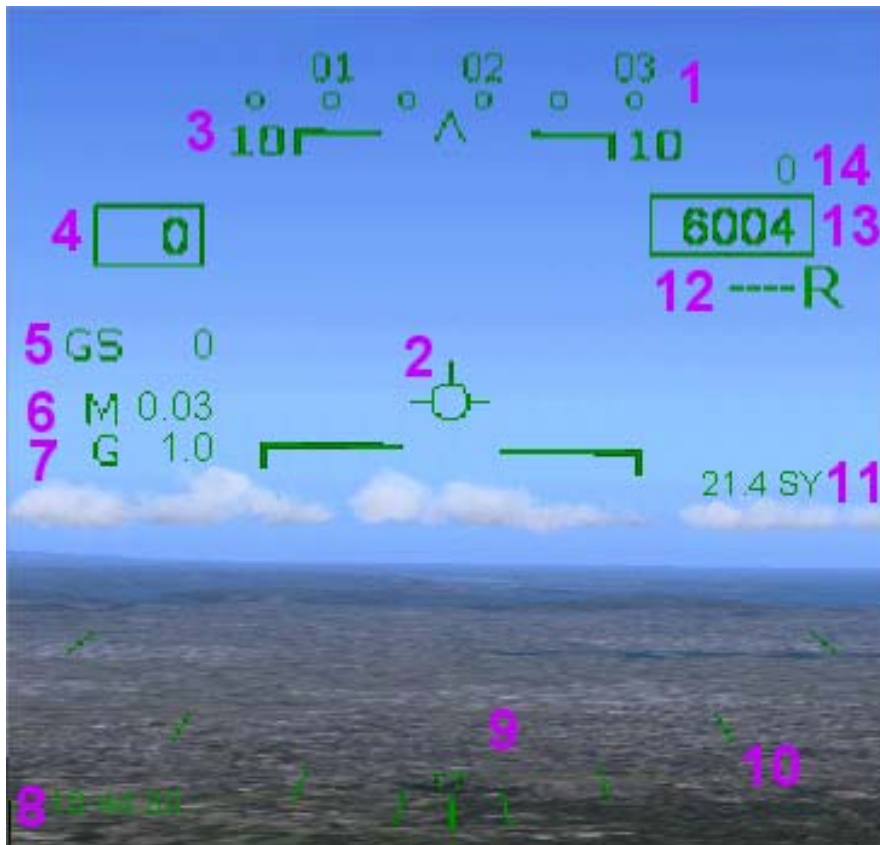
The Comms screen is self explanatory. The numbers relate to the current frequency and the associated crosses to the right can be selected via your mouse when the MFD is in the expanded mode to alter the selected frequency.



Primary Flight Display

The Hawk 100 Primary Flight Display or PFD displays a full digital attitude indicator including ILS display. The upper section of the PFD displays aircraft heading, speed, altitude and distance from current NAV1 DME. The bottom section displays autopilot preset IAS, autopilot heading, and selected autopilot altitude per 100 feet.

Head Up Display in Detail



F-20 Tigershark Series Heads Up Display

The F-20 Tigershark HUD is designed by DSB Design and is a freeware HUD which is only compatible in FS2004. For other HUD solutions for the F-20 relating to FS2002, please visit the DSB Design Forums.

The HUD contains a variety of functions as outlined below;

1. Compass displaying aircraft current heading.
2. Static velocity vector.
3. Pitch and roll ladder in 10 degree increments.
4. Indicated Airspeed.
5. Current Groundspeed.
6. Current Velocity (in Mach value).
7. Current G Load on airframe.
8. Current GPS Local Time
9. Aircraft roll marker
10. Aircraft roll marker reference points
11. Distance from current NAV1 DME station.
12. Radar Altimeter value. (active under 5,000ft AGL)
13. Altimeter value above sea level.
14. Vertical Speed Indicator value.
15. **STALL** - Displays in the centre of the HUD when under stall conditions.
16. **BINGO** - Displays in the Centre of the HUD when fuel is low.