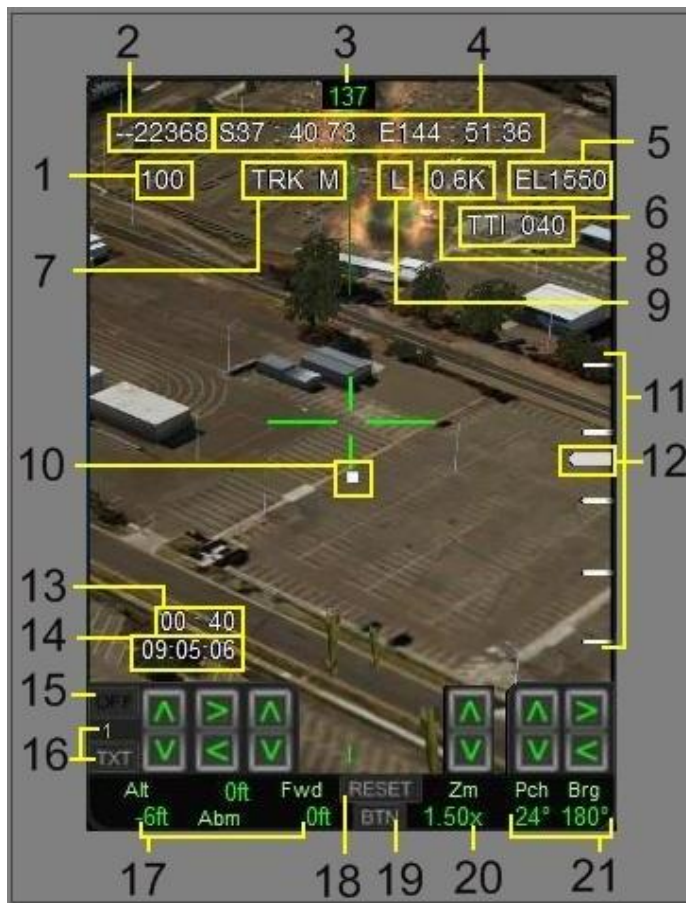
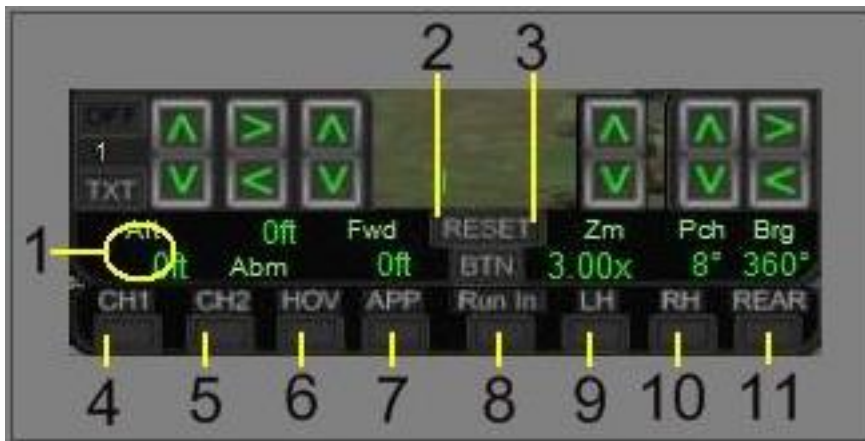


1. PAVE TACK DISPLAY AND PAGE ONE TEXT



1. Sequence No. - 100 is departure point decreasing by 1 at each Wpt.
2. Distance in feet to next Wpt below 99,999' else -00000.
3. Aircraft heading.
4. Aircrafts current Latitude / Longitude.
5. No function.
6. Time in seconds to next Wpt.
7. Orientation of display.
8. Aircraft Radio Altitude AGL in thousands of feet.
9. Cue. 'C' or flashing 'L' laser ranging on countdown.
10. DoF , Direction of Flight rotating arrowhead or square indicator.
11. Countdown ladder, 30 second range.
12. Moving countdown index pointer.
13. Time to next Wpt in minutes and seconds.
14. Calender date. YY:MM:DD.
15. Off button to hide Pave Tack window, On is 'PT' button on panel.
16. Text overlay page button and counter, 4 pages of text and clear.
17. Stand off buttons and readouts , moves viewpoint.
18. Reset button - Left to Original - Right to Bomb views.
19. Button clears/recalls button area to improve screen view.
20. Zoom button and readout.
21. Steering buttons and readouts , change view angles. buttons are single click or repeated if held down.

2. PAVE TACK OPTIONAL RESET BUTTONS



1. Secret Hot spot area to open or hide Lower Optional Buttons.
2. Reset button Left selects original start up view.
3. Reset button Right sets Low level Pave bomb view.
4. CHIN 1 - 15 degree down Fwd , at 500' view.
5. CHIN 2 - 45 degree down Fwd, at 500' view.
6. HOVER - 90 degree down , at 500' view.
7. APPROACH - 8 degree down FWD , at 3.0 zoom.
8. RUN IN - enables low level bomb targeting .
9. LEFT view.
10. Right view.
11. REAR view , at 8 degree up.

NOTES;

- On start up the lower buttons are hidden, they are called up at the Secret Hot Spot.
- Due to aircraft speed and time constraints it is often difficult to set the desired view configuration, the Resets greatly assist in that respect .
- The above buttons represent 10 optional views that are set instantaneously by the click of a single button.
- The selected Reset button is highlighted by a LED light.
- Having set any of these options , the view can then be further refined with the primary control buttons.
- The two Bomb Resets are "Run In" for targeting and "Reset Lo Bmb" which displays a view of bombs falling and exploding if the Weapons Package is loaded and relevant saved flight is used.
- The central button 'BTN' hides/opens the upper button area.

3. PAVE TACK DISPLAY

The Pave Tack Display unit provides the pilot views in all directions . including up and down. These views can be physically moved to standoff distances from the aircraft to enhance the desired view, additionally the views can be magnified or zoomed.

A multitude of viewing settings are available (refer to Table).

This unit has 10 reset options available that instantly set various useful views, considering the speed of fast jets and the time constraints on a busy pilot these reset options represent a vital pilot aid.

There are 4 text overlay options available , including an authentic simulation of the F-111

Pave Tack display.

Two of the reset views are configured to represent typical bombing views as are obtain in the F-111 , a further reset view is the approach view configured for landing on either a runway or aircraft carrier.

This instrument has a variety of uses :

- Pave Tack views under the aircraft .
- Targeting and Bombing.
- BDA - Bomb Damage Assessment .
- Look Down - if on the runway and altitude is increased , then a top down view of the airport or adjacent city is available .
- Reconnaissance - when at any altitude the screen altitude and zoom allow large areas to be viewed , this includes airport being approached at ranges of 10 NM while at 30,000'.
- BVR - Beyond Visual Range , aircraft identification while conducting radar intercepts .
- Approach observations of runway during approach to landing .

Additionally , flares , and Dump and burn can be observed while flying in the cockpit .

For the Targeting and Bombing exercises the Weapons Package must be installed.

NOTE:-

1. It is recommended that a multiple leg flight plan be flown and that Text page 1 be open when approaching the waypoints , the display actively responds to the waypoints in an interesting manner during the final 90 seconds.
This display response also occurs with a Direct To .

2. The following pages detail buttons , resets, and control functions together with the underlying function of this instrument and the included table lists the control settings available.

GENERAL NOTES

The Pave Tack has several modifications to radically improve its capabilities.

1. Both the relative Bearing and Pitch control functions operate in one degree increments, this is both more pleasing , but more importantly it adds greater versatility . At higher zoom levels it eliminates visual gaps that previously existed under the older large increment steps.
2. Selectable four pages of text overlay has been added, the first page functions best if a Flight Plan or Direct To is loaded in the background . The Range or Distance to the next WPT provides a readout in both NM and Feet , the latter being important when used in conjunction with Stand Off and Ranging capabilities.
3. The control buttons can now be selected OFF or ON as required to maximise the screen view. Button control function only exists when the buttons are visible.
4. A small irritant with the flight simulator is LOD (Level Of Detail) at large distances or zooms , The simulator decreases the level of detail resulting in a featureless , bland and fuzzy image.
This aspect has now been overcome to a large degree by " Stand Off " a new feature that has now been added to the PAVE TACK . In essence it enables crisp and highly detailed images at large Stand Off distances.
5. For quick conversion purposes- 1 NM = ~ 6,000 feet , (more precisely 6,076 - 6,080)
6. Stand Off -- Fore and Aft
This is the reason for the addition of this feature. It is to allow the pilot a clear and detailed view of the proposed Target area from a Stand Off range prior to conducting a 'run in' on a bombing exercise . At the ' Fwd ' button , the Camera view can be moved forward in steps given in feet measurements out to a distance of 80NM, the three negative steps are to allow viewing of bomb falls if the 'Weapons Package' is installed .
7. Stand Off -- Left and Right move the camera abeam , and were added to provide a feature or option for the pilot to use as desired.
8. These control functions can be used together to achieve a desired view.
Its versatility and variety are only limited by our imagination and inventiveness .
It is worthy of a little persistence and experimentation.
9. It can be demanding in single pilot operations , the actual F-111 has a WSO to share the workload. The
- 10 Reset buttons are a positive pilot aid.

It is recommended that the following be tried:

- Hit pause to allow time to make desired changes. or
 - Engage autopilot with or without TFR to free pilot to make your changes.
10. RANGING. In a dive place the velocity vector on a target , say a house , then set Stand Off to 6,000' , when the house fills the Pave Tack screen your range is exactly 6,000' and its time to execute a pull up. For this to work accurately all other button parameters must read "0" .
 11. The Pave Tack cannot see your own aircraft , it can see the cockpit and the effects such as, rotating beacons , exhaust , flares and dump and burn.
 12. An interesting aspect is if flying towards an object , for example an aircraft either on the ground or airborne set the Stand Off at a figure past that aircraft then pan the relative bearing to 180 degrees and you will be looking at the other side of that aircraft .
 13. The Stand Off feature is also useful when conducting Aircraft Carrier approaches.
 14. It is important to remain aware of all button settings and their consequent influence , if you are aimed at a tower and zoom in , but the screen is showing a completely different scene , it may well be something as simple as the Stand Off right is set at say 12,000' , and as a consequence you are seeing scenery that is 12,000' to the right of your intended aimpoint .
 15. A further addition to the Pave Tack is the DoF (Direction of Flight) arrowhead , this aids with orientation when the Pave Tack is panned about by the Relative Bearing buttons during flight.
 16. Altitude in this instrument is a measure of 'up' displacement from the **current plane** of the aircraft , it is not an altimeter. If the aircraft is inverted, that measure is then in a downwards sense.

A DESCRIPTIVE EXAMPLE

In this example the aircraft is in level flight at 4,000'.

The first setting is Stand Off increase to 60,000 feet , this moves the Camera that distance directly in front of your aircraft . Then we set Stand Off right to 12,000 feet , this moves the Camera from its current position laterally to a location 12,000' to the right . Then we set Altitude to 15,000' , this moves the Camera up from its present position by that amount. The camera has now been moved from the pilots eyepoint at the aircraft, forward, then to the right, then up , to its current location . We can now point it in the direction that we desire to get the view that we might want ,for example , we turn it around by setting the relative bearing to 180 degrees. Then we tilt it downwards towards an object on the ground by setting the pitch to 45 degrees . We can now zoom in by the amount that we require to observe that object.

The sequence order of settings is irrelevant , as are the figures used above , it was just a description of the cameras movement and directional pointing relative to its origin at the aircraft.

Experimenting with the settings will clarify what they are achieving for you.

NOTE LIMITATIONS

1. This instrument will incur some degree of frame rate impact.
2. When setting Stand Off to large distances it may take the simulator a moment or two to load the Pave Tack screen scenery , suggest the Alt be popped up a few steps , then back down.
3. This instrument can cause transient confusion and disorientation which is only to be expected when you consider the complex spatial geometry that is being manipulated.
4. The pitch range is from 90 degrees down to 0 , then up to -90 degrees , please note there is no stop at 90 degrees down.

XX. The following information is important to understanding the principles underlying Pave Tack and its control and possible uses.

- A. It is a sensor that we will call a Camera.
- B. Its fundamental starting point is the Pilots Eyepoint in the aircraft.
- C. The zoom function is the usual magnification of the current view.
- D. **ALL the control buttons move the camera away from the standard reference point which is the Pilots Eyepoint.**
- E. The Relative Bearing and Pitch actually only rotate and steer the camera regardless of its current location.
- F. This ' pilots eyepoint ' is locked to the plane of orientation of the aircraft in Pitch ,Roll and Yaw.

The following applies to our concept of UP:

- Up in level flight = up.
- Up in 90 degree bank = horizontal
- Up in inverted flight = down
- Up in a absolute vertical climb = horizontal

All of the above applies to our Camera and its resultant views. This leads to interesting , but at times odd views. If flying at 2,000' and in a 45 degree dive and we have placed the Camera 10 NM ahead of our aircraft Guess where the Camera is ? Correct , its a couple of miles underground ! Rather than being comical , these properties afford rich opportunities with a little thoughtful manipulation.

LOW LEVEL TARGETING AND BOMBING

Pave Tack "Run In" Reset button option

This is a low level targeting and bombing configuration which will be reasonably accurate in the height range 200' to about 700' AGL- above ground.

For Precision Fly at 500' to 550' AGL.

For convenience when conducting this bombing exercise both the "Reset Lo Bmb" and "Run In" buttons are in close proximity and near vertical alignment.

PROCEDURE:

For Precision Fly at 500' to 550' AGL.

Choose Flat level terrain.

Level flight with Velocity vector on or very near Horizon bar in HUD.

Having autopilot on helps.

Select "Run In" button to obtain optimum view.

From aircrafts current speed enter table below , chose applicable angle and enter that angle with the PCH (Pitch) button.

Fly accurately towards target , when crosshairs on target click "Droppable Objects" switch , then Click "Reset Lo Bomb" switch which is above the "Run In" button , your view will now be changed to the rear and down and you will see the bomb strike the target and explode.

Go back to "Run In" and proceed to your next target.

Following is ASI then degrees down:-

CIAS PITCH DEGREES DOWN

350 22

360 21

380 20 - Default "Run In" setting.

400 19

420 18

435 17

460 16

485 15

510 14

545 13

610 12

Tested the "Run In" at 500' to 550' AGL .

Bomb placement accuracy is $\pm 20'$, roads at right angles to the flight path used as targets during testing.

The default "Run In" button view is set at 20 degrees down which matches the 380 knot airspeed .

Check your current airspeed , enter table to determine optimum angle and enter that angle with the Pitch buttons , this adjusts the "Run In" button view crosshairs to provide accurate and precise targeting for that specific airspeed.

TABLE 1 - PAVE TACK CONTROL PARAMETER STEPS

1. ** STANDOFF

The Alt , Fwd and Abm all move the camera by the specified distance from the default position , which is the pilots eye point in the aircraft.

Alt - altitude.

Above A/C

0' 6' 100' 200' 500' 800' 2,000' 4,000' 6,000' 10,000' 15,000' 20,000' 28,000' 35,000'

Below A/C

-6' -100' -500' -5,000' -10,000' -15,000' -20,000' -25,000' -30,000'

Fwd - forward.

In front A/C

0' 3,000' 6,000' 10,000' 15,000' 20,000' 30,000' 40,000' 50,000' 60,000'

91,200' 121,520' 151,900' 182,280' 303,800' 486,080'

Behind A/C

-3,000' -6,000' -12,000'

Abm - abeam.

Right or Stbd of A/C

0' 3,000' 6,000' 12,000' 18,000' 24,000'

Left or Pt of A/C

-3,000' -6,000' -12,000' -18,000' -24,000'

2. ** STEERING

Both Pch and Brg are used to point the camera in any required direction, regardless of the cameras current location.

Pch - pitch.

From level 0 up 90 degrees

From level 0 down 90 degrees

Brg - bearing.

From nose 360 degrees either Right or Left

3. ** ZOOM

Is the normal magnification.

0.25 0.50 0.75 1.00 1.50 2.00 2.50 3.00 4.00 6.00 8.00 10.00 12.00 15.00
20.00 25.00