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Credits

We would like to thank the following people for their invaluable contribution to this project.

Project Lead: David Love-Brice

3D Visualisation: David Love-Brice, M.R. & Precise3DModelling

Artwork: David Love-Brice, M.R., Joe Kunzler & Precise3DModelling

Audio Engineering: David Love-Brice & Doug Dawson.


Aerodynamics Simulation: Paul Frimston.

Quality Assurance: Kevin D. Dom, Jerry Witt, Andreas Muno, Joe Kunzler, Raphael Francisco Puttini, Matthew McMahon, Paul Frimston, David Inskip, Tim Hobin, Michael Colley, Jon Kessinger, Robert Graham, Clem Wu, Scen Richter, Sam Rahman & Glenn Roberts

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We would like to offer a special thanks to Martile Allen, Wesley Bard and the team at Lockheed-Martin Global Training & Logistics who manage the Prepar3D training software for their continued faith in our team.
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About this Guide

This guide has been written to familiarize new users to the systems, operations and handling of the Raport Driver product.

It is essential that users have a working knowledge of Microsoft Flight Simulator and/or Lockheed Martin’s Prepar3D and the theory of flight PRIOR to running this product.

By reading and learning this Operations Manual prior to flying and keeping it to hand during your flight for reference, you will gain the most enjoyment from this product.

Tech Talk!

Virtual Cockpit Item Interaction

In general, LEFT mouse-click places a switch AWAY from the aircrew and a rotary selector COUNTER CLOCKWISE.

A RIGHT mouse-click places a switch TOWARDS the aircrew and a rotary selector CLOCKWISE.

In some circumstances this does not apply, but the majority of switches and knobs operate in this fashion.

Missing objects and other visual anomalies

The RAPTOR DRIVER has hundreds, if not thousands of custom variables in its code…and well, despite our best efforts, sometimes an object might not show up properly!

If you find an instant that a part of your aircraft is missing, or the seats aren’t showing up properly, don’t panic… just call your friendly maintenance chief (aka reload your aircraft) and you should be fine. If you have repeated instances of issues, please contact us via the Support menu at www.irissimulations.com.au

Lastly, keep an eye on the IRIS website for more information and other paint-schemes for the RAPTOR DRIVER!
Getting the best from your product!

If you’re running Prepar3D V2.X AND do not have Microsoft Flight Simulator X installed on your computer, you may not have the correct FSX SimConnect module installed. To gain the use of the fantastic custom sound engine and dynamic fueling capabilities of this product, please follow the instructions below.

1. Please ensure you install the FSX-XPACK Simconnect.msi file from the following folder prior to flying this product.

   - Prepar3D V2\Redist\Interface\FSX-SP2-XPACK\retail\lib

2. Next load up your Prepar3D V2\Simobjects\Airplanes\IRIS Raptor Driver\Panel\panel.cfg file in notepad or another similar text editing program.

3. Remove the // characters from in front of gauge11 and gauge12 entries in the [V_Cockpit01] section so they read as follows:

   \n   gauge11=dsd_fsx_xml_sound!Sound, 1,1,1,1, dsd_fsx_xml_sound.ini
   gauge12=fuel_control\rate_control, 1,1,1,1

4. Save the file and overwrite the existing content.

For reference, the correct Simconnect module should be as follows;

Microsoft ESP SimConnect Client v1.0.20.0
AND
Microsoft Flight Simulator SimConnect Client v10.0.61259.0

The above installations can be verified via your Windows ‘Uninstall or Change a Program’ control panel.
Characteristics

The Lockheed Martin F-22 Raptor is a single-seat, twin-engine fifth-generation supersonic supermaneuverable fighter aircraft that uses stealth technology. It was designed primarily as an air superiority fighter, but has additional capabilities that include ground attack, electronic warfare, and signals intelligence roles.

General characteristics

- Crew: 1
- Length: 62 ft 1 in (18.90 m)
- Wingspan: 44 ft 6 in (13.56 m)
- Height: 16 ft 8 in (5.08 m)
- Wing area: 840 ft² (78.04 m²)
- Airfoil: NACA 64A 05.92 root, NACA 64A 04.29 tip

- Empty weight: 43,340 lb (19,700 kg)
- Loaded weight: 64,460 lb (29,300 kg)
- Max. take-off weight: 83,500 lb (38,000 kg)
Performance

Maximum speed: **At altitude: Mach 2.25 (1,500 mph, 2,410 km/h) [estimated]**
Supercruise: Mach 1.82 (1,220 mph, 1,963 km/h)
Range: >1,600 nmi (1,840 mi, 2,960 km) with 2 external fuel tanks
Combat radius: 410 nmi (with 100 nmi in supercruise) (471 mi, 759 km)
Ferry range: 2,000 mi (1,738 nmi, 3,219 km)
Service ceiling: >65,000 ft (19,812 m)
Wing loading: 77 lb/ft² (375 kg/m²)
Thrust/weight: 1.09 (1.26 with loaded weight & 50% fuel)

Maximum design g-load: -3.0/+9.0 g

Powerplant

2 Pratt & Whitney F119-PW-100 Pitch Thrust vectoring turbofans
- Dry thrust: 23,500 lb (104 kN) each
- Thrust with afterburner: 35,000+ lb (156+ kN) each

Armament

Guns: 1× 20 mm (0.787 in) M61A2 Vulcan 6-barreled Gatling cannon in right wing root, 480 rounds

Air to air loadout:
6× AIM-120 AMRAAM
2× AIM-9 Sidewinder

Air to ground loadout:
2× AIM-120 AMRAAM and
2× AIM-9 Sidewinder for self-protection, and one of the following:
2× 1,000 lb (450 kg) JDAM or
8× 250 lb (110 kg) GBU-39 Small Diameter Bombs

Hardpoints:
4× under-wing pylon stations can be fitted to carry 600 U.S. gallon drop tanks or weapons, each with a capacity of 5,000 lb (2,268 kg).
1.0 Cockpit Overview

Aircrew instruments and controls are divided into three main sections: one is the main instrument panel and the other two are the left and right consoles, located on each side of the aircrew's seat. A huge effort has been made to reproduce the myriad of displays, switches and other controls with as much fidelity as possible.
1.1 Main Instrument Panel

The Integrated Control Panel (ICP) is the heart of the aircraft’s systems, navigation and combat capabilities. The units interface with the Primary Multi-Function Display (PMFD), Heads-up Display (HUD), Secondary Multi-Function Displays (SMFD) and two Up-Front Displays (LUFD).

Descriptions of the numbered elements displayed above:

(1) Heads-up Display (HUD) – A flight instrument for the purposes of showing the aircrew various information regarding the current flight behaviour of the aircraft.

(2) Left Up Front Display (LUFD) – A system display instrument covering the Integrated Caution, Advisory and Warning System (ICAW).

(3) Integrated Control Panel (ICP) – The main interface for the aircraft’s integrated avionics.

(4) Right Up Front Display (RUFD) – A backup flight display showing all pertinent flight data for the purposes of coordinated flight in the event of onboard systems malfunction.

(5) Left Secondary Multi-Function Display (Left SMFD) – An active matrix liquid crystal display (AMLCD) featuring various navigation and systems data for the purposes of safe operation of the aircraft.
(6) Primary Multi-Function Display (PMFD) – An active matrix liquid crystal display (AMLCD) featuring all pertinent navigation and tactical data for the purposes of safe and effective operation of the aircraft.

(7) Right Secondary Multi-Function Display (Right SMFD) – An active matrix liquid crystal display (AMLCD) featuring various navigation and systems data for the purposes of safe operation of the aircraft.

(8) Bottom Secondary Multi-Function Display (Bottom SMFD) – An active matrix liquid crystal display (AMLCD) featuring various navigation and systems data for the purposes of safe operation of the aircraft.

(9 & 10) Rudder Pedals – Used for taxiing and yaw control of the aircraft.

**AIRCrew ADVISORY NOTICE**

Please refer to the integrated avionics section for information relating to the operation of the aircraft’s ICP, PMFD, SMFD and UFD units.
1.2 Aircrew’s Left-hand Console

The aircrew’s left hand console contains the oxygen and interior lighting systems, throttle console as well as fuel and engine controls. Further explanations are outlined in the following section.

Descriptions of the numbered elements displayed above:

(1) Flight Control System (FLCS) Approach Control Switch – A two position switch which when in the AUTO position, provides full control of the flaps to the FLCS. In the OFF position, trailing edge flaps can be controlled manually by the aircrew.

(2) FLCS Yaw Trim Switch – A three position sprung rocker switch which controls the yaw (rudder) trim on the aircraft via the FLCS.

In this instance, LEFT-CLICK will trim the rudder LEFT and RIGHT CLICK will trim the rudder to the RIGHT. Releasing the mouse button when the mouse is OVER the switch will cease further trim inputs.

(3) FLCS Alternate Flaps Switch – A two position switch which overrides the FLCS and puts the trailing edge flaps in the fully extended position when in the EXTEND position. This switch overrides the FLCS Approach Control Switch but does not provide manual flaps control to the aircrew.

(4) Engine Motor Pushbutton – When used in conjunction with the Left or Right FADEC switch, this button will force a manual start of the selected engine.
(5) **Engine FADEC Switch** – When used in conjunction with the Engine Motor pushbutton, this switch will force a manual start of the selected engine.

(6) **Left and Right Throttle Levers** – Two levers which control both engine power and engine startup and shutdown.

In this instance, LEFT-CLICK will engage the respective engine start-up and self-test program and RIGHT CLICK will engage the respective engine shutdown program.

(7) **Auxiliary Power Unit (APU) Switch** – A three position switch which controls the operation of the aircraft’s Auxiliary Power Unit, which provides power to onboard systems when no generator power is available.

In the ARM position, this switch will automatically power up the APU in the event of engine flame-out during flight. If engine power is detected whilst the switch is in the ARM position, the APU will shut-down automatically.

In the START position, this switch will power up the APU if battery power is available regardless if the aircraft is airborne or not, providing the engines are not providing power to the onboard systems via the left or right generator buses.

In the OFF position, this switch will always power down the APU.

(8) **Right Generator Bus Switch** – A two position switch which enables power from the right engine or left engine (via the bus tie circuit) to feed the onboard electrical systems.

(9) **Left Generator Bus Switch** – A two position switch which enables power from the left engine or right engine (via the bus tie circuit) to feed the onboard electrical systems.

---

**AIRCREW CAUTIONARY NOTICE**

Onboard primary systems may cease to operate if there is a lack of power to both the left and right generator buses due to both engine and APU failure.

(10) **Air-Air Refueling (AAR) Switch and Lighting Knob** – A two position switch which opens the aircraft’s air to air refuelling receptacle located behind the aircraft canopy. A rotating knob to the right of the AAR switch controls the brightness of the AAR receptacle floodlights for aiding in low light conditions.

(11) **Fuel Source switch** – A two position switch which controls if the fuel source is from external fuel tanks or all internal fuel tanks.

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*FOR SIMULATION USE ONLY*
**AIRCREW ADVISORY NOTICE**

Fuel control of internal fuel tanks is entirely automated by onboard systems to provide an optimum flight profile at various onboard fuel weights.

(12) External Formation Lighting Knob – A ten (10) position rotating knob which controls the intensity of the aircraft’s exterior formation lighting.

(13) External Navigation/Anti-Collision Lighting Knob – A three position knob which controls the aircraft’s wingtip navigation and anti-collision lighting.

In the **OFF** position, all wingtip lighting is OFF.

In the **POSITION/ANTICOL** position, both the wingtip navigation and anti-collision strobe lights are illuminated.

In the **ANTICOL** position, only the wingtip anti-collision strobe lights are illuminated.

(14) Lighting Mode Switch – A three position switch which controls the overall lighting presets of the interior cockpit.

In the **DAY** position, all floodlight and instrument backlighting are set to OFF and the displays are set to a full brightness display. HUD Night Vision is disabled.

In the **NITE** position, instrument backlighting and console lighting are set to appropriate levels and displays are dimmed to reduce glare, HUD Night Vision is enabled.

In the **NVG** position, all cockpit lighting is set to minimal values and displays toggle to suitable colours for use with Night Vision Goggles. HUD Night Vision is disabled.

(15) MFD Brightness Knob – A ten (10) position rotating knob which adjusts the intensity of the Primary and Secondary Multi-function Displays.

(16) Instrument Brightness Knob – A ten (10) position rotating knob which adjusts the intensity of the Left and Right Up-front Displays.

(17) Console Brightness Knob – A ten (10) position rotating knob which adjusts the intensity of the console backlighting.

(18) Flood Light Brightness Knob – A ten (10) position rotating knob which adjusts the intensity of the in-cockpit floodlighting.
(19) **Lamp Test Switch** – A three position switch which tests the onboard warning lamps and NVG illuminations.

(20) **Park Brake Switch** – A three position switch which controls the aircraft’s braking system.

In the **RELEASE** position, the wheel brakes are fully released and brake pressure can be applied via the toe brakes on the rudder pedals.

In the **ANTI-SKID** position, the wheel brakes unlock when the braking system detects a possible skid situation.

In the **PARK BRAKE** position, the wheel brakes are set to be fully engaged. This is the standard position when the aircraft is on the ground during startup.

(21) **Landing/Taxi Light Switch** – A three position switch which controls the twin landing/taxi lights on the nose gear strut.

(22) **Master Arm Switch** – The master arm switch controls the use of any onboard stores and weapons.

In the **SAFE** position, no weapons or ordnance can be deployed by the aircraft.

In the **ARM** position, the aircrew has authority to release onboard stores if required.

(23) **Gear Status Lights** – Three lights which indicate the position of the aircraft’s left, right and nose landing gear position.

If the gear is unlocked and in motion, the **RED** indicator will display for the gear leg affected.

If the gear is up and locked, the gear illumination will extinguish for the gear leg affected.

If the gear is down and locked, the **GREEN** indicator will display for the gear leg affected.

(24) **Landing Gear Handle** – The landing gear handle commands the aircraft to raise or lower the aircraft’s landing gear. If the system detects the aircraft is on the ground, the landing gear cannot be raised regardless of the handle position.
1.3 Aircrew’s Right-hand Console

The aircrew’s left hand console contains the oxygen and interior lighting systems, throttle console as well as fuel and engine controls. Further explanations are outlined in the following section.

Descriptions of the numbered elements displayed above:

(1) **Communications/Navigation/Instrumentation (CNI) Master Switch** – The CNI switch controls master control of the aircraft’s CNI functions. The switch should always remain in the ON position.

**AIRCREW CAUTIONARY NOTICE**

Inhibiting the aircraft’s CNI system will result in a loss of all aircraft avionics and communication abilities.

(2) **AUX/ACP Switch** – To be completed.

(3) **On-Board Oxygen Generation System (OBOGS) Mixture Switch** – The OBOGS mixture switch controls the amount of oxygen/air mixture being fed to the aircrew via the oxygen mask.

(4) **OBOGS Mode Switch** – To be completed.

(5) **OBOGS Power Switch** – This two position switch toggles the OBOGS on and off.
(6) AUX COM Mode Knob – This four (4) position knob controls the mode that the auxiliary communication system runs on.

In the KP position, the ICP has full control of the AUX COM functions via the COM.2 controls.

In the MAN position, the AUX COM panel takes control of all COM.2 functions.

In the PRESET position, the AUX COM panel displays channel numbers rather than a frequency and the left knob cycles through preset frequencies.

A list of channels and associated frequencies can be found in the ‘TACAN and Radio Presets’ supplement.

In the GUARD position, the AUX COM radio automatically cycles the COM.2 radio to the guard frequency of 121.5 Mhz.

USER ADVISORY NOTICE

Whilst we are aware that 121.5 Mhz is the civilian guard frequency, the simulation software does not support the range of 243.0 Mhz used by the military as a guard frequency.

Tuning AUX COM to 122.2 Mhz will play background military chatter.

(7) AUX COM Brightness Knob – A ten position knob which controls the intensity of the AUX COM display.

(8) AUX COM Radio Tuning Knob – A rotating knob which adjusts the COM.2 frequency in 25 Khz increments.

(9) AUX COM Radio Tuning Knob – A rotating knob which adjusts the COM.2 frequency in 1 Mhz increments ranging from 118 Mhz to 136 Mhz.

(10) MIDS Volume Knob – Not currently simulated.

(11) RCN Volume Knob – Not currently simulated.

(12) AUX Volume Knob – Not currently simulated.

(13) RWR Volume Knob – Not currently simulated.

(14) ICS Volume Knob – Not currently simulated.

(15) VOX Volume Knob – Not currently simulated.
(16) Bleed Air Source Knob – To be completed.

(17) Environmental Control System (ECS) Anti-Fog Knob – Adjusts the ambient temperature on the canopy to reduce or eliminate canopy fogging.

(18) ECS Temperature Knob – Adjusts the ambient temperature within the cockpit.

(19) Battery Status Light – This light indicates if the aircraft battery circuit is currently energised.

(20) Battery Switch – A two position switch which turns the master battery circuit on and off.

(21) Aircrew Control Column – A two axis control column which controls the pitch and roll of the aircraft.

“Stick goes back, cows get smaller.

Stick goes forward, cows get bigger.”

(22) Aircrew Control Column Toggle – LEFT-CLICKING this element of the cockpit will hide the aircrew control column. Right clicking the element will reveal the aircrew control column.

This feature has been added to aid visibility of the audio and ECS elements to the right of the aircrew.
2.0 Integrated Avionics – Integrated Control Panel

2.0.1 ICP OVERVIEW

The Integrated Control Panel is located on the main instrument panel just below the Heads-up Display and consists of a numeric keypad for data entry, a mode keypad for master mode interaction, a single line scratchpad and five information displays.

The displays are split into two elements, a SCRATCHPAD above the keypad and a five line DATA DISPLAY.

The DATA DISPLAY shows all necessary information to the aircrew as dictated by the ICP mode selected. The SCRATCHPAD displays any aircrew entered data prior to acceptance by the ICP system.

To the RIGHT of the keypad are the five (5) DATA DISPLAY lines, each with their own corresponding LINE SELECT KEYS (LSK).

The LSK’s are used for selecting various individual data fields or entering data points to the ICP system.

The numbered items above are as follows;

(1) ICP MODE Keys – These keys will alter the ICP mode and subsequent data displays. The modes are as follows;

COM1
- Displays the COM page for the purposes of viewing and altering the COM radios in the aircraft. In addition, the COM page allows alteration of COM.1 and volumes.

COM.1 and COM.2 IDENT volumes can also be adjusted via the COM1 VOL and COM2 VOL knobs on the side of the ICP unit.
COM2 - Displays the COM page for the purposes of viewing and altering the COM.2 radio in the aircraft. In addition, the COM page allows alteration of COM.2 and volumes.

COM.1 and COM.2 IDENT volumes can also be adjusted via the COM1 VOL and COM2 VOL knobs on the side of the ICP unit.

NAV - Displays the NAV page and subpages for the purposes of viewing and altering the NAV radios in the aircraft. In addition, the NAV page allows alteration of NAV.1 and 2 IDENT volumes along with TACAN 1 & 2, ILS 1 & 2, STEER-POINT DATA, ADF and the F-22 Global Inertial Reference System (GINS).

STPT - Displays the STEER-POINT page for the purposes of viewing the currently inputted flight-plan data loaded into the mission computer.

AIRCREW ADVISORY NOTICE

The STPT master mode button redirects the aircrew to the NAV master mode steer-point sub-page.

Please refer to 2.11.1 - ICP STEER-POINT (STPT) SUB-MODE for further information.

IFF - Displays the current IFF/Transponder page allowing the aircrew to alter IFF frequency and modes.

ALT - Displays the Altitude Information page for the purposes of adjusting onboard altitude reference information such as pressures, altitude modes and units of measurement.

HUD - Displays the current HUD configuration options for navigation and tactical weapons deployment such as Air to Air (A/A) and Air to Ground (A/G) modes.

OTHR - Displays various other data pages not specifically called upon by the other master mode keys such as Flight Data, Fuel Data, Built-In Test functions and Emission Control (EMCON) systems.

DVR - Not currently simulated.

A/P - Displays the various Autopilot modes and functions such as altitude, speed, heading and approach control functions.

(2) ICP Scratchpad – The scratchpad either displays frequency and page information or acts as a display for aircrew entered data prior to it being confirmed into the aircraft’s CNI systems.

(3) ICP Keypad – These keys allow the aircrew to enter in data to the scratchpad prior to it being confirmed into the aircraft’s CNI systems.
(4) **ICP Line Select Keys (LSK)** – These keys will allow the aircrew to directly interact with the ICP Data Displays, such as navigating various sub-pages or cycling through displayed information.

(5) **ICP Data Display Lines** – The Data Display lines show the aircrew various important information for the purposes of operating the aircraft in a safe environment.

Data Display lines beginning with the character ‘>’ indicate an item which can be either selected or toggled between various states.

Data Display lines beginning with the character ‘:' indicate an item which points to a sub-mode or sub-page, such as seen on the NAV Master Mode page.

(6) **ICP MRK Key** – This key sends any aircrew entered scratchpad data into the CNI systems. Any errors picked up in the formatting or entry of the scratchpad data will be displayed on the scratchpad by the text ‘ERR/RETRY’ and the aircrew will be given the option to attempt the data entry again.

(7) **ICP Page Cycle Rocker Key** – This key allows the aircrew to cycle through various pages where multiple pages are indicated either on the scratchpad or data display.

LEFT-CLICK will cycle the pages incrementally, RIGHT CLICK does nothing.

(8) **ICP COM.1 Volume Knob** – This knob will adjust the COM.1 volume and overrides any setting on the ICP input from the COM1 Master Mode screen.

(9) **ICP COM.2 Volume Knob** – This knob will adjust the COM.2 volume and overrides any setting on the ICP input from the COM1 Master Mode screen.

(10) **Heads-up Display (HUD) Brightness Knob** – This knob will increase or decrease the Heads-up Display intensity as required by the aircrew.

(11) **ICP Brightness Knob** – This knob will increase or decrease the ICP Scratchpad and Data Display intensity as required by the aircrew.

ICP Backlighting is controlled by the CONSOLE LIGHT knob on the left hand console as referenced in section ‘1.2 Aircrew’s Left-hand Console, item 17’.
2.1.1 - ICP COM.1 PAGE

The ICP COM.1 page features the following displays:

**SCRATCHPAD**  - COM.1 active frequency.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - COM.1 volume.

**DATA LINE.3**  - COM.1 volume adjustment and cancellation display.

**DATA LINE.4**  - N/A

**DATA LINE.5**  - COM.1 frequency adjustment and cancellation display.

**INTERACTION METHODS – COM.1 VOLUME**

To alter the COM.1 volume, follow one of the procedures below;

1. Using the mouse-wheel, scroll the COM.1 Knob located on the Left of the ICP.

2. **LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the COM.1 IDENT volume.
INTERACTION METHODS – COM.1 FREQUENCY

To alter the COM.1 frequency, follow the procedure below:

1. LEFT-CLICK LSK5 once. Confirm that > FREQ ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired radio frequency up to five (5) digits without the decimal point and LEFT-CLICK the MRK key. (e.g. 124.850 would be entered in by the value 12485)

2.2.1 - ICP COM2 PAGE

AIRCREW ADVISORY NOTICE

COM.2 ICP functions are identical in structure and operation to that of COM.1 functions.

As such, please refer to section 2.1.1 – ICP COM.1 Page for further information on COM.2 functions.
2.3.1 - ICP NAV MASTER MODE PAGE 1

The ICP NAV Master Mode page 1 features the following displays;

- **SCRATCHPAD**: Current Master Mode page.
- **DATA LINE.1**: NAV.1 sub-mode page.
- **DATA LINE.2**: NAV.2 sub-mode page.
- **DATA LINE.3**: TACAN.1 sub-mode page.
- **DATA LINE.4**: TACAN.2 sub-mode page.
- **DATA LINE.5**: ADF sub-mode page.

**INTERACTION METHODS – NAV MASTER MODE PAGE 1**

LEFT-CLICKING any of the LSK buttons on this page will take you to the selected sub-mode pages.
2.3.2 - ICP NAV MASTER MODE PAGE 2

The ICP NAV Master Mode page 2 features the following displays:

**SCRATCHPAD** - Current Master Mode page.

**DATA LINE.1** - ILS.1 sub-mode page.

**DATA LINE.2** - ILS.2 sub-mode page.

**DATA LINE.3** - STEER-POINT/MISSION sub-mode page.

**DATA LINE.4** - Global INS (GINS) sub-mode page.

**DATA LINE.5** - N/A

**INTERACTION METHODS – NAV MASTER MODE PAGE 2**

**LEFT-CLICKING** any of the **LSK** buttons on this page will take you to the selected sub-mode pages.
2.4.1 - ICP NAV.1 SUB-MODE (1/3)

The ICP NAV.1 sub-mode page 1 features the following displays:

**SCRATCHPAD**  
- NAV.1 active frequency.

**DATA LINE.1**  
- Page title & index.

**DATA LINE.2**  
- Currently tuned NAV.1 IDENT.

**DATA LINE.3**  
- Range to currently tuned NAV.1 navigation aid in nautical miles.

**DATA LINE.4**  
- Bearing to currently tuned NAV.1 navigation aid in degrees magnetic.

**DATA LINE.5**  
- Estimated time en-route (ETE) to currently tuned NAV.1 navigation aid at current speed in hours, minutes & seconds.

This current page features no interactive elements.
2.4.2 - ICP NAV.1 SUB-MODE (2/3)

The ICP NAV.1 sub-mode page 2 features the following displays:

**SCRATCHPAD**  - NAV.1 active frequency.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - Currently tuned NAV.1 IDENT.

**DATA LINE.3**  - Current Local or Zulu time.

**DATA LINE.4**  - Estimated time en-route (ETE) to currently tuned NAV.1 navigation aid at current speed in hours, minutes & seconds.

**DATA LINE.5**  - Time on Arrival (TOA) at currently tuned NAV.1 navigation aid at current speed in hours, minutes & seconds.

**INTERACTION METHODS – CURRENT TIME DISPLAY**

To alter the time value on Data Line 3 between Local and Zulu time, simply **LEFT-CLICK** on **LSK3** to toggle between Local and Zulu Time.
2.4.3 - ICP NAV.1 SUB-MODE (3/3)

The ICP NAV.1 sub-mode page 3 features the following displays:

**SCRATCHPAD** - NAV.1 active frequency.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - NAV.1 volume.

**DATA LINE.3** - NAV.1 volume adjustment and cancellation display.

**DATA LINE.4** - N/A

**DATA LINE.5** - NAV.1 frequency adjustment and cancellation display.

**INTERACTION METHODS – NAV.1 VOLUME**

To alter the NAV.1 volume, follow the procedure below:

**LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the NAV.1 IDENT volume.

**INTERACTION METHODS – NAV.1 FREQUENCY**

To alter the NAV.1 frequency, follow the procedure below:

1. **LEFT-CLICK LSK5** once. Confirm that > FREQ ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired radio frequency up to five (5) digits without the decimal point and **LEFT-CLICK** the MRK key. *(e.g. 118.100 would be entered in by the value 11810)*
2.5.1 - ICP NAV.2 SUB-MODE

**AIRCrew ADVISORY NOTICE**

NAV.2 ICP functions are identical in structure and operation to that of NAV.1 functions.

As such, please refer to section 2.4.1 – ICP NAV.1 SUB-MODE Pages for further information on NAV.2 functions.
2.6.1 - ICP TACAN.1 SUB-MODE (1/4)

The ICP TACAN.1 sub-mode page 1 features the following displays:

**SCRATCHPAD**
- TACAN.1 Mode, channel and band.

**DATA LINE.1**
- Page title & index.

**DATA LINE.2**
- Currently tuned TACAN.1 IDENT.

**DATA LINE.3**
- Range to currently tuned TACAN.1 navigation aid in nautical miles.

**DATA LINE.4**
- Bearing to currently tuned TACAN.1 navigation aid in degrees magnetic.

**DATA LINE.5**
- Estimated time en-route (ETE) to currently tuned TACAN.1 navigation aid at current speed in hours, minutes & seconds.

This current page features no interactive elements.
2.6.2 - ICP TACAN.1 SUB-MODE (2/4)

The ICP TACAN.1 sub-mode page 2 features the following displays:

**SCRATCHPAD** - TACAN.1 Mode, channel and band.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Currently tuned TACAN.1 IDENT.

**DATA LINE.3** - Current Local or Zulu time.

**DATA LINE.4** - Estimated time en-route (ETE) to currently tuned TACAN.1 navigation aid at current speed in hours, minutes & seconds.

**DATA LINE.5** - Time on Arrival (TOA) at currently tuned TACAN.1 navigation aid at current speed in hours, minutes & seconds.

**INTERACTION METHODS – CURRENT TIME DISPLAY**

To alter the time value on Data Line 3 between Local and Zulu time, simply **LEFT-CLICK** on **LSK3** to toggle between Local and Zulu Time format.
2.6.3 - ICP TACAN.1 SUB-MODE (3/4)

The ICP TACAN.1 sub-mode page 3 features the following displays:

**SCRATCHPAD**  - TACAN.1 Mode, channel and band.
**DATA LINE.1**  - Page title & index.
**DATA LINE.2**  - Currently selected TACAN.1 Mode.
**DATA LINE.3**  - Currently selected TACAN.1 Channel.
**DATA LINE.4**  - Currently selected TACAN.1 Band.
**DATA LINE.5**  - N/A

**INTERACTION METHODS – TACAN.1 MODE**

**LEFT-CLICKING LSK2** will cycle through the following three TACAN modes;

**A/A** – Air to Air TACAN mode. Currently not simulated.

**T/R** – Transmit & Receive TACAN Mode. Provides both heading and distance information

**REC** – Receive only TACAN mode. ONLY provides TACAN heading information.
INTERACTION METHODS – TACAN.1 CHANNEL

To alter the TACAN Channel, follow the procedure below;

1. **LEFT-CLICK LSK3** once. Confirm that **DATA DISPLAY LINE 3** now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired TACAN channel up to three (3) digits and **LEFT-CLICK** the MRK key.

INTERACTION METHODS – TACAN.1 BAND

To alter the TACAN Band (X/Y), follow the procedure below;

1. **LEFT-CLICK LSK4** to cycle between X and Y band. Verify the change on the ICP Scratchpad.

**AIRCREW ADVISORY NOTICE**

TACAN, ILS and NAV functions in the RAPTOR DRIVER are all tied to the simulator’s NAV.1 or NAV.2 radios. As such, alteration to the NAV.1 or NAV.2 radio will in turn affect both ILS1, ILS2 and TACAN.1 & TACAN.2.

- RAPTOR DRIVER: TACAN.1 / FSX/P3D: NAV.1
- RAPTOR DRIVER: TACAN.2 / FSX/P3D: NAV.2
- RAPTOR DRIVER: NAV.1 / FSX/P3D: NAV.1
- RAPTOR DRIVER: NAV.2 / FSX/P3D: NAV.2
- RAPTOR DRIVER: ILS.1 / FSX/P3D: NAV.1
- RAPTOR DRIVER: ILS.2 / FSX/P3D: NAV.2

Please bear the above in mind when planning your mission.

For a full list of TACAN channels and their associated MICROSOFT FLIGHT SIMULATOR X or LOCKHEED MARTIN PREPAR3D NAV radio frequencies, please refer to the RAPTOR DRIVER TACAN supplement.
2.6.4 - ICP TACAN.1 SUB-MODE (4/4)

The ICP TACAN.1 sub-mode page 4 features the following displays:

**SCRATCHPAD** - TACAN.1 active frequency.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - TACAN.1 volume.

**DATA LINE.3** - TACAN.1 volume adjustment and cancellation display.

**DATA LINE.4** - N/A

**DATA LINE.5** - N/A

**INTERACTION METHODS – TACAN.1 VOLUME**

To alter the TACAN.1 volume, follow the procedure below:

**LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the TACAN.1 IDENT volume.
2.7.1 - ICP TACAN.2 SUB-MODE

**AIRCREW ADVISORY NOTICE**

TACAN.2 ICP functions are identical in structure and operation to that of TACAN.1 functions.

As such, please refer to section 2.6.1 – ICP TACAN.1 SUB-MODE Pages for further information on TACAN.2 functions.
2.8.1 - ICP ADF SUB-MODE (1/2)

The ICP ADF sub-mode page 1 features the following displays:

**SCRATCHPAD**  - ADF active frequency.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - N/A

**DATA LINE.3**  - N/A

**DATA LINE.4**  - Bearing to currently tuned ADF navigation aid in degrees magnetic.

**DATA LINE.5**  - Current Local or Zulu time.

**INTERACTION METHODS – CURRENT TIME DISPLAY**

To alter the time value on Data Line 5 between Local and Zulu time, simply **LEFT-CLICK** on **LSK5** to toggle between Local and Zulu Time format.
2.8.2 - ICP ADF SUB-MODE (2/2)

The ICP ADF page features the following displays:

**SCRATCHPAD** - ADF active frequency.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - ADF volume.

**DATA LINE.3** - ADF volume adjustment and cancellation display.

**DATA LINE.4** - N/A

**DATA LINE.5** - ADF frequency adjustment and cancellation display.

**INTERACTION METHODS – ADF VOLUME**

To alter the ADF volume, follow one the procedure below:

1. **LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the ADF IDENT volume.

**INTERACTION METHODS – ADF FREQUENCY**

To alter the ADF frequency, follow the procedure below:

1. **LEFT-CLICK LSK5** once. Confirm that > FREQ ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired radio frequency up to four (4) digits without the decimal point and **LEFT-CLICK** the MRK key. *(e.g. 286.5 would be entered in by the value 2865)*
2.9.1 - ICP ILS.1 SUB-MODE (1/3)

The ICP ILS.1 sub-mode page 1 features the following displays:

**SCRATCHPAD** - ILS.1 active frequency.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Currently tuned ILS.1 IDENT.

**DATA LINE.3** - Range to currently tuned ILS.1 navigation aid in nautical miles.

**DATA LINE.4** - Bearing to currently tuned ILS.1 navigation aid in degrees magnetic.

**DATA LINE.5** - Status of currently tuned ILS.1 navigation aid;

  - **GS** – ILS.1 has Glideslope.
  - **LOC** – ILS.1 has Localiser.

This current page features no interactive elements.
2.9.2 - ICP ILS.1 SUB-MODE (2/3)

The ICP ILS.1 sub-mode page 2 features the following displays:

**SCRATCHPAD**
- ILS.1 active frequency.

**DATA LINE.1**
- Page title & index.

**DATA LINE.2**
- Currently tuned ILS.1 IDENT.

**DATA LINE.3**
- Current Local or Zulu time.

**DATA LINE.4**
- Estimated time en-route (ETE) to currently tuned ILS.1 navigation aid at current speed in hours, minutes & seconds.

**DATA LINE.5**
- Time on Arrival (TOA) at currently tuned ILS.1 navigation aid at current speed in hours, minutes & seconds.

**INTERACTION METHODS – CURRENT TIME DISPLAY**

To alter the time value on Data Line 3 between Local and Zulu time, simply **LEFT-CLICK** on **LSK3** to toggle between Local and Zulu Time format.
2.9.3 - ICP ILS.1 SUB-MODE (3/3)

The ICP ILS.1 sub-mode page 3 features the following displays:

**SCRATCHPAD** - ILS.1 active frequency.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - ILS.1 volume.

**DATA LINE.3** - ILS.1 volume adjustment and cancellation display.

**DATA LINE.4** - N/A

**DATA LINE.5** - ILS.1 frequency adjustment and cancellation display.

**INTERACTION METHODS – ILS.1 VOLUME**

To alter the ILS.1 volume, follow the procedure below;

1. **LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the ILS.1 IDENT volume.

**INTERACTION METHODS – ILS.1 FREQUENCY**

To alter the ILS.1 frequency, follow the procedure below;

1. **LEFT-CLICK LSK5** once. Confirm that > FREQ ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired radio frequency up to five (5) digits without the decimal point and **LEFT-CLICK** the MRK key. *(e.g. 110.100 would be entered in by the value 11010)*
2.10.1 – ICP ILS.2 SUB-MODE

AIRCREW ADVISORY NOTICE

ILS.2 ICP functions are identical in structure and operation to that of ILS.1 functions.

As such, please refer to section 2.9.1 – ICP ILS.1 SUB-MODE Pages for further information on ILS.2 functions.
2.11.1 - ICP STEER-POINT (STPT) SUB-MODE (1/4)

The ICP STEER-POINT sub-mode page 1 features the following displays:

- **SCRATCHPAD**
  - Steer-point Index display.

- **DATA LINE.1**
  - Page title & index.

- **DATA LINE.2**
  - Next steer-point IDENT.

- **DATA LINE.3**
  - Range to next steer-point in nautical miles.

- **DATA LINE.4**
  - Bearing to next steer-point in degrees magnetic.

- **DATA LINE.5**
  - Estimated time en-route (ETE) to the next steer-point at current speed in hours, minutes & seconds.

This current page features no interactive elements.
2.11.2 - ICP STEER-POINT (STPT) SUB-MODE (2/4)

The ICP STEER-POINT sub-mode page 2 features the following displays:

**SCRATCHPAD** - Steer-point Index display.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Next steer-point IDENT.

**DATA LINE.3** - Current Local or Zulu time.

**DATA LINE.4** - Estimated time en-route (ETE) to next steer-point at current speed in hours, minutes & seconds.

**DATA LINE.5** - Time on Arrival (TOA) at next steer-point at current speed in hours, minutes & seconds.

**INTERACTION METHODS – CURRENT TIME DISPLAY**

To alter the time value on Data Line 3 between Local and Zulu time, simply **LEFT-CLICK** on **LSK3** to toggle between Local and Zulu Time format.
2.11.3 - ICP STEER-POINT (STPT) SUB-MODE (3/4)

The ICP ILS.1 sub-mode page 3 features the following displays:

**SCRATCHPAD** - Steer-point Index display.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Current steer-point index and total steer-points in flight-plan.

**DATA LINE.3** - Latitude of next steer-point in degrees, minutes and seconds.

**DATA LINE.4** - Longitude of next steer-point in degrees, minutes and seconds.

**DATA LINE.5** - Elevation of next steer-point in feet.

**INTERACTION METHODS – ILS.1 VOLUME**

To alter the ILS.1 volume, follow the procedure below;

**LEFT-CLICK LSK3** once followed by a numeric input of 0-5 to adjust the ILS.1 IDENT volume.

**INTERACTION METHODS – ILS.1 FREQUENCY**

To alter the ILS.1 frequency, follow the procedure below;

1. **LEFT-CLICK LSK5** once. Confirm that > FREQ ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired radio frequency up to five (5) digits without the decimal point and **LEFT-CLICK the MRK key**. *(e.g. 110.100 would be entered in by the value 11010)*
2.11.4 - ICP STEER-POINT (STPT) SUB-MODE (4/4)

The ICP STEER-POINT sub-mode page 4 features the following displays:

**SCRATCHPAD**  - Steer-point Index display.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - CNI Primary Navigation Source.

- **NAV** – NAV.1, TACAN.1 or ILS.1 has priority
- **MC** – Mission Computer Flight-plan has priority.

**DATA LINE.3**  - N/A

**DATA LINE.4**  - N/A

**DATA LINE.5**  - N/A

**INTERACTION METHODS – CNI PRIMARY NAVIGATION SOURCE**

To alter the primary navigation source between NAV and MC, simply **LEFT-CLICK** on LSK2 to toggle between sources.
2.11.1 - ICP GLOBAL INS (GINS) SUB-MODE (1/1)

The ICP GLOBAL INS sub-mode page 1 features the following displays:

**SCRATCHPAD**  - GINS alignment status.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - Magnetic Variation at present position.

**DATA LINE.3**  - Latitude of present position in degrees, minutes and seconds.

**DATA LINE.4**  - Longitude of present position in degrees, minutes and seconds.

**DATA LINE.5**  - GINS alignment command (if not aligned), otherwise empty.

**INTERACTION METHODS – GINS ALIGNMENT**

To align the Global Inertial Navigation System (GINS), simply **LEFT-CLICK** on **LSK5** to start the alignment procedure. The procedure is fully automated and takes approximately **60** seconds.

When fully aligned, the **SCRATCHPAD** will indicate **GINS-OK** and the option to align the GINS will be removed.

GINS alignment is automatic when following the RAPID START checklist.
2.12.1 - ICP IDENTIFICATION, FRIEND OR FOE (IFF) SUB-MODE (1/2)

The ICP IFF sub-mode page 1 features the following displays:

**SCRATCHPAD** - IFF Mode and code.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - IFF Mode 3/A selection and display.

**DATA LINE.3** - IFF Mode 4 selection and display.

**DATA LINE.4** - IFF Mode 5 selection and display.

**DATA LINE.5** - N/A

**INTERACTION METHODS – IFF MODES**

Identification, friend or foe (IFF) is an identification system designed for command and control. It enables military and national (civilian-located ATC) interrogation systems to identify aircraft, vehicles or forces as friendly and to determine their bearing and range from the interrogator.

IFF may be used by both military and civilian aircraft.

**LEFT-CLICK** on **LSK2** will switch the IFF to mode 3/A which provides a 4-digit octal identification code for the aircraft, assigned by the air traffic controller.

**LEFT-CLICK** on **LSK3** will switch the IFF to mode 4 which provides a military only, 3-pulse reply to crypto coded challenge.
LEFT-CLICK on LSK4 will switch the IFF to mode 4 which provides a military only, cryptographically secured version of Mode S and ADS-B GPS position.

2.12.2 - ICP IDENTIFICATION, FRIEND OR FOE (IFF) SUB-MODE (2/2)

The ICP IFF sub-mode page 2 features the following displays:

**SCRATCHPAD**  - IFF Mode and code.

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - IFF Mode C selection and display.

**DATA LINE.3**  - IFF Mode S selection and display.

**DATA LINE.4**  - IFF CypherText (C/T) mode.

**DATA LINE.5**  - IFF code adjustment and cancellation display.

**INTERACTION METHODS – IFF MODES**

Identification, friend or foe (IFF) is an identification system designed for command and control. It enables military and national (civilian-located ATC) interrogation systems to identify aircraft, vehicles or forces as friendly and to determine their bearing and range from the interrogator.

IFF may be used by both military and civilian aircraft.

LEFT-CLICK on LSK2 will switch the IFF to mode C which provides the same information as Mode 3, but with the addition of pressure altitude information.
LEFT-CLICK on LSK3 will switch the IFF to mode S which transmits information about the aircraft to the SSR system, to TCAS receivers on board aircraft and to the ADS-B SSR system.

This information includes the call sign of the aircraft and/or the transponder’s permanent ICAO 24-bit address in the form of a hex code.

**INTERACTION METHODS – CYPHERTEXT MODE**

LEFT-CLICK on LSK4 will cycle the onboard CYPHERTEXT between normal and cyphertext-only modes.

**INTERACTION METHODS – IFF CODE**

To alter the IFF CODE, follow the procedure below:

1. **LEFT-CLICK LSK5** once. Confirm that > CODE ADJ now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired IFF code of four (4) digits and **LEFT-CLICK** the **MRK** key.
2.13.1 – ICP ALTITUDE (ALT) SUB-MODE (1/1)

The ICP ALT sub-mode page 1 features the following displays;

**SCRATCHPAD**  - Altitude Pressure reading displayed in inches of mercury (inHG) or millibars (mb).

**DATA LINE.1**  - Page title & index.

**DATA LINE.2**  - Altitude pressure selection and display.

**DATA LINE.3**  - Altitude mode selection and display.

**DATA LINE.4**  - N/A

**DATA LINE.5**  - Low Altitude Warning (LAW) selection and display

**INTERACTION METHODS – ALTITUDE PRESSURE TYPE**

To swap the Altitude Pressure displays between inches of mercury and millibars, follow the procedure below;

1. **LEFT-CLICK LSK2** once. This will cycle your PX value from inHG to Mb (displayed as QNH). **LEFT-CLICKING LSK2** again will cycle the value back to inHG.
INTERACTION METHODS – ALTITUDE MODE

To swap the Altitude Mode between **barometric altitude** (altitude above sea level) and **radar altitude** (altitude above ground level), follow the procedure below:

1. **LEFT-CLICK LSK3** once. This will cycle your MODE value from BARO to RDR. **LEFT-CLICKING LSK3 again** will cycle the value back to BARO.

INTERACTION METHODS – LOW ALTITUDE WARNING (LAW)

To alter the Low Altitude Warning (LAW) value, follow the procedure below:

1. **LEFT-CLICK LSK5** once. Confirm that **> LAW XXXFT** now indicates **> CANCEL**, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired Low Altitude Warning value of up to five (5) digits and **LEFT-CLICK the MRK key.**
2.14.1 - ICP HEADS-UP DISPLAY MASTER MODE

The ICP HUD Master Mode page 1 features the following displays:

**SCRATCHPAD** - Current Master Mode page.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Air to Air (A/A) sub-mode page.

**DATA LINE.3** - Air to Ground (A/G) sub-mode page.

**DATA LINE.4** - Navigation (NAV) mode selection.

**DATA LINE.5** - N/A

**INTERACTION METHODS – HEADS-UP DISPLAY MASTER MODE PAGE**

**LEFT-CLICKING** the LSK2 and LSK3 buttons on this page will take you to the selected sub-mode pages whereas **LEFT-CLICKING LSK4** will switch the HUD unit to the standard navigation display.
2.15.1 – ICP HEADS-UP DISPLAY – AIR TO AIR (A/A) SUB-MODE (1/1)

The ICP HUD Air to Air mode page features the following displays:

**SCRATCHPAD** - Master Arm status and selected store.

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - AIM-9/M Sidewinder symbology mode.

**DATA LINE.3** - AIM-120/C AMRAAM symbology mode.

**DATA LINE.4** - M61-A2 Vulcan cannon symbology mode.

**DATA LINE.5** - N/A

**INTERACTION METHODS – AIM-9/M SYMBOLOGY MODE**

**LEFT-CLICKING** LSK2 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the AIM-9/M Sidewinder air to air missile.

**INTERACTION METHODS – AIM-120/C SYMBOLOGY MODE**

**LEFT-CLICKING** LSK3 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the AIM-120/C AMRAAM air to air missile.
INTERACTION METHODS – M61-A2 SYMBOLOGY MODE

LEFT-CLICKING LSK4 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the M61-A2 Vulcan cannon in air to air mode.

AIRCREW ADVISORY NOTICE

For more information on HUD Symbology, please refer to Section 4.0 – Integrated Avionics – Heads-Up Display.

2.16.1 – ICP HEADS-UP DISPLAY – AIR TO GROUND (A/G) SUB-MODE (1/1)

The ICP HUD Air to Ground mode page features the following displays:

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCRAPTPAD</td>
<td>Master Arm status and selected store.</td>
</tr>
<tr>
<td>DATA LINE.1</td>
<td>Page title &amp; index.</td>
</tr>
<tr>
<td>DATA LINE.2</td>
<td>GBU-39 Small Diameter Bomb (SDB) symbology mode.</td>
</tr>
<tr>
<td>DATA LINE.3</td>
<td>GBU-31 Joint Direct Attack Munition (JDAM) symbology mode.</td>
</tr>
<tr>
<td>DATA LINE.4</td>
<td>M61-A2 Vulcan cannon symbology mode.</td>
</tr>
<tr>
<td>DATA LINE.5</td>
<td>N/A</td>
</tr>
</tbody>
</table>
INTERACTION METHODS – GBU-39 SYMBOLOGY MODE

LEFT-CLICKING LSK2 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the GBU-39 small diameter bomb.

INTERACTION METHODS – GBU-31 SYMBOLOGY MODE

LEFT-CLICKING LSK3 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the GBU-31 Joint Direct Attack Munition.

INTERACTION METHODS – M61-A2 SYMBOLOGY MODE

LEFT-CLICKING LSK4 will switch the aircrew’s HUD unit to display symbology in accordance with the use of the M61-A2 Vulcan cannon in air to ground mode.

AIRCREW ADVISORY NOTICE

For more information on HUD Symbology, please refer to Section 4.0 – Integrated Avionics – Heads-Up Display.
2.17.1 - ICP OTHER SYSTEMS (OTHR) MASTER MODE PAGE

The ICP Other Systems Master Mode page features the following displays:

- **SCRATCHPAD** - N/A
- **DATA LINE.1** - Page title & index.
- **DATA LINE.2** - Flight data (FLT DATA) sub-mode page.
- **DATA LINE.3** - Fuel data sub-mode page.
- **DATA LINE.4** - Integrated Built-in Test (IBIT) sub-mode page.
- **DATA LINE.5** - Emission Control (EMCON) sub-mode page.

**INTERACTION METHODS – OTHER SYSTEMS (OTHR) MASTER MODE PAGE**

**LEFT-CLICKING** any of the **LSK** buttons on this page will take you to the selected sub-mode pages.
2.18.1 - ICP FLIGHT DATA SUB-MODE PAGE (1/3)

The ICP Flight Data sub-mode page 1 features the following displays:

**SCRATCHPAD** - N/A

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Altitude information selection and display.

**DATA LINE.3** - Airspeed information selection and display.

**DATA LINE.4** - Chronometer selection and display

**DATA LINE.5** - N/A

**INTERACTION METHODS – ALTITUDE INFORMATION DISPLAY**

To alter the altitude information display, LEFT-CLICK LSK2 to cycle between Barometric (altitude above sea level) and Radar (altitude above ground level).

**INTERACTION METHODS – AIRSPEED INFORMATION DISPLAY**

To alter the airspeed information display, LEFT-CLICK LSK3 repeatedly to cycle through Calibrated Airspeed (CAS), True Airspeed (TAS) and Ground Speed (GS).
INTERACTION METHODS – CHRONOMETER DISPLAY

To alter the chronometer display, press LSK4 to cycle between Local Time and Zulu Time.

2.18.2 - ICP FLIGHT DATA SUB-MODE PAGE (2/3)

The ICP Flight Data sub-mode page 2 features the following displays:

- **SCRATCHPAD** - N/A
- **DATA LINE.1** - Page title & index.
- **DATA LINE.2** - Current steer-point display
- **DATA LINE.3** - Total fuel available in pounds.
- **DATA LINE.4** - Ground Speed in knots.
- **DATA LINE.5** - Estimated Time En-route (ETE) to next steer-point in hours, minutes and seconds.

This current page features no interactive elements.
2.18.3 - ICP FLIGHT DATA SUB-MODE PAGE (3/3)

The ICP Flight Data sub-mode page 3 features the following displays:

- SCRATCHPAD - N/A
- DATA LINE.1 - Page title & index.
- DATA LINE.2 - Next steer-point display
- DATA LINE.3 - N/A
- DATA LINE.4 - Time on Arrival (TOA) to next steer-point in hours, minutes and seconds.
- DATA LINE.5 - N/A

This current page features no interactive elements.
2.19.1 - ICP FUEL DATA SUB-MODE PAGE (1/1)

The ICP Fuel Data sub-mode page features the following displays:

**SCRATCHPAD** - N/A

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Total fuel on-board in pounds.

**DATA LINE.3** - Bingo Fuel (BF) selection and display.

**DATA LINE.4** - Flight Time Remaining (FTR) in hours and minutes.

**DATA LINE.5** - Fuel Flow (FF) in pounds per hour.

**INTERACTION METHODS – BINGO FUEL (BF)**

To alter the Bingo Fuel (BF) value, follow the procedure below;

1. **LEFT-CLICK LSK3** once. Confirm that > BF XXLBS now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired bingo fuel value of up to five (5) digits and **LEFT-CLICK** the **MRK** key.
2.20.1 - ICP INTEGRATED BUILT-IN TEST (IBIT) SUB-MODE PAGE

AIRCREW ADVISORY NOTICE

The IBIT functions are currently not simulated in this program. As these functions are programmed in later block releases, we will update this section accordingly.

2.21.1 - ICP EMISSION CONTROL (EMCON) SUB-MODE PAGE

AIRCREW ADVISORY NOTICE

The EMCON functions are currently not simulated in this program. As these functions are programmed in later block releases, we will update this section accordingly.
2.22.1 - ICP AUTOPILOT FLIGHT DIRECTOR SYSTEM (AFDS) MASTER MODE PAGE

The ICP AFDS Master Mode page is accessed via the A/P pushbutton and features the following displays:

**SCRATCHPAD**
- AFDS Status:
  - Autopilot engaged (M)
  - Altitude Hold mode engaged (A)
  - Heading hold mode engaged (H)
  - Airspeed hold mode engaged (S)
  - ILS/Approach mode engaged (I)

**DATA LINE.1**
- Page title & index.

**DATA LINE.2**
- Altitude hold control sub-mode page.

**DATA LINE.3**
- Heading hold control sub-mode page.

**DATA LINE.4**
- Airspeed hold control sub-mode page.

**DATA LINE.5**
- ILS/Approach hold control sub-mode page.

**INTERACTION METHODS – OTHER SYSTEMS (OTH) MASTER MODE PAGE**

**LEFT-CLICKING** any of the LSK buttons on this page will take you to the selected sub-mode pages.
2.23.1 - ICP AFDS ALTITUDE CONTROL SUB-MODE PAGE (1/1)

The ICP Fuel Data sub-mode page features the following displays:

**SCRATCHPAD**
- AFDS Status:
  - Autopilot engaged (M)
  - Altitude Hold mode engaged (A)
  - Heading hold mode engaged (H)
  - Airspeed hold mode engaged (S)
  - ILS/Approach mode engaged (I)

**DATA LINE.1**
- Page title & index.

**DATA LINE.2**
- Altitude hold selection and display.

**DATA LINE.3**
- Altitude hold mode selection and display.

**DATA LINE.4**
- Pitch hold mode selection and display.

**DATA LINE.5**
- N/A

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FOR SIMULATION USE ONLY

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INTERACTION METHODS – ALTITUDE HOLD SELECTION

To alter the required altitude hold value, follow the procedure below;

1. LEFT-CLICK LSK2 once. Confirm that > ALT XXXFT now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired altitude value of up to five (5) digits and LEFT-CLICK the MRK key.

AIRCREW ADVISORY NOTICE

Please note that the AFDS Altitude hold will only hold the barometric altitude and does not offer any radar or terrain following hold functions.

INTERACTION METHODS – ALTITUDE HOLD FUNCTION

To toggle the altitude hold function on and off, simply LEFT-CLICK the LSK3 key repeatedly.

INTERACTION METHODS – PITCH HOLD FUNCTION

To toggle the pitch hold function on and off, simply LEFT-CLICK the LSK4 key repeatedly.

AIRCREW CAUTIONARY NOTICE

Please note that the Altitude Hold function and Pitch hold function are both independent systems and cannot run at the same time.

In the event that one system is toggled on whilst the other is running, the oldest selected system will turn off.
2.24.1 - ICP AFDS HEADING CONTROL SUB-MODE PAGE (1/1)

The ICP Fuel Data sub-mode page features the following displays:

**SCRATCHPAD**
- AFDS Status;
  - Autopilot engaged (M)
  - Altitude Hold mode engaged (A)
  - Heading hold mode engaged (H)
  - Airspeed hold mode engaged (S)
  - ILS/Approach mode engaged (I)

**DATA LINE.1**
- Page title & index.

**DATA LINE.2**
- Heading hold selection and display.

**DATA LINE.3**
- Heading hold mode selection and display.

**DATA LINE.4**
- Navigation Aid hold mode selection and display.

**DATA LINE.5**
- Navigation Aid source selection and display.
INTERACTION METHODS – HEADING HOLD SELECTION

To alter the required heading hold value, follow the procedure below;

1. **LEFT-CLICK** LSK2 once. Confirm that > HDG XXX now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired magnetic heading value of up to three (3) digits and **LEFT-CLICK** the MRK key.

INTERACTION METHODS – HEADING HOLD FUNCTION

To toggle the magnetic heading hold function on and off, simply **LEFT-CLICK** the LSK3 key repeatedly.

INTERACTION METHODS – NAVIGATION AID HOLD FUNCTION

To toggle the Navigation Aid hold function on and off, simply **LEFT-CLICK** the LSK4 key repeatedly.

AIRCREW CAUTIONARY NOTICE

Please note that the Heading Hold function and Navigation Aid hold function are both independent systems and cannot run at the same time.

In the event that one system is toggled on whilst the other is running, the oldest selected system will turn off.

INTERACTION METHODS – NAVIGATION AID SOURCE FUNCTION

To toggle the navigation aid source between VOR/TACAN (NAV) and Mission Computer (MC), simply **LEFT-CLICK** the LSK5 key repeatedly.
2.25.1 - ICP AFDS AIRSPEED CONTROL SUB-MODE PAGE (1/1)

The ICP Fuel Data sub-mode page features the following displays:

**SCRATCHPAD** - AFDS Status;
- Autopilot engaged (M)
- Altitude Hold mode engaged (A)
- Heading hold mode engaged (H)
- Airspeed hold mode engaged (S)
- ILS/Approach mode engaged (I)

**DATA LINE.1** - Page title & index.
**DATA LINE.2** - Airspeed hold selection and display.
**DATA LINE.3** - Airspeed hold mode selection and display.
**DATA LINE.4** - Mach hold mode selection and display.
**DATA LINE.5** - Airspeed source selection and display.
INTERACTION METHODS – AIRSPEED HOLD SELECTION

To alter the required airspeed hold value when the Airspeed source display is set to IAS, follow the procedure below:

1. **LEFT-CLICK** LSK2 once. Confirm that > SPD XXX now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired airspeed value of up to three (3) digits and **LEFT-CLICK** the MRK key.

To alter the required mach hold value when the airspeed source display is set to MACH, follow the procedure below:

1. **LEFT-CLICK** LSK2 once. Confirm that > MACH XXX now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired airspeed value of up to three (3) digits without the decimal point and **LEFT-CLICK** the MRK key. *(e.g. Mach 1.20 would be entered in by the value 120 and Mach 0.80 would be entered in with the value 080)*

INTERACTION METHODS – AIRSPEED HOLD FUNCTION

To toggle the airspeed hold function on and off, simply **LEFT-CLICK** the LSK3 key repeatedly.

INTERACTION METHODS – MACH HOLD FUNCTION

To toggle the mach hold function on and off, simply **LEFT-CLICK** the LSK4 key repeatedly.

AIRCREW CAUTIONARY NOTICE

Please note that the airspeed hold function and mach hold function are both independent systems and cannot run at the same time.

In the event that one system is toggled on whilst the other is running, the oldest selected system will turn off.

INTERACTION METHODS – AIRSPEED SOURCE FUNCTION

To toggle the airspeed source between Indicated Airspeed (IAS) and Mach (MACH), simply **LEFT-CLICK** the LSK5 key repeatedly.
2.25.1 - ICP AFDS APPROACH CONTROL SUB-MODE PAGE (1/1)

The ICP AFDS Approach sub-mode page features the following displays:

**SCRATCHPAD** - AFDS Status;
- Autopilot engaged (M)
- Altitude Hold mode engaged (A)
- Heading hold mode engaged (H)
- Airspeed hold mode engaged (S)
- ILS/Approach mode engaged (I)

**DATA LINE.1** - Page title & index.

**DATA LINE.2** - Selected course selection and display.

**DATA LINE.3** - ILS/Approach hold mode selection and display.

**DATA LINE.4** - Back-course hold mode selection and display.

**DATA LINE.5** - Approach type display:
- Navigation aid has glideslope (GS)
- Navigation aid has localiser (LOC)
INTERACTION METHODS – COURSE SELECTION

To alter the required course value, follow the procedure below;

1. LEFT-CLICK LSK2 once. Confirm that > CRS XXX now indicates > CANCEL, and that you have a flashing asterisk in your ICP SCRATCHPAD.

2. Using the numeric keypad, push in the desired magnetic heading value of up to three (3) digits and LEFT-CLICK the MRK key.

INTERACTION METHODS – APPROACH HOLD FUNCTION

To toggle the approach hold function on and off, simply LEFT-CLICK the LSK3 key repeatedly.

INTERACTION METHODS – ILS BACKCOURSE HOLD FUNCTION

To toggle the ILS Back-course hold function on and off, simply LEFT-CLICK the LSK4 key repeatedly.

AIRCREW CAUTIONARY NOTICE

Please note that the approach hold function cannot function if the navigation aid source is set to Mission Computer.

In the event that the approach hold system is toggled on whilst the navigation aid source is set to MC, the ICP will switch onboard systems to Navigation Aid source mode.
3.0 Integrated Avionics – Primary Multi-Function Display (PMFD)

3.0.1 PMFD OVERVIEW

The Primary Multi-Function Display (PMFD) is an 8x8 inch Active Matrix Liquid Crystal Display (AMLCD) which displays all required tactical and navigation data for the purposes of flying and fighting the aircraft.

Descriptions of the numbered elements displayed above:

1. **AMLCD Screen** – This screen displays all tactical and navigation data along with various interactive options for the pushbuttons located around the edge of the unit.

2. **Primary selection knob** – This knob will allow the aircrew to adjust certain options and settings within the PMFD system. This control can be interacted with via the mouse scroll-wheel.

3. **Secondary selection knob** – This knob will allow the aircrew to adjust certain options and settings within the PMFD system. This control can be interacted with via the mouse scroll-wheel.
(4) PMFD Item Pushbuttons (1-5) – These sets of pushbuttons are used to interact with the various side menus and options on the PMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(5) PMFD Item Pushbuttons (6-10) – These sets of pushbuttons are used to interact with the various side menus and options on the PMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(6) PMFD Item Pushbuttons (11-15) – These sets of pushbuttons are used to interact with the various side menus and options on the PMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(7) PMFD Item Pushbuttons (16-20) – These sets of pushbuttons are used to interact with the various side menus and options on the PMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.
3.1.1 PMFD MAIN MENU

The Primary Multi-Function Display (PMFD) main menu features

(1) AMLCD Screen – This screen displays all tactical and navigation data along with various interactive options for the pushbuttons located around the edge of the unit.

(2) Configuration Option (PB1) – This pushbutton provides access to the PMFD configuration screen for the various PMFD submodes such as HUD, MAP and TACT.

(3) Head’s Down Display (HDD) Option (PB6) – This pushbutton displays a full screen Head’s Down Display (HDD) overlay on the PMFD for look down capability.

(4) Moving Map Display (MMD) (PB8) – This pushbutton displays a full screen moving map overlay for the purposes of navigating the aircraft.

(5) Tactical Information Display (TID) (PB10) – This pushbutton displays a full screen Tactical overlay on the PMFD for the purpose of deploying onboard weapons. *(Prepar3D V2 only)*
USER ADVISORY NOTICE

Please note that no tactical functions exist at this stage for the Raptor Driver product.

In Prepar3D Version 2.5 and onwards, Air to Ground Radar functionality has been added to the Tactical Information Display.

As the core software is updated for use with P3D 2.X and Vertical Reality Simulations TacPack product, this entry will be adjusted.
3.2.1 PMFD CONFIGURATION MENU

On the left side of the screen next to PB5 is the current avionics software version installed. In this case it is the ARES-X software for the F-22 Raptor Product and is showing Version 1 and a Build Number of 1311210654. This information is altered by IRIS Flight Simulation Software when a new core software build is produced.

The Primary Multi-Function Display (PMFD) configuration menu features the following items:

1. **HDD Configuration (PB6)** – This pushbutton displays the various display options for the Head’s Down Display (HDD).

2. **MMD Configuration (PB8)** – This pushbutton displays the various display options for the Moving Map Display (MMD) screen.

3. **TID Configuration (PB10)** – This pushbutton displays the various display options for the Tactical Information Display (TID).

4. **TID Configuration (PB11)** – This pushbutton displays the various display options for the Stores Management System (SMS).
(5) TID Configuration (PB12) – This pushbutton displays the various display options for Systems Management (SYS).

(6) MENU Option (PB18) – This pushbutton returns to the PMFD Main Menu.

3.2.2 SYSTEMS MANAGEMENT MENU

The Primary Multi-Function Display (PMFD) SYS configuration menu features the following items:

For all options which can be toggled on or off, **GREEN** indicates a currently enabled option, and **GREY** indicates a disabled option. If the item is **RED**, no action can be performed at that time.
(1) **VMS Mute/Unmute Option (PB4)** – This pushbutton performs an immediate silence on all VMS audible warnings.

(2) **EFT Option (PB5)** – This pushbutton toggles the external fuel tanks on and off and can ONLY be done when the aircraft meets the following conditions:

- Aircraft is stationary.
- Aircraft is located on the ground.
- Both engines are shut-down.
- OR the EFT ORIDE button is pushed.

(3) **RAPID START Option (PB6)** – This pushbutton performs a rapid start of the aircraft when the APU is running and configures the aircraft for takeoff.

(4) **SHUT-DOWN Option (PB8)** – This pushbutton performs an immediate shutdown of the aircraft to a cold/dark condition.

(5) **EFT OVERRIDE Option (PB11)** – This pushbutton allows the pilot to override the pre-set restrictions on when External Fuel Tanks can be loaded/unloaded from the aircraft. This allows the pilot to add external fuel tanks to the aircraft regardless of the state of flight.
3.3.1 MMD CONFIGURATION MENU

The Primary Multi-Function Display (PMFD) MMD configuration menu features the following items:

For all options which can be toggled on or off, **GREEN** indicates a currently enabled option, and **GREY** indicates a disabled option.

(1) **APT Option (PB1)** – This pushbutton toggles the display of Airport Facility information on the MMD.

(2) **WPT Option (PB2)** – This pushbutton toggles the display of Mission Computer (MC) waypoint information on the MMD.

(3) **AIR Option (PB3)** – This pushbutton toggles the display of Airspace information on the MMD.

(4) **GEO Option (PB4)** – This pushbutton toggles the display of Geopolitical boundary information on the MMD.

(5) **VOR Option (PB5)** – This pushbutton toggles the display of VOR navigational information on the MMD.
(6) **TOPO-N Option (PB6)** – This pushbutton enables the display of night-time topography (Monochrome Green) information on the MMD.

(7) **TOPO-D Option (PB8)** – This pushbutton enables the display of day-time topography (Full Colour) information on the MMD.

(8) **CLR Option (PB10)** – This pushbutton removes the display of night-time and day-time topography information on the MMD.

(9) **HI Option (PB11)** – This pushbutton toggles the display of High Altitude Airway information on the MMD.

(10) **LO Option (PB12)** – This pushbutton toggles the display of Low Altitude Airway information on the MMD.

(11) **ILS Option (PB13)** – This pushbutton toggles the display of Instrument Landing System (ILS) information on the MMD.

(12) **NDB Option (PB14)** – This pushbutton toggles the display of Non-Directional Beacon (NDB) information on the MMD.

(13) **RTE Option (PB15)** – This pushbutton toggles the display of Mission Computer (MC) Route information on the MMD.

(14) **MSN Option (PB16)** – This pushbutton toggles the display of Mission Computer (MC) mission information on the MMD.

(15) **FIX Option (PB17)** – This pushbutton toggles the display of Airway Intersection information on the MMD.

(16) **BACK Option (PB18)** – This pushbutton returns to the PMFD Configuration Menu.

(17) **ROSE Option (PB19)** – This pushbutton toggles the display of the compass rose overlay on the MMD.

(18) **ADS-B Option (PB20)** – This pushbutton toggles the display of ADS-B Datalink information on the MMD.
3.5.1 TID STANDBY SCREEN MENU (Prepar3D V2 ONLY)

The Primary Multi-Function Display (PMFD) TID standby screen is the first screen you see when choosing the Tactical Information Display overlay and features the following items:

(1) **MENU Option (PB1)** – This pushbutton returns you to the PMFD main menu.

(2) **Air To Ground (ATG) Radar Option (PB11)** – This pushbutton toggles the display of the Air to Ground Radar on the TID.

(3) **Air To Air (ATA) Radar Option (PB12)** – This pushbutton toggles the display of the Air to Air Radar on the TID. *(Not Currently Simulated)*
3.5.2 AIR TO GROUND RADAR SCREEN – SCAN MODE (Prepar3D V2 ONLY)

The Primary Multi-Function Display (PMFD) TID air to ground radar – scan mode is the first screen you see when powering up the TID Air to Ground Radar and features the following items:

(1) **MENU Option (PB1)** – This pushbutton returns you to the TID standby screen and turns off the Air to Ground Radar.

(2) **Radar Azimuth Increase/Decrease (PB2 & 3)** – These pushbuttons increase and decrease the Radar Azimuth in 10° increments from 10° to 60°.

(3) **Radar Zoom Increase/Decrease (PB4 & 5)** – These pushbuttons increase the zoom level focused on the radar tracking cross position. The zoom increases in factors of 1.0 from 1.0 to 10.0. Using the mouse scroll wheel, you can increase or decrease the zoom from 1.0 to 10.0 in factors of 0.25.

(4) **Radar Freeze Function (PB8)** – This freezes the Radar sweep and allows you to zoom or designate against a static radar image.

(5) **Radar Track Function (PB10)** – This function will track the position of the radar designator cross and superimpose it on the Head Up Display for use in the Head Up Display air to ground modes.
(6) **TID Option (PB11)** – This pushbutton returns to the Tactical Information Screen Main Menu.

(7) **Radar Range Increase/Decrease (PB13 & 14)** – These pushbuttons increase and decrease the visible range of Air to Ground Radar from 1nm to 80nm.

(8) **Cursor Data Cluster** – This data cluster in the bottom right of the screen shows the cursor position in the Air to Ground Radar with designator latitude and longitude.

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**USER ADVISORY NOTICE**

Please note that the Radar software doesn’t currently calculate a distance above sea level when designating targets.
3.5.3 AIR TO GROUND RADAR SCREEN – TARGET TRACK MODE (Prepar3D V2 ONLY)

The Primary Multi-Function Display (PMFD) TID air to ground radar screen contains an air to ground radar overlay and is identical to the scan mode with the exception of the following items:

(1) Designated Target Data Cluster – This data cluster in the bottom right of the screen shows the designated target position in the Air to Ground Radar with the following information:

   a. Target Identifier
   b. Target Latitude
   c. Target Longitude
   d. Heading to Target
   e. Distance to Target
3.4.1 MOVING MAP DISPLAY (MMD) MODE

The Primary Multi-Function Display (PMFD) MMD page features a full screen overlay for the purposes of navigating the aircraft. The following items are of particular note:

**Upper Left Quadrant** – This area of the MMD features the following items;

- A **magenta** mission computer flight-plan field which displays magnetic heading to the next steer-point and the distance to go in nautical miles (nm).

- A white navigation aid information display which indicates magnetic heading to the tuned navigation aid and the distance to go in nautical miles (nm). To the right of this entry is a time indicator showing the time remaining to the navigation aid in hours, minutes and seconds based on current aircraft speed.
Upper Right Quadrant – This area of the MMD features the following items:

- A white text indication of the currently selected steer-point, below which is the ICAO identifier of the next steer-point.

Lower Right Quadrant – This area of the MMD features the following items:

- Latitude and longitude of the aircraft’s current position, below which is the current outside air temperature based on onboard sensors.

- A green navigation aid information display which indicates magnetic heading to the tuned navigation aid and the distance to go in nautical miles (nm), below which is the mission computer flight-plan field which displays the ICAO identifier, magnetic heading and the distance to go in nautical miles (nm) to the next steer-point.

- To the right of the navigation aid information is the MMD visible range which is calibrated to the outer compass rose line.

The MMD also has a number of pushbutton options available as outlined below:

(1) Navigation Source Option (PB10) – This pushbutton toggles the Navigation Source of the CNS between Navigation aid (NAV) and Mission Computer (MC) on the MMD.

AIRCREW CAUTIONARY NOTICE

Please note that the Navigation Source Option explained above is system-wide and will alter information on all aircraft navigation systems.

(2) MENU Option (PB18) – This pushbutton returns to the PMFD Main Menu.

(3) RNG Increase (PB19) – This pushbutton increases the visible range on the MMD as indicated on the lower right quadrant.

(4) RNG Decrease (PB20) – This pushbutton decreases the visible range on the MMD as indicated on the lower right quadrant.

USER ADVISORY NOTICE

Please note currently the TID and HDD PMFD modes are not currently simulated and will be made available during later software builds.
4.0 Integrated Avionics – Secondary Multi-Function Display (SMFD)

4.0.1 SMFD OVERVIEW

The cockpit features three Secondary Multi-Function Displays (SMFD) in addition to the PMFD. The SMFD units are 6 ¼ inch square Active Matrix Liquid Crystal Display (AMLCD) which displays all required system and flight instrumentation data for the purposes of flying and fighting the aircraft.

Descriptions of the numbered elements displayed above:

(1) AMLCD Screen – This screen displays the various SMFD information pages along with various interactive options for the pushbuttons located around the edge of the unit.

(2) Primary selection knob – This knob will allow the aircrew to adjust certain options and settings within the SMFD system. This control can be interacted with via the mouse scroll-wheel.

(3) Secondary selection knob – This knob will allow the aircrew to adjust certain options and settings within the SMFD system. This control can be interacted with via the mouse scroll-wheel.
(4) **SMFD Item Pushbuttons (1-5)** – These sets of pushbuttons are used to interact with the various side menus and options on the SMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(5) **SMFD Item Pushbuttons (6-10)** – These sets of pushbuttons are used to interact with the various side menus and options on the SMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(6) **SMFD Item Pushbuttons (11-15)** – These sets of pushbuttons are used to interact with the various side menus and options on the SMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.

(7) **SMFD Item Pushbuttons (16-20)** – These sets of pushbuttons are used to interact with the various side menus and options on the SMFD unit. A single **LEFT-CLICK** will act as a pushbutton action on the unit.
4.1.1 SMFD MAIN MENU

The Secondary Multi-Function Display (SMFD) main menu features the following pushbutton options:

(1) **SMS Option (PB2)** – This pushbutton provides access to the Stores Management Screen (SMS) including configuration and information display of currently loaded stores.

(2) **RDR Option (PB3)** – This pushbutton provides access to the Radar Configuration Screen (RDR) to allow secondary access to radar controls which would normally be on the PMFD Tactical Information Display configuration screen.

(3) **EHSI Option (PB4)** – This pushbutton displays a full screen Horizontal Situation Display (EHSI) overlay on the SMFD for the purpose of navigation.

(4) **ADI Option (PB5)** – This pushbutton displays a full screen Attitude Directional Indicator (ADI) on the SMFD for the purpose of aircraft orientation.

(5) **CHK Option (PB8)** – This pushbutton displays a full screen checklist page and sub-pages on the SMFD.
(6) FUEL Option (PB11) – This pushbutton displays the fuel system schematic for fuel management purposes.

(7) ENG Option (PB12) – This pushbutton displays the engine status pages for engine management purposes.

(8) SYS Option (PB13) – This pushbutton displays the aircraft systems page for aircraft management purposes.

(9) CWS Option (PB14) – This pushbutton displays an expanded caution warning system page for aircraft management purposes.

USER ADVISORY NOTICE

Please note currently the SMS, RDR and CWS SMFD modes are not currently simulated and will be made available during later software builds.
5.0 Normal Operating Procedures

5.0.1 BEFORE START CHECKLIST

1. FLCS BIT SWITCH
2. ALT FLAPS SWITCH
3. APR SWITCH
4. YAW TRIM SWITCH
5. FADEC SWITCH
6. THROTTLE LEVERS
7. CANOPY JETTISON HANDLE
8. INTERIOR LIGHTING
9. EXTERIOR LIGHTING
10. FUEL TANKS SWITCH
11. AAR SWITCH
12. AAR LIGHT KNOB
13. LEFT & RIGHT GEN SWITCHES
14. AUX GEN SWITCH
15. APU SWITCH
16. HOOK SWITCH
17. PARK BRAKE
18. MASTER ARM
19. LAND/TAXI LIGHTS
20. LANDING GEAR LEVER
21. BATTERY SWITCH
22. ECS TEMPERATURE KNOB
23. ECS ANTI-FOG CONTROL
24. RADIO VOL KNOBS
25. OXYGEN MIXTURE
26. OXYGEN MODE
27. OXYGEN POWER

Guarded – STOP
NORM
AUTO
CENTERED
CENTERED
CUTOFF
SAFE
AS REQUIRED
OFF
INTERNAL
CLOSE
OFF
OFF/RESET
GUARDED – ON
OFF
UP
PARK
SAFE
OFF
DOWN
OFF
AS REQUIRED
AS REQUIRED
AS REQUIRED
AUTO
NORMAL
ON
5.0.2 ENGINE START CHECKLIST

1. BATTERY SWITCH ON CONFIRM UFD POWERUP START
2. APU SWITCH MONITOR APU STATUS ON LEFT UFD, CHECK FOR OK.

ON

3. LEFT AND RIGHT GENERATOR SWITCHES
4. POSITION LIGHTS
5. LEFT THROTTLE MOVE TO IDLE POWER-ON POSITION.
MONITOR ENGINE STATUS ON RIGHT UFD.

MOVE TO IDLE POWER-ON POSITION.
MONITOR ENGINE STATUS ON RIGHT UFD.
OFF

6. RIGHT THROTTLE

7. APU SWITCH

5.0.3 POST START CHECKLIST

1. PMFD AS REQUIRED
2. SMFD AS REQUIRED
3. LAND/TAXI LIGHT TAXI
4. PARK BRAKE RELEASE

5.0.4 TAKE-OFF CHECKLIST

1. INSTRUMENTS CHECK FOR NORMAL OPERATION
2. LAND/TAXI LIGHT LAND
3. PARK BRAKE ANTI-SKID
4. POSITION LIGHTS POSN/ANTICOL
5. INCREASE POWER TO TAKEOFF THRUST
6. ROTATE AT 100 KNOTS TO 10 DEG NU
7. WHEN AIRBORNE, GEAR UP.

CHECK FOR NORMAL OPERATION.

8. INSTRUMENTS
5.0.4 LANDING CHECKLIST

1. GEAR LEVER
2. FLAPS
3. LAND/TAXI LIGHT
4. PARK BRAKE
5. APPROACH SPEED
6. THRESHOLD SPEED

5.0.5 POST LANDING CHECKLIST

1. BRAKES

WHEN CLEAR OF THE ACTIVE RUNWAY

2. POSITION LIGHTS
3. APU SWITCH
4. LAND/TAXI LIGHT
5. INSTRUMENTS

5.0.6 SHUTDOWN CHECKLIST

1. BRAKES
2. POSITION LIGHTS
3. THROTTLE LEVERS
4. LAND/TAXI LIGHT
5. CANOPY JETTISON HANDLE
6. INTERIOR LIGHTING
7. EXTERIOR LIGHTING
8. LEFT & RIGHT GEN SWITCHES
9. AUX GEN SWITCH
10. APU SWITCH
11. BATTERY SWITCH
12. OXYGEN MIXTURE
13. OXYGEN MODE
14. OXYGEN POWER

DOWN BELOW 150 KIAS
AUTOMATIC
LAND
CHECK RELEASE
140 KIAS
130 KIAS

AS REQUIRED

ANTICOL
START
MONITOR APU STATUS ON LEFT UFD, CHECK FOR OK.
TAXI
CHECK FOR NORMAL OPERATION.

PARK
OFF
CUTOFF
OFF
SAFE
AS REQUIRED
OFF
OFF/RESET
GUARDED – ON
OFF
AUTO
NORMAL
OFF
6.0 Reference Speeds

**USER ADVISORY NOTICE**

Please note all speeds below are based on the simulation parameters ONLY and may not be a true indication of the F-22 Raptor’s capabilities due to the classified nature of the aircraft.

### 6.0.1 Takeoff Speeds

GROSS WEIGHT / 60,742Lbs 120 KIAS

### 6.0.2 Cruise Speeds – Standard Cruise

<table>
<thead>
<tr>
<th>Altitude</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000FT ASL</td>
<td>460KIAS/M0.86</td>
</tr>
<tr>
<td>15,000FT ASL</td>
<td>420KIAS/M0.86</td>
</tr>
<tr>
<td>20,000FT ASL</td>
<td>380KIAS/M0.86</td>
</tr>
<tr>
<td>25,000FT ASL</td>
<td>340KIAS/M0.86</td>
</tr>
<tr>
<td>30,000FT ASL</td>
<td>300KIAS/M0.86</td>
</tr>
<tr>
<td>35,000FT ASL</td>
<td>240KIAS/M0.80</td>
</tr>
<tr>
<td>40,000FT ASL</td>
<td>200KIAS/M0.77</td>
</tr>
<tr>
<td>45,000FT ASL</td>
<td></td>
</tr>
</tbody>
</table>

### 6.0.3 Cruise Speeds – Supercruise

<table>
<thead>
<tr>
<th>Altitude</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,000FT ASL</td>
<td>290KIAS/M1.10</td>
</tr>
<tr>
<td>60,000FT ASL</td>
<td>220KIAS/M1.10</td>
</tr>
</tbody>
</table>

### 6.0.4 Approach Speeds

GROSS WEIGHT / 60,742Lbs 140 KIAS

### 6.0.5 Landing Speeds

GROSS WEIGHT / 60,742Lbs 120 KIAS