

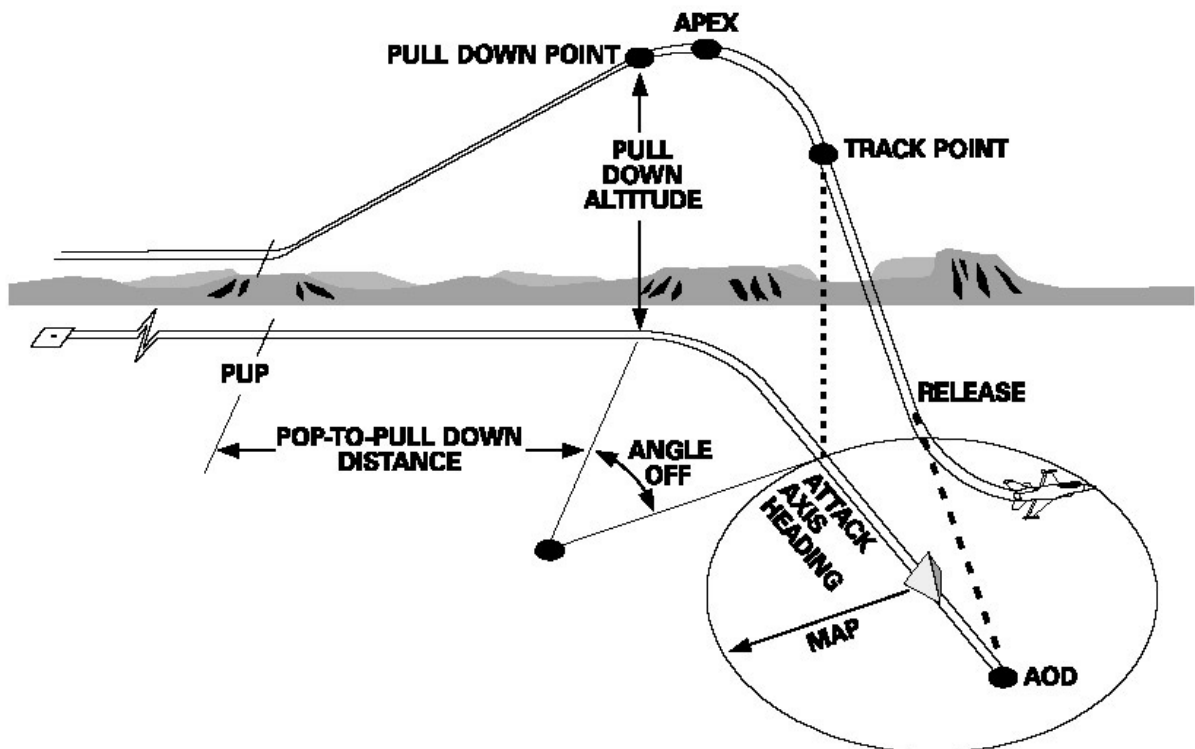
Weapon Delivery Planner

Manual

Version 2.0

Written by

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Picture from MCH F-16 Volume

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Introduction

Weapon Delivery Planner has come a long way throughout the years. Starting off as a Pop-Up planner, getting more attack profiles like the HADB and TOSS attack. Then the DTC manager was added.

Real life planning is done with a program called Falcon View and is a classified program. WDP has almost become a program like this. This does not mean that you can create a TE with WDP. Making a TE still has to be done in Falcon itself. But flying with more aircrafts in multiplayer generates a lot of difficulties and problems. Most of these problems can be solved before you get into your F-16. The key word is: Planning.

With this planning you need to make agreements between pilots. These agreements contain elements like, takeoff and departure procedures, communication, navigation and weapon deployment. All this data can be hard to communicate to all your fellow pilots.

Weapon Delivery Planner will gather and sort all the data needed. At the same time it will generate a DataCard that can be printed or saved as a jpg.


This will help the mission planner to make a briefing package so that it can be send to all participants.

It all sounds like a lot of work. This version of Weapon Delivery Planner will automatically calculate and sort all this data. With just a couple of mouse clicks you can print a DataCard for every pilot in your flight with all the information needed.

Before we begin

DTC and Briefing files

Falcon can produce a couple of files that WDP will use to gather the information it requires.

The DTC file is a function of Falcon and can be saved when you are in a Campaign or a TE mission. You can find the  button on the right side of the mission screen in Falcon. The DTC screen will open and here you can save the DTC file for this mission.

This file contains the missions STPTs and has the same name as the mission. The extension for the DTC files is *.ini.






Earlier versions of WDP would use the briefing file for collecting a lot of data, but this version uses the TE files itself to collect all the data needed.

DataCard

When you have started WDP you will start at the datacard. Use the “Open TE file” button to select the TE you want to use. After selecting the TE you will be shown a selection screen.



Select the flight you want to use. Note that you can not select an aircraft when it is not an F-16. When you open a TE, the DTC file will also be loaded automatically if WDP can find one.

Page 1			DATACARD						
126534	Callsign	Cowboy 1	Package	3703	Mission	oca strike			
ATIS			M 1755LT ILS RWY36 TL140 350/15kts 9999 FEW 7000 28/ 23 Q1013						
Airbase	Airbase		TCN	RNG	UHF	VHF	RWY	ILS	
	DEP	Kunsan	75 X	100	292.3	126.5	36	110.3	
	ARR	Kunsan	75 X	100	292.3	126.5	18	110.30	
	ALTN	R218	8 Y	0	233.8	122.8	18	---	
Flight	Pos	Name	IDM	TCN	TO	LND	Notes:		
	1 Lead	Falcas	1-1	1Y					
	2 Wing	Apex	1-2	64Y					
	3 Element		1-3						
4 Wing		1-4							
Package	Callsign	Aircraft Type	UHF	VHF	IDM	TCN	Task		
	 Cowboy 1	4 F-16C-40	20	1	1	1Y	OCA Strike		
	 Falcon 1	2 F-16C-40	20	2	2	2Y	SEAD Strike		
	 Fury 1	2 F-16C-40	20	3	3	3Y	SEAD Strike		
	 Lobo 1	2 F-16C-40	20	4	4	4Y	SEAD Strike		
 Claw 1	4 F-15C	20	5	5	5Y	Escort			
Flightplan	STPT	Action	TOS	HDG	ALT	KIAS	Fuel	Formation	
	1	TakeOff	18:12:23	---	---	---		Spread	
	2	Nav	18:17:35	35	25000	264		Spread	
	3	Assemble	18:30:24	346	25000	264		Spread	
	4	Nav	18:37:19	359	20000	290		Spread	
	5	Nav	18:38:39	180	14500	320		Trail 1nm	
	6	Strike	18:40:00	353	14500	319		Trail 1nm	
	7	Nav	18:41:20	270	20000	290		Trail 1nm	
	8	PostAssemble	18:50:06	175	25000	264		Spread	
	9	Refuel	18:54:32	221	25000	264		Spread	
	10	Nav	19:40:06	156	0	153		Spread	
	11	Land	19:42:26	272	0	409		Spread	
	12	Land	19:42:26	11	0	0			
	13								
	14								
	15								
	16								
	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								

Page 2									
DATACARD									
1265334		Callsign	Cowboy 1	Package	3703	Mission	oca strike		
TO / Lastout	Config								
	A-A	2x A120C 2x A-9X		Gross Wgt	37783	Rotation	169	TO Fuel	12194
	A-G	6x M82S		Drag ind	120	TO SPD	179	Set Fuel	
	ECM	1x AL131		ALOW	300	Refusal	184	JOKER	
	Tanks	2x TK370		MSL	10000	MI Power	103 %	BINGO	1500
TCN	Primary	Koksan Airbase				Secondary			
	DMPI	Runway				DMPI			
	Lat&Long	N38,47.797 E127,32.058				Lat&Long			
Weapon	Type	MK82 Snake Eyes				Profile 1	CCIP	Rel Angle	45
	SNSR	Nose				Arring dly	04.00	SGUPAIR	SGL
	CPS time	18:39 - 18:41				Burst Alt	5000	Ripole	1
	Release	CCIP				Fuse	NOSE	Spacing	175
	Attack type	PopUp / VRP							
Delivery		VIP / VRP		QA1	QA2	PUP	Pull Hdg	20.0	
	TBRG	209.0		225.5	225.5	219.7	Attack Hdg	49	
	RNG	32908		11906	11906	15169	Dive angle	10 deg	
	ELV	150		990	0	150	Pulling G	3 G	
	Ingress Alt	150		Rel Height	500		Turn	Right	
Support	Ingress Spd	500 kias		Rel Spd	500 kias		TGT in HUD	Target visible	
		AG Type		TACAN	UHF	LOC	Notes:		
	Tanker 1	KC-10 Camel_1							
	Tanker 2								
	AWACS	E-3 Chalis_1							
Stapiness	JSTAR	E-8C Sentry_1							
	FAC								
	ROE			Class	Altitudes		Notes:		
Mission Notes									

After these files have been loaded and you have checked and accepted the load out of your aircraft, you will get back to the DataCard. You can see that a lot of data is already inserted and you won't have to write it down yourself anymore.

You can still change this data by selecting a different flight or DTC file. You can change or add any data on the DataCard where the label is colored yellow. Just clicking on the label will make it possible to add data or a selection window will appear.

Weather

One new feature is the ATIS. The ATIS will not only give you an weather information in metar format, but also other important airport information. The weather information comes directly from the TE weather file. So make sure you save the weather file in Falcon.

It is also good to set the wind direction to deterministic. This will save the wind direction. If you don't do this, there will be no wind direction in the weather file and the wind will always be 360deg.

Identif	Time	Altitude	Wind	Speed	Direction	Cloud	Temp	Dew	QNH	QFE	QFF	QSL	QDM	QDR	QDM	QDR	QDM	QDR
ATIS	M 1755LT	ILS RWY36	TL140	350M	15kts	9999	FEW	7000	28/	23	Q1013							
		Altitude	TCN	RNG	TIME	WHE	RWY	ILS										

An ATIS is an observation for the last 30min and will be published every 30min. Publish times are normally 5min before the hour and 5 min before the half hour.

An ATIS starts with an identifier. In the example above, the identifier is M.

The next thing is the time at which the ATIS has been published. Normally this is done in GMT, but as falcon works with local time, you can see that this ATIS is 1755LT

The next section is the approach and runway information. WDP will check the wind and will pick the best runway compared to the wind. If the runway has an ILS, the approach type is set to ILS.

The following section is the transition level. This is the flight level at which you will switch from flight levels to feet. So above this level you will have the altimeter set to the standard value of 1013Hpa/29.92inch. Below this level you will set your altimeter to the QNH give by the ATIS or reported by the tower.

The next section is the wind. Given in degrees and knots and in the example it is 350deg /15knots

The next section is the visibility. This is given in meters. In the example you can see a value of 9999. This means that the visibility is more than 10km.

The next section is the cloud base. Given in the standard FEW, SCT, BKN or OVC., followed by the underside of the clouds. The value is in feet above ground level. (note; still needs improvement)

The next section is the temperature and dewpoint. In the example you can see that the temperature on the ground is 28deg C and the dewpoint 23deg C. The dewpoint is the temperature at which the aspiration will be 100%.The difference between the temperature and the dewpoint is an indication of how much moister there is in the air. This will give the pilot a feel for how likely it is if fog will be building.

The next section is the QNH in Hpa and in the example this is 1013.

The last section is a short forecast. In the example this is missing due to space, but if you print the datacard you will see the word NOSIG, which means No Significant change.

(Note; I still need to find some more space for the weather.)

The weather can also be loaded manually after a mission has been loaded. WDP needs the correct mission name to get the correct weather file.

If you have loaded a TE or manually reloaded the weather, the runway at the departure airport will be set to the same as the in the ATIS and the take off performance is being recalculated.

Airports

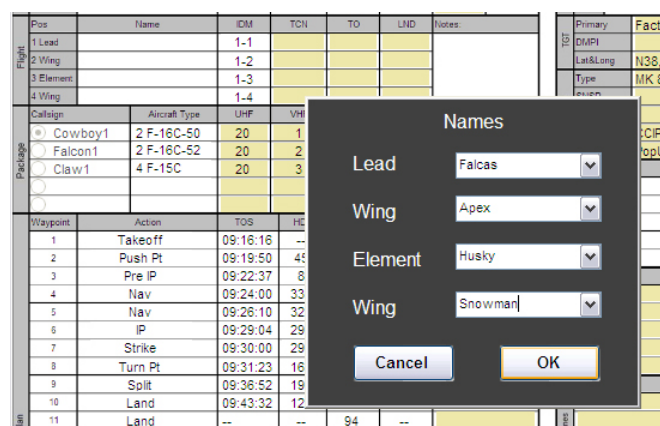
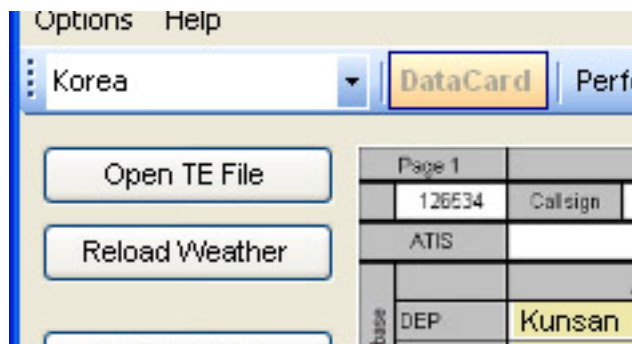
When you load a TE file, WDP will set your departure, arrival and alternate airport. The data for these airports come from a database which contains the Korea and Balkan theater. If you have loaded a TE file that is for the Balkan and you have the theater in WDP set for Korea, the result will be at least to say odd but mostly WDP will not find an airport.

If this is the case, set the theater selection to the correct theater and reload the TE file.

You can also set any airport by clicking on the yellow label where the airport names are written.

The important data, like frequencies and runways are shown.

The runway can be set to your liking by clicking on the yellow runway label. Not every runway has an ILS so selecting the runway that has an ILS will give you at least one ILS frequency. If the Departure and Arrival airports are the same, it is smart to select different runways for these airports. This way you can have more ILS frequencies on your DataCard.



Names.

When you click the “Select Names” button, you will be shown the screen as seen on the left side. In the root directory of WDP you will find a file called Names.ini. This file contains the names shown in the boxes. You can edit this file with Notepad. Just write one name on each line.

WDP will remember the names you have used the last time and come with these names the next time you select this option.

The IDM numbers are filled in automatically.

This is especially handy when you have a large package. The IDM numbers are the ones in the package. Under the Package info you will find the main IDM numbers of the other flights.

By clicking on the yellow label under TCN you can set the A-A TACAN channels for your flight.

The TO and LND are for the actual takeoff and landing times.

Package

After you have loaded a TE and have selected the flight you want to use, you can see the other flights in your package. If you wish to select another flight you can do so.

At the Packages section you will find boxes for the communication plan. UHF, VHF and A-A TACAN frequencies can be set. IDM numbers are filled in automatically.

Note that you can only select a flight that contains F-16s.

Flight plan

The flight plan comes straight out of the TE file. When you select an other flight in the package selection, the flight plan will be updated.

Takeoff and Load out

TO / Loadout	Config			TO Spec	13 / M	Fuel	
A-A	2x A120C 2x A-9LM	Gross Wgt	39837	Rotation	173	TO Fuel	12194
A-G	2x M84	Drag ind	162	TO SPD	183	Set Fuel	
ECM	1x AL131	ALLOW	100	Refusal	181	JOKER	2500
Tanks	2x TK370	MSL	10000	Mil Power	108 %	BINGO	1500

The load out of the aircraft comes from the Performance part of the program. There you can set the load out that you want WDP to calculate

with. If you load a TE file, the load out is taken from it and updated in WDP.

Using the weight and the departure airport data, WDP will calculate the takeoff performance and show it.

The Mil Power RPM of the aircraft is also shown. This will give the flight lead the information for a formation takeoff. The lead can then set 2% less and the wingman can stay in formation during takeoff roll.

The ALLOW and BINGO settings should be self explanatory. Changes here are also changed in the DTC. Don't forget to save the DTC to let the changes make effect.

Set fuel can be used for example the minimum fuel where an A-A refuel will be aborted.

Target

This is the target information. You can fill 2 targets, the primary and the secondary target. These are the names of the complex you want as a target. Like this example it is the Kaesong textile mill.

Primary	Kaesong textile mill	Secondary	
DMPI	Factory	DMPI	
Lat&Long	N38,01.514 E127,29.370	Lat&Long	

The DMPI stands for: Desired Mean Point of Impact. This is the separate target where you are going to drop your bombs on. In the picture above you can see that the Factory is selected. The other aircraft will select another target here. The coordinates of a strike STPT will be inserted when loading the DTC. If WDP find a second strike STPT it will add the coordinates to the secondary target.

Weapons

In the Weapons part you can put some more detailed information about your weapon and weapon setup. The type of weapon you want to use together with the sensor you plan to use to the strike. The Ops time can be used for many things. In this example I used the time that I should put the bombs on the target.

The release is CCIP this time because we plan to fly a Pop-Up with the use of a VRP setup.

CCRP	Rel Angle	45
02.50	SGLPAIR	SGL
2000	Ripple	2
NSTL	Spacing	175

To the right you will see the bomb profile. Here you can add any information about the weapon setup you are using. This data is the same as the bomb profile 1 in the DTC. Changing these settings in the DataCard will also adjust the DTC settings and the other way around. Don't forget to save them if you have changed them.

Note that the release mode is set as CCIP but the in the bomb profile it is still set as CCRP. This is because you should have CCRP set to see the Nav Offsets in the HUD.

Delivery

If you want to select a PopUp or TOSS, click on the yellow label next to "Attack Type". Buttons will pop up, so you can make your selection.

When you have selected a delivery type like Pop-Up, HADB or TOSS make sure you have saved your DTC. If you have saved the data for those deliveries in there respective part of WDP, the values in the DataCard will be updated. These labels are white so they can not be changed in the DataCard.

Type	MK-84	Profile 1	CCRP	Rel Angle	45
SNSR	Dumb bomb	Arming dly	02.50	SGLPAIR	SGL
OPS time	09:30-09:35	Burst Alt	2000	Ripple	2
Release	CCIP	Fuse	NSTL	Spacing	175
Attack type	PopUp / VRP				
	VIP / VRP	OA1	OA2	PUP	Approach
TERG	115.4	86.4	86.4	115.4	Attack hdg
RNG	44031	15288	15288	25802	Dive angle
ELV	150	6748	0	150	Pulling G
Ingress Alt	150	Rel Height	5000	Turn	Left
Ingress Spd	500 kias	Rel Spd	500 kias	TGT in HUD	Target visible

Other Labels

All the other labels that have a yellow color can be used to insert text. This text will be on the printout or on the jpg.

Performance

Performance

Airport

Select APT Charts

Osan

RWY: 09

ELV: 97

TODA: 10356 f / 3157 m

LDA: 10356 f / 3157 m

Width: 250 f / 76 m

Temp C: 21 F: 70 ISA dev: 6

Wind: 0 / 0 HWC: 0 CWC: 0

Aircraft (OF database)

Type: F-16C-50

Power Plant: F110-GE-129

Dry: 17155 lbs

Max: 28948 lbs

Mil Power: 108 %

Empty Weight: 19900

Fuel: 12194

Loadout: 7743

Gross weight: 39837

Max weight: 42300

Drag Factor: 162

Set

TakeOff

Pitch: 13

Power: MIL

Rotate: 173

Lift Off: 183

Refusal: 181

Factor: 2.44

Input

Speed 350 CAS

Altitude 15000 feet

G's 4 g

Actual Temp -15 °C

Result

Speed 431 TAS

Mach 0.69 M

Temperature ISA -15 °C

ISA Dev. 0 °C

Density Alt 15000 feet

Turn Radius 4119 feet

Performance is a big thing in the aviation world. WDP will calculate your takeoff and climb performance depending on many factors. With the WDP install comes the Falcon database. WDP uses this database to get all the weights and drags. This means that the weight and drag for the calculations are the same as the aircraft in your mission.

The left side of the screen is presenting you the takeoff and climb data. The right side of the screen is for speeds and altitudes information.

Airport

After loading a TE file, WDP will set the departure airport. If you want to change the airport is possible, but be reminded that is also changed in the datacard. You can also have a look at the airport chart by clicking on the “Chart” button.

Check if the runway is correct, compared to the wind. The temperature and the wind can be set as well. If you load a briefing file for the DataCard, the values for the wind and temperature will be updated automatically.

Aircraft

In the Aircraft section you can select the block you plan to fly. For almost all the blocks the performance data is in WDP. This means that you will see differences in performance between the block 52 or MLU. The block is also updated after loading a TE file.

The aircraft will also need the correct load out. By use of the “Set” button, that is located next to the fuel and load out values, you will come to the load out screen.

Loadout

Aircraft: **F-16C-50**

AA: 2x A120C 2x A-9LM
AG: 2x M84
ECM: 1x AL131
FUEL: 2x TK370

Empty: 19900
Load: 7743
Fuel: 12194
Gross: 39837
Max: 42300
Drag: 162

Loadout:

Name	QTY	9	8	7	6	5	4	3	2	1
370 Gal Tank	2				1		1			
AIM-120C	2	1	X	X				X	X	1
AIM-9M	2	X	1	X				X	1	X
ALQ-131	1			X		1		X		
Mk-84 LDGP	2			1	X		X	1		

This screen works just like in Falcon, but it will NOT change your load out in the mission. This is only for WDP to get the correct weights and drags for the performance calculations.

Climb and Cruise

In the Climb sections you can see the optimum climb speeds as well as the Distance, Fuel consumed and Time to climb to a certain altitude.

In the Cruise section you can select the altitude you want to climb to.

TAS, CAS and Mach

Did you also wanted to know about the relation between altitudes, temperatures and speeds? Then have a look at this part of the program. This can also be used for planning a route. Looking at the relation between CAS and TAS you can see how fast you are actually moving through the air. If you take the wind into this calculation you know how fast you are moving compared to the ground. This can give you a nice idea how long it will take to get from A to B when you fly at low level or at a high level.

DTC

One of the best additions to Falcon is the DTC (Data Transfer Cartridge). This stands for Data Transfer Cartridge. In real life the planning of a mission is not done inside the cockpit, but back at base with a cup of coffee.

All this planning is done on a computer (laptop) and the results are transferred to a box that you could compare to a memory stick. This cartridge is taken by the pilot and inserted in the cockpit (right side). This data then needs to be loaded into the mission computer.

Open Falcon started with simulating this and WDP makes very good use of it. I will not explain how to use the DTC in the Falcon's UI in this manual. For that you have to check the manual that comes with your Falcon install. You might have noticed that, in Falcon, you can only change a small part of the data in the DTC. This is correct and that is the reason why it is included in WDP.

DTC files and locations

Falcon uses 2 files for the DTC and even that WDP will take care of the files some understanding of these two files is needed to use it correctly.

The first file is made when you select your callsign in Falcon. Thus this file is called the Callsign.ini file. So my Callsign.ini would be Falcas.ini and can be found at the following location: \\Falcon4\\config\\Falcas.ini.

This file contains a lot of data that WDP will read and show to you. It contains the data for if you are flying a campaign mission and are the following types of data:

- STPT
- PPT
- LINES

But the Callsign.ini also contains all the other data used by your aircraft systems:

- EWS
- MFD
- Radio/Nav
- Nav Offsets
- Systems
- Weapons

If you are going to fly a TE mission you would need something more. You also want to pass this file to someone else who also flies the same mission in multi play.

Upon saving your DTC file when you are in the Falcon TE section a new file will be created that has the same name as the TE. For example you make a TE that is called "Bridge Strike", the name for the DTC will be "Bridge Strike.ini". This file can be found in the following location:

\\Falcon4\\campaign\\save\\Bridge Strike.ini

This file contains the data for this mission and contains the following data:

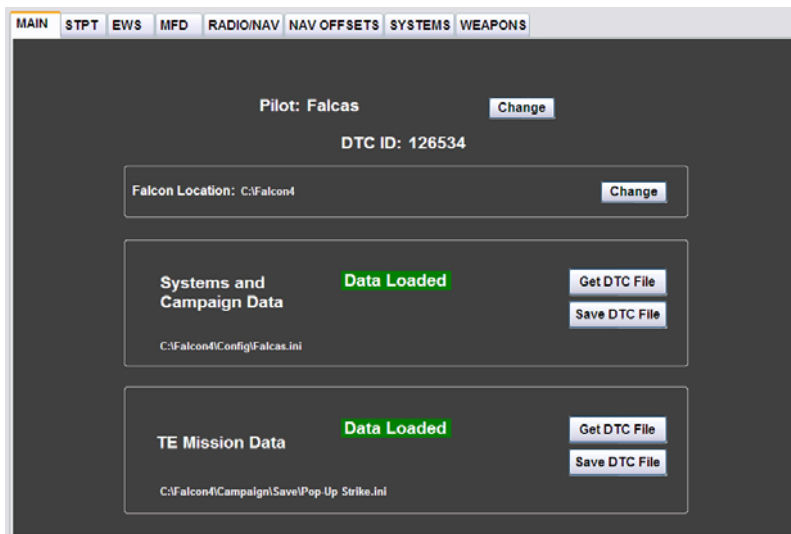
- STPT
- PPT
- LINES

Now the important thing you need to understand about these DTC files. Suppose you are flying a TE in multi play. You pass the TE.ini file to your wingman. When going to the 3D world, the data from the TE.ini is copied to the Callsign.ini. The Callsign.ini is then loaded.

If you have selected "No DTC for Ramp start" in the ConfigEditor and you are doing a ramp start, no DTC file will be loaded.

When you load a DTC file while in the pit, the Callsign.ini will be loaded.

DTC - Main



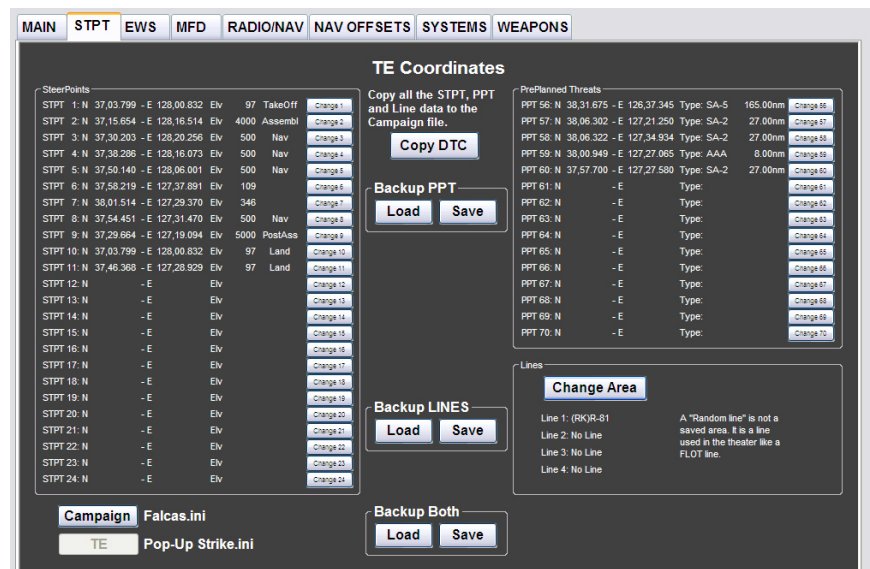
To the right you will see the DTC main page. If you start WDP for the first time, it will ask which Callsign you are using in Falcon. WDP will then look if you have Falcon installed on your computer. If it finds an install, WDP will automatically look for your Callsign.ini and load it. On the Main page you can change your Callsign if you want. If WDP did not find a Falcon install, you have the option to point to the location of falcon. This means that you can use WDP on a remote computer that is

connected over a network.

If you want to change to another callsign.ini or want to load a TE.ini file just click on the corresponding 'Get DTC File' button and point to the file you want to load. If the loading of this file was successful, you will get the information label 'Data Loaded'. You will also see which file has been loaded.

DTC – STPT

On the DTC STPT page you can find and manage all that has to do with Steerpoints. First let me tell you something about the buttons in the left lower corner, the Campaign and TE button. As I have explained to you before, the DTC consists of 2 files. In this example the callsign.ini and the TE.ini have been loaded. To the right of the buttons you can see what file is loaded. In the example picture it is the Falcas.ini and the Pop-Up Strike.ini files.



The TE button has been selected and that will tell you that you are working with the TE data. The text in the upper part is also there to make it clear which file we are working on. When you load a TE.ini WDP will select TE automatically.

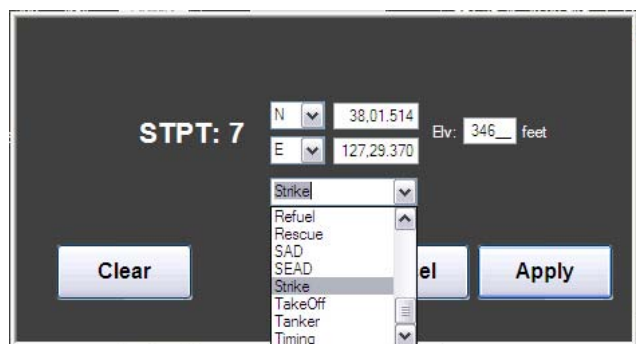
For the Steerpoint part the coordinates are listed. You might notice that for the Takeoff and Land STPTs the elevation is no longer zero. WDP will compare the coordinates of these STPTs to the airport database and will get the correct elevation.

If the DTC file already did contain an elevation for these STPTs, it will leave the elevation as is. The airport that is found for the takeoff and land STPT are also passed on to the DataCard.

If you want to change, delete or add coordinates for an STPT, you can do so by clicking the corresponding change button. A new screen will appear for making the changes.

These changes will only be in your DTC file, not in the mission itself.

As you can see in the picture on the previous page, the action type for STPT 6 and 7 are empty.



This is because I have set the coordinates for the target and the IP on the exact place of the Factory and the IP point. After saving the DTC the action type is then deleted in the DTC. In WDP you can set the action type back to Strike again.

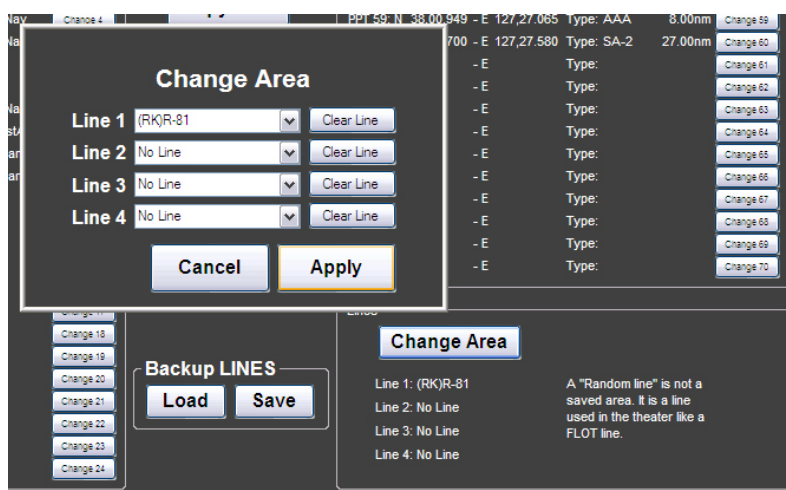
Save the TE.ini DTC file on the DTC Main page. The action type is now saved. Reloading the TE.ini will insert the coordinates of the strike STPT into the DataCard.

This DTC file also contains some PPTs. You probably don't want to change much here, but you can. One very nice option is that you can make a backup of the PPTs. This can be used to transfer the PPTs to another DTC file or keep a backup for if you are flying a campaign and did not destroyed a threat. That will save you some time selecting all the PPTs again.

New in this version is the option for the Lines. WDP contains a database for MOAs (Military Operating Areas) and Restricted Areas.

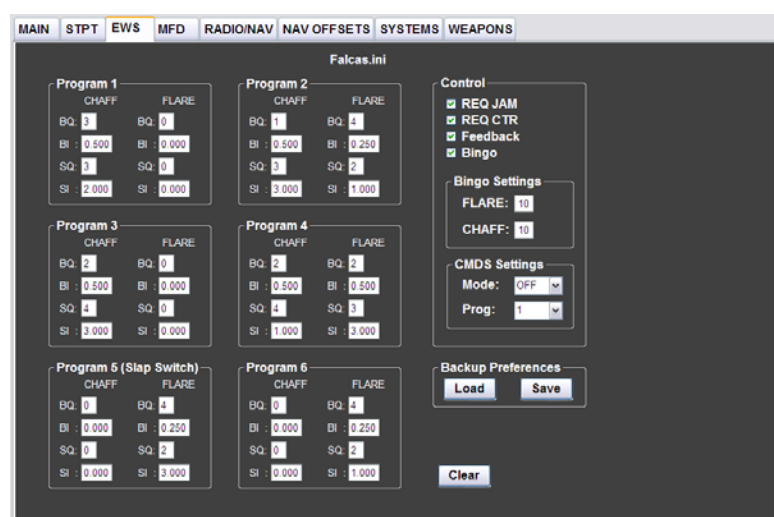
Clicking the "Insert Area" button will show you a new screen where you can select these areas. If you already had a line in the DTC and don't want to change that line, select "Random Line" and the line will remain as it is.

You can delete a line but selecting the "No Line" or clicking the Clear Line button.



If you have made any change here, don't forget to go to the DTC – Main page to save the callsign.ini or the TE.ini files.

DTC – EWS



Here you can manage your EWS setup. You can make, change and delete different EWS programs and settings. The label in the upper middle will show you which file are being used at the time. You can see that this example it is the Falcas.ini. For each program you can set the Burst Quantity, Burst Interval, Salvo Quantity and Salvo Interval. Program 5 is started by pressing the Slap switch. This switch is located on the wall just above the throttle. You can also set your preferences for

the other setting for the EWS system. They can be found in the Control part. The options are REQ JAM, REQ CTR, Feedback and Bingo. Bingo amount for Flare and Chaff and the beginning position for the Mode and Program selector on the CMD5 panel.

With the Clear button you can clear all the settings for the programs at once if you want to start from the beginning.

Also for the EWS you can make a backup. This can be used to make different setups for different types of missions. With the install of WDP a typical setting is already included and can be loaded.

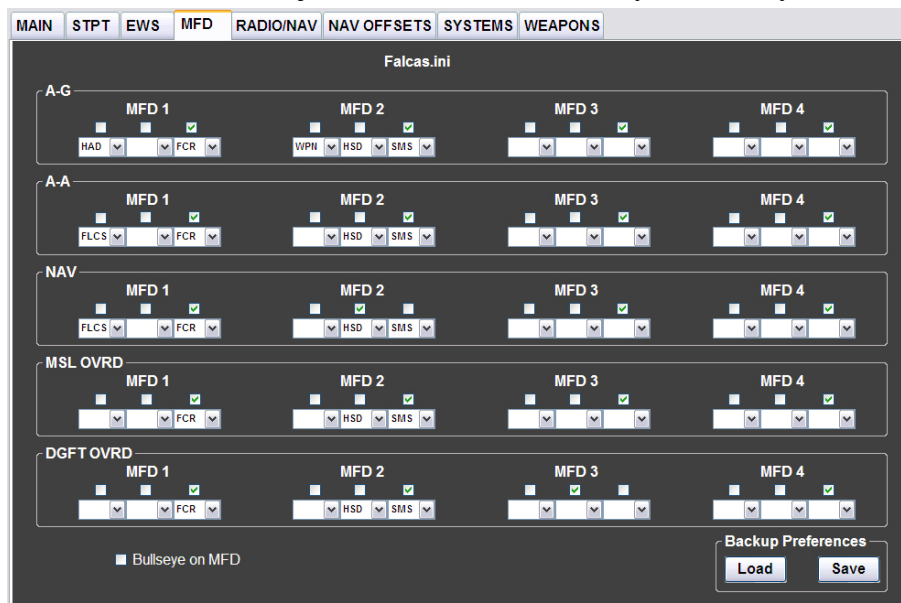
If you have made any change here, don't forget to go to the DTC – Main page to save the callsign.ini file.

DTC – MFD

Here you can manage the setup for your MFDs. The 3 middle OBS buttons of the lower row of the MFD can be set as the pilot wants. You can do this already in WDP and as soon as the DTC is loaded in the F-16, these setting are present. The label in the upper part shows again in which file this data is stored. It is the callsign.ini.

The F-16 has 7 Master Modes, A-G, A-A, NAV, MSL OVRD, DGFT OVRD and JETT.

The JETT mode is the jettison mode and will only be used by selective jettison.



The MFD screen is divided in the 6 remaining Master Modes: A-G, A-A, NAV, MSL OVRD and DGFT OVRD.

For each of these modes you can make a different setup so that you can have the correct data for the situation. The checkbox above the selection will indicate which one will be selected when switching to that mode. Have a look at the picture suppose you switch to A-G. You will have the FCR on the left

MFD and the SMS in the right MFD. Although not in the F-16, MFD3 and MFD4 are included in the DTC.

At the bottom of the screen you can also select if you want to see the Bullseye on the MFD or not. Just select what you want.

You can make a backup again for the MFDs setup. Now you can make a setup for an A-A, SEAD or Strike with LGBs and save them for later use.

If you have made any change here, don't forget to go to the DTC – Main page to save the Callsign.ini or the TE.ini files.

DTC – Radio/Nav

Here you can manage all your settings for the Radios and Navigation. Again the label on the top will show you from which file this data comes.

There are 2 sections for communication frequencies. Here you can change the frequencies for any preset by clicking on the Change button. A new screen will appear where you make the changes.

On top of the comm-1 and comm-2 column, you can find the channel that will be default when you enter the cockpit.

The screenshot shows the 'Radio/Nav' tab of the DTC interface. It is divided into four main sections:

- COMM 1 - UHF:** A list of 20 frequency presets (297.500 to 280.500 MHz) with 'Change' buttons next to each. A 'Quick Settings' section at the bottom has buttons for 'Default', 'RED', and 'Blue'.
- COMM 2 - VHF:** A list of 20 frequency presets (138.050 to 121.700 MHz) with 'Change' buttons next to each. A 'Backup Preferences' section at the bottom has buttons for 'Load' and 'Save'.
- NAV:** Fields for 'TACAN Channel' (94), 'TACAN Function' (T/R (AG)), 'ILS Frequency' (109.00), and 'ILS Course' (000).
- Airport Database:** A section with 'Select APT' and 'Charts' buttons. It displays data for 'Osan' airport, including coordinates, elevation, and various frequencies. 'USE' buttons are provided for copying data from the database to the NAV section.

The Nav section will set all TACAN and ILS data. You can select the tacan channel, the A-G or A-A tacan mode, ILS frequency and ILS course. These will be all inserted and won't need to be inserted by hand anymore.

The airport database section holds a complete database for the Korean and Balkan theater and contains all the data like coordinates, frequencies and runway data. By clicking the "Charts" button you will see the chart of the airport.

Normally the COMM presets 15 are used for the tower frequencies. In the Airport database section you can select at which preset you want to have these frequencies and by pressing the 'SET' button they are copied to those preset location.

With the 'USE' buttons you can copy the data from the Airport database section to the Nav section. Just by one click you have the data at the spot that you need it.

Also here you can save and load a backup file. But you can do even more. If you make a setup for the comms and then save it as Red.rad or Blue.rad, you can use it with the quick buttons Red and Blue. They are for if you are flying Force on Force missions. This way each side can have there own set of frequencies.

The default button will give you the default frequencies that come with the Falcon install.

If you have made any change here, don't forget to go to the DTC – Main page to save the callsign.ini or the TE.ini files.

DTC – NavOffsets

On the NavOffsets page you can select and include the attack profiles into the DTC. WDP will calculate the data for each type of attack when the program is started. While WDP will remember your settings it will have your latest calculation upon start up. This means it has this data is available for all three types, PopUp, HADB and TOSS. So if you don't want to change any parameter, you also don't need to go that attack profile page.

The NavOffsets are located in the Callsign.ini DTC file. In the example you can see that this is the Falcas.ini file.

MAIN STPT EWS MFD RADIO/NAV NAV OFFSETS SYSTEMS WEAPONS

Pop Up Data

VIP
STPT: 6
BRG: 295.6
RNG: 46412
ELV: 150

VRP
STPT: 7
BRG: 115.0
RNG: 38671
ELV: 150

VIP PUP
STPT: 6
BRG: 296.1
RNG: 25972
ELV: 150

VRP PUP
STPT: 7
BRG: 115.0
RNG: 20442
ELV: 150

OA1
STPT: 6
RNG: 33761
BRG: 301.7
ELV: 2872

OA1
STPT: 7
RNG: 13343
BRG: 99.9
ELV: 2872

OA2
STPT: 6
RNG: 33761
BRG: 301.7
ELV: 0

OA2
STPT: 7
RNG: 13343
BRG: 99.9
ELV: 0

TE Offsets

Settings

Falcas.ini

Reference
Off
VIP VRP

None
Pop Up
HADB
TOSS

With the Reference switch you can select if you want to have a VIP or a VRP setup active when you are in the pit. If the switch is in the OFF position, the data for the VIP and VRP are both included in the DTC, but none has been made active. For activating the VIP or VRP go to the LIST (DED) page. There you will see the (3)VIP and (9)VRP options. The one that is highlighted is the active one. If none of these are active, you can activate them by going to their respective page. By inserting zero in the first line you can activate and deactivate it.

The buttons None, Pop Up, HADB or TOSS will select which NavOffset data will be transferred to the DTC. By selecting your attack profile, the data is also passed on to the DataCard

The main difference between the OFF position of the Reference switch and the 'None' button is that with the 'None' button there will be no data in the DTC. With the Reference switch in 'Off' the data is in the DTC, but VIP and VRP are not active.

If you made any changes that you want to take effect, or you just want to include the NavOffset data in the DTC, go to the DTC main page and save the callsign.ini. So now you don't need to type all this data into the MMC yourself and the chance of the wrong data is made very small this way.

DTC – Systems

The screenshot shows the 'SYSTEMS' menu with the following sections:

- HUD:** Color (Green), Brightness (1), SymWheelPos (On), Scales (VAH), FPM (ATT/FPM), DED (DED), Velocity (CAS), Altitude (BARO).
- Views:** WideView (OFF), Start View (3D Pit).
- ICP:** MasterMode (NAV), ALLOW AGL (100 feet), ALLOW MSL (10000 feet), ALLOW TFadv (400 feet), Wingspan (35 feet), Bingo (1500 lbs).
- Misc Panel:** Master Arm (OFF).
- Laser:** Laser Time (20 sec).
- Quick Settings:** Ramp, Taxi, TakeOff.
- Backup Preferences:** Load, Save.
- WingSpans Table:**

Aircraft	Wingspan	Aircraft	Wingspan
MIG17	36	A-10	58
MIG21	23	EF2000	35
MIG23	45	F-4	36
MIG25	45	F-5	27
MIG27	49	F-14	64
MIG29	36	F-15	43
MIG34	49	F-16	32
SU17	44	F-18	37
SU26	47	M2000	39
SU27	48	Tornado	46

On the systems page you can make a lot of different settings for aircraft system and other settings that will be set when you enter the cockpit.

These settings are located in the Callsign.ini file as you can see on the top of the page.

In the HUD section you can set the position of a lot of switches so that they are in the position that you would like. I think that I don't need to explain every switch here.

In the view section you have two options. You can choose if you want to have Wide view or not. But the second option is probably new to most people. With the Start View you can select in which view you start when you enter the 3D world. I have this option selected to 3D pit. That means that I don't have to change the view anymore.

In the ICP section you can select some data that will be handy to set before you enter the pit. Because you can also set the Wingspan that will set the size of the A-A gun funnel, I also included a table with the wingspans of a number of aircraft.

In the Misc Panel section you can choose the position of the Master Arm switch.

The Laser time can be set so that the tracking of the LGB will start at that time before impact.

Also here you can save and load your preferences. If you give the saved file the following names; Ramp.sts, Taxi.sts or Takeoff.sts, you can use the quick setting buttons to select your saved preference for that situation.

DTC – Weapons

One of the best features of the DTC is the possibility to setup your weapons while planning. As you can see in the example picture there is a lot of data that can be set.

All the data for your weapons are located in the callsign.ini.

For your A-A missiles you got the possibility to set the spot/scan and TD/BP functions for the AIM-9. For the AIM-120 you can set the target size.

The A-G missiles have the possibility to set the auto power function. With this function you can

choose when the missile will get powered.

For the bombs you will have 2 sets of profiles that can be used and also set in the DTC. While flying you can quickly change profile by the push of just one MFD button on the SMS page.

For each profile you can set which type off FCC sub mode will be used. The type of fuse can be set. Then you can set the amount of bombs that will be dropped and how this is done by setting the SGL/PAIR, pacing and release pulse.

For the TOSS delivery you can set the amount of degrees at which you want to release the bomb upwards. The FCC will then give you the correct pull-up cue for a 3g pull-up.

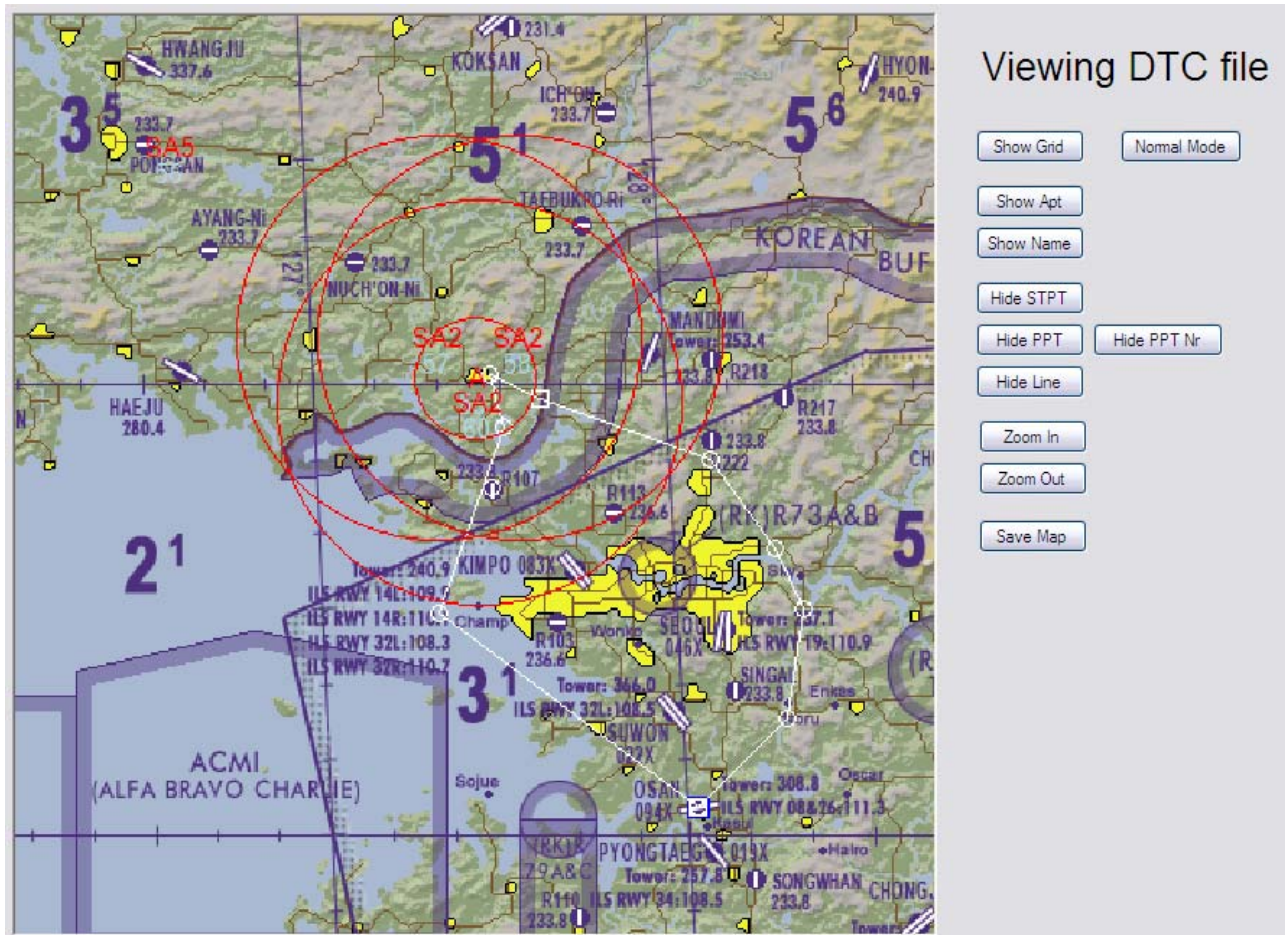
For both profiles you can set the arming delays and burst altitude already.

Also for this page you can make a backup of your favorite settings and load them again when you want.

You can see that this part of WDP will reduce the work that needs to be done in the cockpit a lot. But if you want to know how to do these changes while in the jet, please refer to the chapter: Entering the data in the F-16 MMC at page 57.

MAP

The Map will show you what you have in the DTC at this time. You can zoom and scroll the map. You can choose what you want to see on the map by using the selections on the right. When you have set scroll and zoom of the Map as you would like to use it, you can click on the “Save Map” button and save a jpg.



One very useful feature is the “Show PPT Nr”. The numbers of the PPTs will be shown on the map. This is very useful for MP SEAD missions. If the SEAD flight is sure that it has killed a threat, he can report this number to other human flights. They can quickly scroll to that PPT and set the coordinates to zero. This will “Delete” the PPT from the HSD.

If you click the “Normal Mode” button, the button will change to “Map Building” and you get an extra button “Save Full Map”.

This function is for if you want to work with the map and place a dot on the map. It will place the STPTs from the DTC on the map with a Lime color.

The Save Full Map makes sure the map is saved in Full size.

This will help develop new en better maps.

Threat Info

Knowing everything about the threats that you can encounter is a big part of the planning of an attack. So WDP also includes a database with all the data that I could find. Because there is so much data to find and also so many different versions of weapons, I made the database as an open database.

This means you can change or add data as you like.

Munitions Info

Now that you know everything about your target, you also want to know which weapon you can use to destroy it. Here you can find all the data that you need. This is also an open database so you can add or change data as you like.

In the lower left corner you can find a small selection panel. This is for the Minimum Release Altitude. This will give you an altitude at which it is safe to release the selected type of bomb. This depends on the speed you are flying. If you fly low and slow at the time the bomb explodes, you are still inside the bomb blast and you will get damage.

This part is not working completely yet, but I left it in the program so you can have a look at it.

POP-UP

Introduction to the Pop-Up

Imagine you have to bomb a bridge and AAA and SAMs are defending it. The weapons assigned for the job are MK84s and you are coming in at 20,000 feet. You see your target at your 2 o'clock, 5nm. The RWR is screaming with AAA and a SAM just got a lock on you! You turn to the target, but with everything going on, you lost it. Ah!... there it is again! Turning the nose on the target, diving to the ground. Aiming, aiming, yes you got it. Pickle and get out of here. But what was that? Altitude is 7000? BANG, BANG, BANG..... I just got hit! Engine is out and it's time to leave this piece of falling metal.

It has happened to us all. Getting shot down by SAMs or AAA while dropping your bombs. How do you get to the target and even more important, how you get back alive? This is the big question for all strike missions. Planning is partly the answer. If you plan your attack, you will have a better chance to survive the strike mission. But how and what can you do? One of the things that could be done is making sure you are not seen. Ok let's take a F117 or B2 and we will be ok. But we are Viper drivers aren't we? We don't have that choice.

One thing you might try is staying below the radar and pop up just before we drop our bombs. This will give the enemy only a short time to track and thus a short time to aim and shoot at you. You could also stay above the threat and drop your bombs from a safe altitude. Maybe we could stay far away from the threats and toss the bomb to the target. But when do we go up? How high do we climb?

The answer to these questions are found in the MCH 11-F16 Vol. 5 and RP5 manual. This program will give you the variables to put in the F-16's computer. Basically they are *extra waypoints* at the last part of the attack. The F-16 will display these as *visual cues* in your HUD and these are the points where you will make turns, pulls and dives. In this way you can fly a planned attack with unguided bombs. These tactics can be used against all static targets like buildings; bridges and static vehicles with known positions.

This manual will not only explain how to use this program, but it will also give the explanation how to use this data in the cockpit. And so it will also describe some tactics that can be used to get you home safe.

Differences between Manuals

Some manuals use different names for the visual cues and differ in the positions where they are placed. Some things in this manual will differ from what you might be used to. Because Falcon is a computer program and not a real F-16, it has its limitations. In this version the placements of the points are the same as in the MLU_M1 document. The difference between VIP and VRP is now used as it should.

Important rules

To fly the pop-up correctly, you should fly the planned trajectory as precisely as you can. You will have to be especially focused on several characteristics. The other profiles can be flown a bit less precise.

Climb and Dive path

The reason for calculating all these points comes down to one simple thing. It will get you to an exact point in the air where you aim the plane at the target. You will then have the right dive angle, speed and height.

For the pop-up imagine driving a car over a high round bridge. On the other side of the bridge is the target. From the highest point of the bridge to the point where you exit the bridge is a straight line. This is the same as the bombing run. It doesn't matter how you get to the highest point of the bridge, you just have to get down on that straight path.

What does that mean for us? It means that all the climb- and dive angles are straight paths through the air from one point to another. To fly a climbing or descending path, you should fly with the help of the FPM (Flight Path Marker). If you want to fly a dive angle of 30deg, the FPM in the HUD should be on the 30deg ladder. It does not matter where the nose of the plane is pointing.

The difference between TAS and CAS

In the cockpit there is an instrument that measures pressure. This instrument has an error. An airplane speed indicator indicates IAS (Indicated Airspeed). Calculate the error of the indicator itself, and compare it with the IAS. If you delete the error of the indicator you will get the CAS (Calibrated Airspeed). Error of the instruments is so small that you can say that IAS is the same as CAS. But you still don't have the TAS. The first problem is altitude. The higher you get, the less molecules there are in a fixed amount of air. That means you need more speed to get the same pressure in the instrument. The result is: If you climb with a fixed CAS, the TAS will increase.

The other factor is temperature. Higher temperature means less molecules in the same space and so the same effect. I believe in Falcon4 the atmosphere is modeled as the standard atmosphere. The result is that we can neglect the temperature effect.

The F-16 can show you TAS in the HUD. Look at your Airspeed tape on the left hand side of the HUD. You can see a symbol like this "C". The C stands for CAS. Use the switch on the right lower console or the key SHF+CTRL+ALT+V to change it to "T". The airspeed you see now is the TAS. ("G" is Ground Speed). Just tapping the key when you are on the ground won't change the indication in the HUD, but the TAS is pre-selected. It will change automatically when you raise the gear. The instrument will always show CAS when the gear is down.

Speed

One other important value to think about is the speed you fly. It is important to fly the speeds you have planned, since all the ranges and performances are calculated with this speed.

All the calculations are done in True Airspeed (TAS). The TAS is the speed with which you are actually moving through the air. It is possible to use Calibrated Air Speed (CAS), but then the CAS has to be corrected for the TAS. This means that when you climb, the CAS will become less while

the TAS stay's the same. So if you climb to a higher altitude, its ok if your CAS drops a bit. I prefer not to switch my basic instruments too much and fly the profile with CAS.

The difference between Height and Altitude and Elevation.

A mountain has an elevation of 2000'. That means it is 2000' higher than MSL. (Main Sea Level)

If you fly at 3000', you will fly with only 1000' between you and the mountain. Your height is 1000'. This is also what your Radar Altimeter (RA) indicates

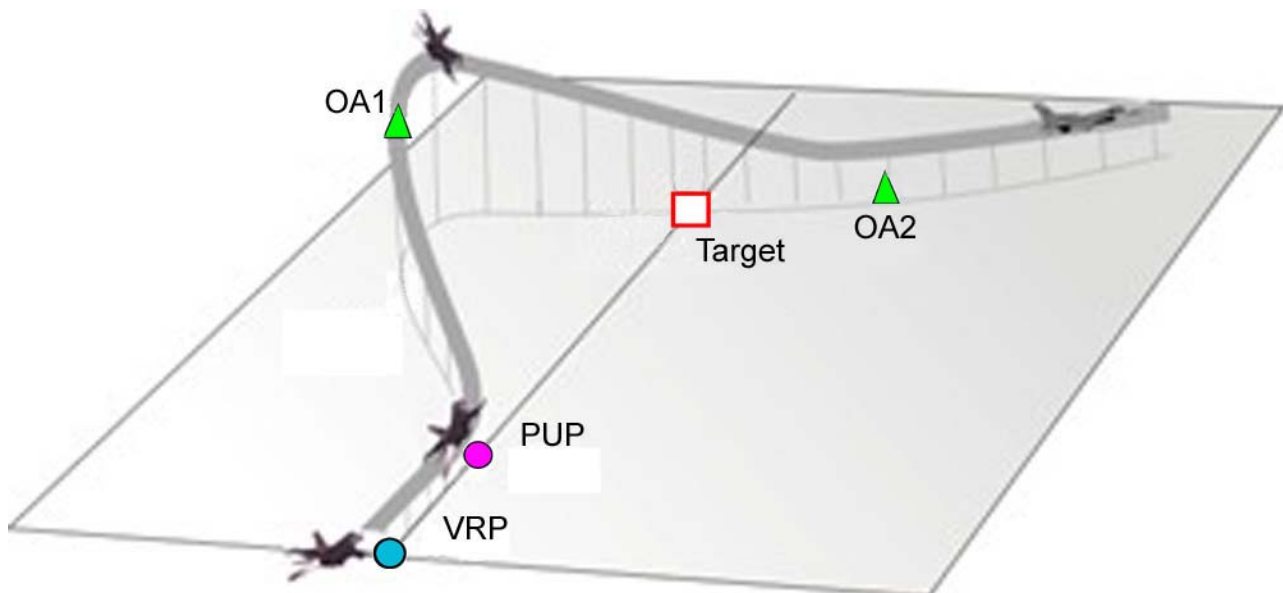
By default in Falcon your altimeter is set to AUTO. This means that If you fly below 2000' height, your altimeter will be indicate your height (RA) If you fly higher it will indicate Barometric Altitude set to MSL. You can switch your altimeter to Auto, RA or Baro on the right console.

Heights and Altitudes

Height and altitude can also pose problems. When you want to drop your bombs at 8000' height, but the target is on a hill that's 2000' high, you will have to drop your bomb at 10.000' altitude. Remember: height is the space between you and the ground. Altitude is the amount of feet between the airplane and MSL. (Main Sea Level) Elevation is the difference between MSL and the ground.

Pop-up theory

You have to fly a route that I call 'the profile'. WDP will provide you with two types of profiles, Type 1 and Type 2. When it is flown correctly, you get your target under the piper at the altitude and dive angle you planned to drop your bombs. It sounds easy but you will have to do a lot of turns and pulls in a very short time. At the same time you have to know where the target is. This all happens at a very low altitude and with high speed. The result of this is that the AAA and SAMs have a hard time hitting you.



There is the possibility to program visual cues in the computer of the F-16. Beside waypoints there are 4 types of cues. These are called VIP, VRP, PUP and OA's.

VIP = Visual Initial Point

VRP = Visual Reference Point

PUP = Pull Up Point

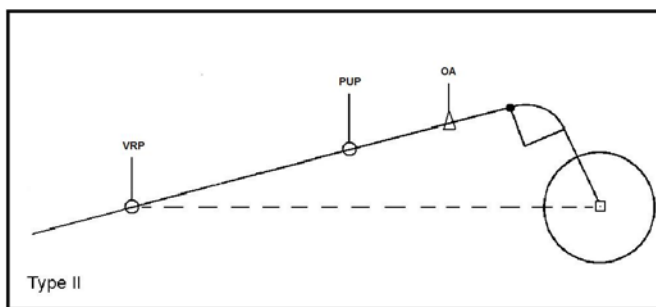
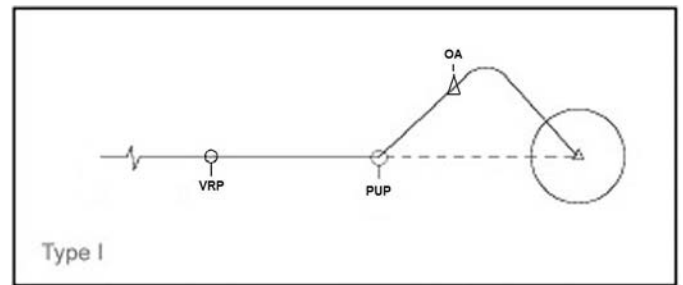
OA = Offset Aim

The VIP, VRP and PUP are displayed in the HUD as *circles*. The OA's are displayed as *triangles*. The Weapon Delivery Planner will provide you with the data that should be entered into the F-16s computer to have the visual cues at the right position.

You can fly a lot of different kinds of pop-ups. In this program there are only two of those profiles. With the combination of all the different release heights and dive angles, there should be ample options. For these pop-ups you will fly a profile that will basically be the same. So when you got the idea how it works, it doesn't change if you select other values.

Type 1 and Type 2

As you can see in the picture to the right, the first option is to fly directly towards the target. Before you get to the target you turn away from it and start your pull-up. At the highest point you turn back to the target. This is called TYPE-1. The second option is to fly a track that is at an offset from the target from the beginning and start your pull-up at the right point (TYPE-2). This can be seen in the picture below. In both cases you will get a certain offset from the target, which will give you the correct distance for the final turn and your bombing run. This distance will also give you a chance to find the target by looking to the side. This can be done before turning towards the target and makes it a lot easier.



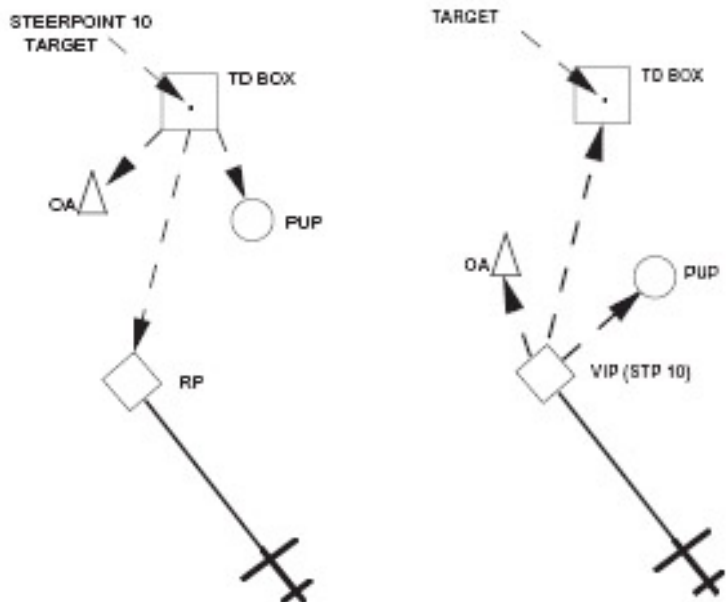
Type 2 is a bit easier to fly, because you won't have to do the turn before the pull-up. How the two profiles are flown, is explained in: Flying the Profile.

Reference point

To get yourself in the correct place and doing the turns, you can place 4 points that can be seen in the HUD. These points are placed by bearing/distance from a reference point.

In older versions of WDP, the reference point was always the target. Now we can choose where that reference point will be. For this we have to separate the setup into two groups. The reference point is the target or it is **not** the target. When the reference point is the target, we use VRP. The VRP usage is the same like older versions of WDP.

When the reference point is **not** the target, we use VIP. With VIP usage you place your reference point at a smart place that is **not** the target.



In the left schematic you can see that the reference point is the target and the waypoint is also placed over the target. This is done when you use the VRP setup.

If you look at the right schematic, you can see that the reference point is not the target, but somewhere else. Also the used waypoint, the IP, is placed at this point. The IP is set at a place

where it is good use to us and that will be the reference point. It has now become the Visual Initial Point (VIP). So as an example, place the VIP over a building that you can find easily and fly to it. This will also mean that WDP will need to have the coordinates of the target and the IP for it to calculate a VIP setup. For this we will use the DTC. How this is done will be discussed later.

The PUP

The first point I start to talk about is the point where you start turning and climbing. This point is called the PUP or Pull Up Point and has a known bearing and distance relative to your reference point. The PUP is displayed as a circle in the HUD. Flying towards the PUP should be done with a pre-planned track. For Type 1 this track is planned in such a way that you will fly in a straight line over the PUP to the target. For Type 2 this track is the same with which you will do the pull-up. More details later.

Line up with the PUP

Lining up for the PUP is done because, for Type 1 you need to make a turn of an exact amount after the PUP. This will be the heading with which you pull-up. For Type 2 this is already the pull-up heading. To get on this heading towards the PUP you could use a point that will get you lined up. For this reason we got the VIP or the VRP, depending on which you are using.

The offset

For Type 1, we turn left or right at the PUP to a predetermined heading. Like all climbs and turns, it has to be done with a predetermined amount of Gs. It will give you an offset slightly away from the target. This offset is made to keep the target in sight when you do the pull-up and makes it easier to turn to the target. You don't have to turn the airplane completely upside down. The amount of bank you have to roll is less and this will make the profile easier to fly.

Using Type 2 you don't need to make a turn to get the offset you need. Just flying from VIP/VRP to the PUP will give the right offset already.

To get you to the correct offset you can use the OA's (Offset Aimpoint)

Another reason for using an offset is the fact that you are harder to hit by AAA. You are not coming head on, but moving sideways. That makes you a more difficult target to hit.

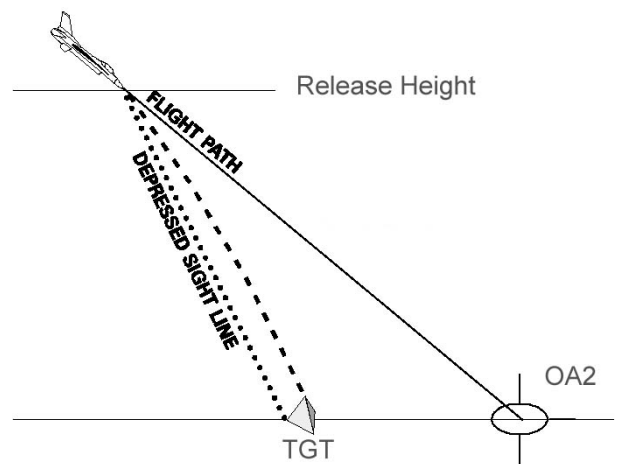
The pop-up

After passing the PUP, and the turn with Type 1, you have to pull the nose up until a certain climb angle. This is also done with the predetermined amount of Gs. Fly along the climb path to a certain height above the target. You are now at the pull-down point. This pull-down can also be shown with an OA. Roll the aircraft with the lift line (looking straight up) towards the target. Then pull the nose, with the same amount of g's, toward the calculated aim point. This point is called OA2 or Off Aim point 2. The distance between the Target and OA2 is called the Aim Off Distance (AOD).

The dive

When you rolled the wings level, you should have the planned dive angle. If you have selected the OA2 as Aim Off point, the point you be flying to, you should see it behind the target. OA's are indicated by a triangle in the HUD. Point the FPM at the same distance behind the target as the OA2. You need to fly over the target and not in to the target. See the picture beside for clarification.

If you have flown the plane as it should, you should have a couple of seconds to aim and pickle the weapon. At this stage it is not important any more if you have the exact dive angle or not. Just concentrate on hitting the target. What is important is the height that you drop the bombs. If this is too low, you will fly in the bomb blast and will have damage.



Leaving the target area

Now break hard to the predetermined heading or pull up and climb away. The exit point can be shown on the HUD as well. It is called the VRP (Visual Reference Point) and is displayed as a circle.

This will give you a basic idea about what is going on and what points you have to work with. In the following paragraphs I will explain in more detail how to use the program and how to fly the pop-up.

Pop Up section in WDP

The calculations made in the Pop Up part will help you plan an attack around mountains, keep you low as long as possible and let you pop up at the last moment. But flying low takes a lot of your concentration to keep clear of the ground. The symbols in the HUD will let you know where you have to do what, without doing any calculation yourself.

The picture below shows the Weapon Delivery Planner when the Pop Up is selected. It has some

Pop Up

Mode: Profile DED Data

Input Panel

Ingress Alt	150	feet
Dive Angle	30	deg
Speed	500	kts (CAS)
Release Height	5000	feet
Tracking Time	5	sec
Pulling G's	3	g
Turn To Target	Left	
Attack heading	0	deg
VRP to PUP dist	3	nm

☐ Place OA2 at the Aim Off Point

TAS	532	kts
Aim Off Dist	2715	feet

Turn Data Panel

Offset Angle	35.6 deg
Pull Heading	80.0 deg
Climb Angle	40 deg
Pulldown height	6748 feet
Angle Off	80.0 deg

Selections Panel

Profile: Type 1 Type 2

Bomb: Low Drag High Drag

Reference: VIP VRP

Coordinates: Campaign TE

TGT STPT: 7

Target Coordinate

N	38,01.514	Elev:	346 feet
E	127,29.370		

IP Coordinate

N	37,58.219	Elev:	109 feet
E	127,37.891		

Use CCIP or DTOS as Delivery Mode

panels to select and insert the values you want. Other panels will give you additional information. In the upper panel with the name of the type of delivery you can find the mode selector. With this selector you can set the main information modes for the chosen delivery.

It always starts in the Selections mode. After you have made your selections you can have a look at the delivery by selecting the Profile mode. When you are done with your setup you can check the values by selecting the DED Data mode. Except from the mode-switch the position of all the other switches and values are saved when you exit the program. The values will return when you start the program again or when you return from any other part of the program.

The selections panel

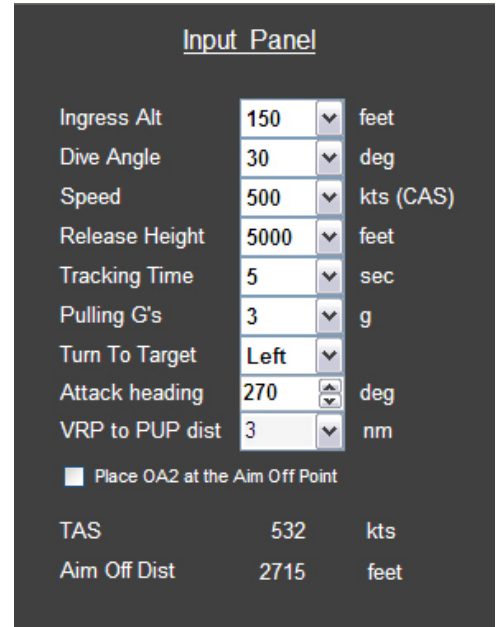
In the Selections panel you can select the basics for the delivery. The profile selector will let you select the type of profile you would like to use. I don't think the Low/High Drag bombs switch needs much explanation.

The reference selector gives you the option to select the reference you want to use, VRP or VIP. This selection can be used depending if you have a DTC file loaded and if you got the coordinates saved in the that DTC file. I will explain this in more detail later on.

The input panel

This panel can be used to enter the data we have accumulated before. Just click on a combo box and scroll down the list. Select the value you want.

- The Ingress Alt is the altitude at which you want to approach the target area. It should be low to stay undetected.
- The Dive Angle is the angle at which you will release the bomb. Select one of the options.
- In the Speed box select the speed with which you want to fly the profile. This speed is CAS. The program will calculate the TAS from this value.
- The Release Height is the height above the target where you want to pick the bombs.
- The Tracking Time is the time that you have to aim. It starts when you have stopped the turn to the target, but this time starts before you have rolled wings level. It stops when you pick the bombs. I recommend using 5sec for a start.
- Pulling G's, are the g's with which you want to make all the turns and pull-ups.
- The Turn to Target is the last turn you make to fly towards the target. Do you want to make a left or a right turn?
- The VRP to PUP dist gives you some control of the distance between the line-up point and the PUP if you use a VRP setup.
- If you select the box "Place OA2 at the Aim Off Point" the place of OA2 is behind the target.



The screenshot shows a dark-themed interface titled "Input Panel". It contains several input fields with dropdown menus and a checkbox. The values entered are: Ingress Alt (150 feet), Dive Angle (30 deg), Speed (500 kts (CAS)), Release Height (5000 feet), Tracking Time (5 sec), Pulling G's (3 g), Turn To Target (Left), Attack heading (270 deg), and VRP to PUP dist (3 nm). Below these is a checkbox labeled "Place OA2 at the Aim Off Point" which is currently unchecked. At the bottom, two calculated values are shown: TAS (532 kts) and Aim Off Dist (2715 feet).

Parameter	Value	Unit
Ingress Alt	150	feet
Dive Angle	30	deg
Speed	500	kts (CAS)
Release Height	5000	feet
Tracking Time	5	sec
Pulling G's	3	g
Turn To Target	Left	
Attack heading	270	deg
VRP to PUP dist	3	nm
<input type="checkbox"/> Place OA2 at the Aim Off Point		
TAS	532	kts
Aim Off Dist	2715	feet

The Turn Data Panel

Turn Data Panel	
Offset Angle	35.6 deg
Pull Heading	81.0 deg
Climb Angle	40 deg
Pulldown height	6748 feet
Angle Off	80.0 deg

Save to DTC

In the Turn Data Panel you will find all the information you need about the headings and the angles.

The Offset Angle is the amount of degrees left or right that you have compared to a straight in flight over the target. For the type 1 profile this is the first turn that will be made.

The pull heading is the heading at which you will pull the nose up to the desired climb angle. The pull down height is the height above the target where you will start the pull towards the target. The angle off is the amount of degrees that you have to turn to get on the given attack heading to the target.

Also the attack heading is shown in this panel. If you have selected an approach heading you can find your attack heading here.

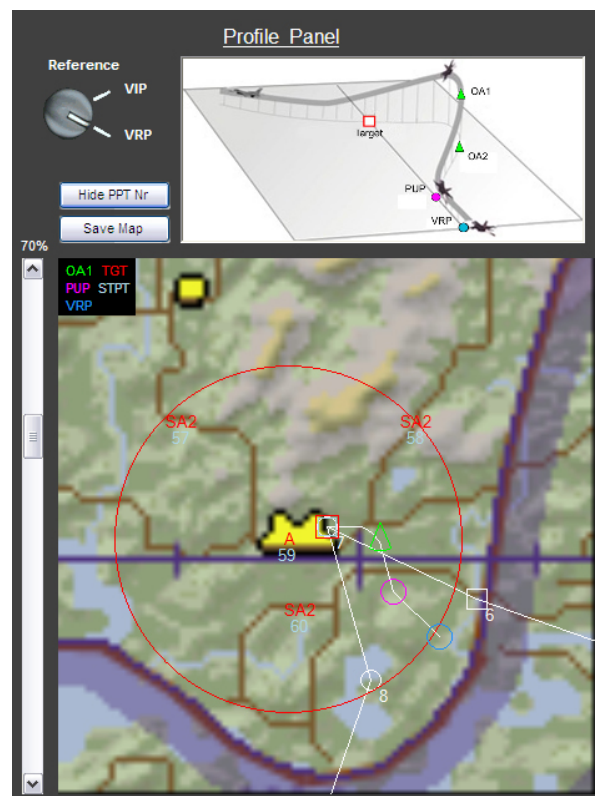
When you are happy with the setting you have selected and want to save the Nav Offsets to the DTC, click the “Save to DTC” button. This will also transfer the data to the DataCard.

The profile panel

Now that we have made all our selections and want to get a better picture of how the profile will look like. The upper picture will give you a 3D view of the profile and gives you a better idea how to fly the attack.

The lower picture is an overview of the target area. If you have coordinates for the target in the DTC-STPT page and the correct STPT is selected in the Selection panel of the Pop Up, the map will be shown. If not, the screen will be blank. Having the map will give you a much better picture of the target area.

While you are looking at the Profile panel, you can still change the values in the selection panel. You will see the changes you made in the profile panel. You can save the map by pressing the “Save Map” button. A jpg will be saved and you can use this picture for your briefing or as a map in the cockpit.

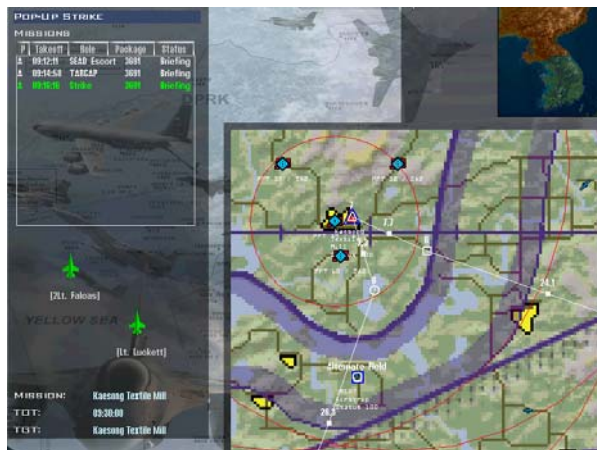


The DED panel

So what do we do with all this planning? First we have a look at what you can insert in the F-16's computer. With the ICP and DED you can insert the VIP, VRP, PUP, OA1 and OA2 bearing, distance and elevation. The program will give the data in the DED Data panel. This panel contains four pages that look like the DED in Falcon.

The data can also being transferred to the DataCard. The DataCard can be saved to a jpg or be printed.

Planning your mission



Now that you know how it works in theory, I will explain how to fly different kinds of Pop-Ups and use WDP to plan a complete mission.

The mission still has to be created in Falcon itself. Also the placing of the PPTs is done in Falcon. The reason is that you can see the threats in Falcon. But while making a mission there are already some things have to be thought about. The ingress and egress route should be laid out so that the Pop Up can be planned.

More about how to place the ingress route later.

What do we need?

This is always a good question to start with. When you know what you need, you also know what you should be looking for.

For a start we need to know what the target is. Is it a “point”, like a radar dish, or is it a long target like a bridge or building? If it is a “point” it doesn’t matter from which direction you attack it. If it’s a long bridge you might want to think about attacking it along its axes. This way you can ripple your bombs in a “stick”. What is the elevation of the target? Is it on a mountain or at sea level?

And one of the most important questions, what is the threat that surrounds the target? Can you find a route around AAA and SAMs?

What does the surrounding look like? There could be a mountain blocking your route during the attack or during the exit. Do we ingress at a low or a high altitude? As you can see, there is a lot to think about. Here are 6 steps to follow.

What do you need

- Type of target
- Target coordinates
- Target heading
- Elevation of the target
- Threats
- Surroundings
- Weather



Step 1. Recon

A good place to start is the recon screen. Take a look at your target. When it’s an elongated target, note the heading to which it is aligned. Falcon has the option to see the coordinates of the target. Write it down or use the DTC, you can insert it in the MMC and the target waypoint will be over the target. In the picture you can see Kaesong textile mill. We will use the Factory as our target. See how long the target is. Then you can decide on ripple and spacing. Notice the color of the

target. This might help during the day. A dark building can be found nicely when it has a light background.

To get the elevation of the target save the coordinates of the target to the DTC. In the DTC STPT page you can see the elevation of every saved precision STPT. What is the weather like? Can you see the target when you are at 3.000 feet? This will give you the first idea for the ingress altitude. Also take a look at what is around the target. This is for a mental picture so you can recognize the

target quickly. For example look at roads, mountains and buildings. The factory is just at the edge of town. Look at the positions of AAA, SAM and radar stations. You should get a plan working in your head now. If you can't think of any route to the target, stay home! (Start with SEAD strikes first.) Check if objects like mountains or cities block your entry and exit. You should look in a radius of about 10nm to 12nm. You can change the distance for the starting point a little bit. Maybe you can avoid some mountains. The calculation starts from a point that is at the same elevation as the target. If you start higher than the target, you will end up at the wrong place when you turn in to the target.

Trick for finding the length of an Object

To find the length of an object, in the recon screen look at the target from straight above by clicking the brown button (above the Target button). Turn the object so it is pointing from left to right. Now use the Zoom function to close in to the object. Zoom it until the sides of the object are at the side of the recon window. At the bottom you can find the Slant Range. When the object is touching the side of the recon screen, the object length is almost the same as the Slant Range.

Step 2. Type of delivery

With Weapon Delivery Planner you can use three different types of tactics for an attack.

- A Pop-up attack,
- High Altitude Dive Bombing
- TOSS delivery attack.

As a famous Dutch soccer player / coach once said: "Every advantage has its disadvantage". The same thing applies to every type of attack.

Using a Pop-Up you can stay below the radar of most of the SAMs. Although you should fly fast, but beware: you are in range of MANPADs and AAA.

A HADB will put you above most of the MANPADs and small SAMs but you will be a nice target for high altitude SAMs like the SA-5 or SA-10.

The TOSS delivery will keep you low and at some distance from the target. But the accuracy of hitting the target is smaller.

Which one do you select for the correct situation? This question together with step 1 will be the biggest decision you have to take.

High or Low level ingress

First make a decision between a high or a low level ingress. The choice of a high or low ingress is actually only about the last part of the ingress. Picture a circle of about 30nm. Everything that is outside of 30nm range of the target is en route and can be flown at a fuel economic altitude. Plan your routing around SAMs and other threats when you are ingress to the target.

Getting into the 30nm range of the target you might get into the range of SAMs or fighters that can not avoided.

At this stage there are two options: The first option is usually a good choice in the beginning of the campaign: Low level ingress. The target area is protected by medium or high altitude SAMs and the chance of enemy fighters is still high. This way you can avoid detection of the enemy radar and try to stay away from enemy fighters. Always try to stay Air-to-Air until the last possible moment.

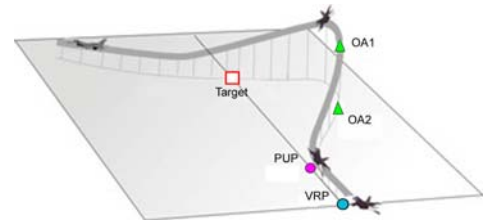
The second option you will most likely encounter later in the campaign. Most of the SAM radars have been disabled and only MANPADs and AAA are a threat. Now we can make a nice "safe" high level ingress. Deal with enemy fighters at long range and stay above the ground threats.

Low level ingress

With low level ingress we again have two options. Here we can use a Pop-up or a TOSS delivery. Choosing the Pop-Up or TOSS depends on the target to hit and if you can fly over the target.

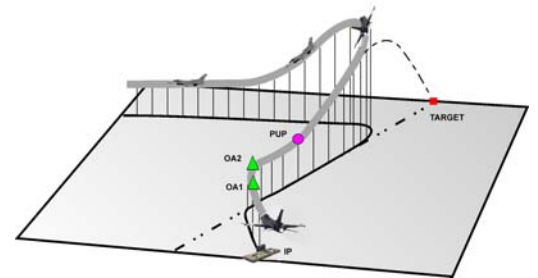
Pop-Up

This type of delivery can be useful for all static targets. Think about buildings, bridges, runways and even vehicles. The ordnance that can be used is the whole range from low and high drag dumb bombs, cluster and laser guided bombs.



TOSS

For a low level ingress we should use a LAT delivery. LAT stands for Low Altitude TOSS. During this delivery the bomb will be released upwards. The range will become greater but the accuracy smaller. Therefore the best type of bomb used will be a cluster bomb. This is a very nice way to attack a group of vehicles like a SA-2 or SA-3 site. But also freefall bombs can be used against large targets.

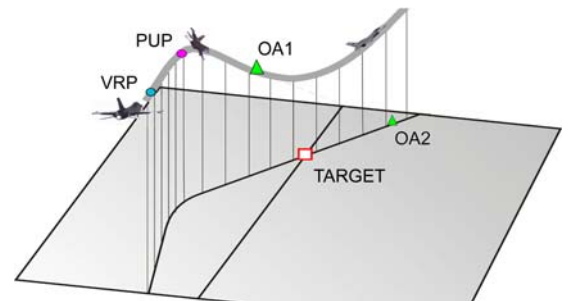


High level ingress

So now the area is clear of high altitude threats or you have a SEAD escort to take care of them. Then it is time to stay high above all the other small threats. Most of the MANPADs can't shoot above 12.000' and the bomb release should be planned above this altitude.

HADB

This delivery should keep you above a planned altitude and can be used for hitting all types of static target like buildings, bridges and vehicles. Any type of bomb can be used. It is also possible to use missiles like the AGM-65 with this delivery.



Step 3. Ordnance

If you can, choose your ordnance carefully and wise. Think about the target to hit. Most important question: will the weapon destroy the target?

Do I use low or high drag bombs? Maybe you want to use a laser guided bombs. This will all depend on the delivery, weather and the target.

Also the amount of bombs is a factor. You must take in account the weight of the aircraft. Using 2x MK84's and 2x drop tanks with a pop-up and a climb to 12.000' will not work. You will lose too much speed. Taking 2x MK84's and 2x drop tank with an ingress height of 20.000' and a HADB delivery will work.

The weather can be a factor. If you know that the target is covered by a cloud layer, the laser for a guided weapon will not work through the cloud layer. In this case you have to revert to dumb bombs. And even need to do a radar only CCRP delivery.

See what the "stick" length will be with a ripple bombing. You should always drop all the bombs on the first pass and leave the area. You should never want to make a second pass over the target unless you are really, really, really sure that nothing can shoot you down! (And even then don't do

it!!!) So adjust your load-out accordingly to the target. If only 2x MK82 will do the job, just take those and keep your aircraft as light as possible.

If you encounter any problem making a plan during Step 1, 2 or 3 revert back a step and try another option.

Step 4. Dive angle and Release height

What will be the best dive angle and the release height? High dive angles give a better accuracy, small dive angles gives you more cover from the ground. Also think about the bomb blast by determining the dive angle and release height. When you fly at very low altitudes you might end up getting damaged by your own bomb blast.

Look at the surrounding. Maybe a mountain will cover your pop-up or a TOSS delivery. Nothing better than starting your climb when you fly behind a mountain.

Higher release altitudes are easier to fly, you have more time and space to correct errors. Dive angles of 30 degrees will give you a nice compromise to start with.

If you use high drag bombs, you will probably fly over the target but won't have a problem with the bomb blast. When using high drag bombs from a higher altitude, the target is most likely not visible in the HUD and you have to use the CCRP mode of the FCC.

Make sure you know how to use the weapon. Weapons are designed to be used in a certain way. Bombs like the Durandal have been designed to be dropped at a height of 250' and be used against runways or taxiways. A near level flight with high speed over the runway is used.

Step 5. Attack heading and approach

At which heading do you want to drop your bombs? Does it have to be a specific heading like bombing a long bridge? You can find the heading in the recon screen.

One other thing has to be taken into account. You have to take a look at where the first point for the profile is positioned compared to the IP in Falcon.

Mostly the first point is at around 10nm from the target. If you can, adjust the place of the IP so it has a good use. I will explain this later.

Step 6. Leaving the target area

To which direction do you have to turn to leave the area safely and how far do you want to fly in that direction? This all depends on the threat around the target and the position of the waypoint after the target. Find the safest route and note the bearing and distance from the target.

One more overall idea about the strike mission: Don't think you can handle everything. The A-A missiles you will take with you are for self defense. You might plan to avoid being detected by radar and hit the target and go home. The hardest part is still the enemy that will defend the target with fighters. Fighters will shoot at you while you concentrate on the ground target. Make sure you've got a good team that will do a fighter sweep at the time you hit your target.

Preparing for the mission

We will use the same route, target and release parameters for all the PopUp examples. This will make it more clear what the differences are. These values are not the best for this situation, so I will also give some values that will better fit this situation.

After the mission has been planned in Falcon and you saved your DTC file, make sure you are in the correct flight and go to the Briefing in Falcon. When you are in the briefing screen hit the Print button. Now you are ready to start WDP.

After WDP has been loaded you are presented with a screen that will ask you which DTC and Briefing file you want to load. Finding the DTC is easy, but the Briefing file can be harder. I have renamed the briefing file to match the mission name. These files must be the correct files or you will get mixed data.

When you have selected the files WDP will start processing the files and show you the load out screen of the aircraft you are about to fly. Check if the aircraft is the correct type and that the load out is also correct. After finishing the load out and accepted with “Ok” the DataCard is filled with as much data as it can.

You can see that it has found the airports you are using for this flight. Without doing anything yourself, you have all the Comm and Nav frequencies at your disposal.

Page 1											
DATACARD											
126334		Callsign		Cowboy1		Mission		Pop-Up Strike			
Weather		Sunny		Wind		0/0		Temp		21 C	
		Airbase		TCN		RWG		UHF		RWY	
DEP		Osan		094 X		100		308.8		122.1	
ARR		Osan		094 X		100		308.8		122.1	
ALTN		R107		16 Y		0		233.8		122.8	
Pos		Name		IDM		TCN		LND		Notes	
1 Lead				1-1							
2 Wing				1-2							
3 Element				1-3							
4 Wing				1-4							
Callsign		Aircraft Type		UHF		VHF		IDM		TCN	
Cowboy1		2 F-16C-50 <td colspan="2"></td> <td colspan="2"></td> <td colspan="2">1</td> <td colspan="2">Strike</td>						1		Strike	
Falcon1		2 F-16C-52 <td colspan="2"></td> <td colspan="2"></td> <td colspan="2">2</td> <td colspan="2">SEAD Escort</td>						2		SEAD Escort	
Claw1		4 F-15C <td colspan="2"></td> <td colspan="2"></td> <td colspan="2">3</td> <td colspan="2">TARCAP</td>						3		TARCAP	
Waypoint		Action		TOS		HDD		ALT		KIAS	
1		Takeoff		09:16:16		--		97		--	
2		Push Pt		09:19:50		45		4.0A		270	
3		Pre IP		09:22:37		8		0.5A		315	
4		Nav		09:24:00		335		0.5A		385	
5		Nav		09:28:10		324		0.5A		405	
6		IP		09:29:04		290		0.2A		500	
7		Strike		09:30:00		295		0.2A		495	
8		Turn Pt		09:31:23		163		0.5A		315	
9		Split		09:36:52		199		0.5A		285	
10		Land		09:43:32		127		5.0M		365	
11		Land		--		--		97		--	
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

Page 2											
DATACARD											
1263334		Callsign		Cowboy1		Mission		Pop-Up Strike			
Config		2x A-120C 2x A-5LM		Gross Wgt		39837		TO Sacc		13 / M	
A-A		2x M84		Drag Ind		162		TO SPD		183	
A-G		1x AL151		ALLOW		100		Retard		181	
Tactics		2x TK370		WSL		10000		MID Power		108 %	
Primary		Secondary									
DMPI		DMPI									
Luf/Lung		N38.01.514 E127.29.370									
Type		Profile 1						CCRP		Ref Angle	
BURR		Arming dly						02.50		EOL PAIR	
OFF time		Burn Alt						2000		Typic	
Release		Fuse <td colspan="2">NSTL</td> <td colspan="2">Spacing</td>						NSTL		Spacing	
Attack type		None									
DBRG		VIP / VIPR		OA1		OA2		RUP		Approach	
IRIG		0.0		0.0		0.0		0.0		235	
SLV		0		0		0		0		Dirct angle	
Ingress Alt		150		Ref Height <td colspan="2">5000</td> <td colspan="2">Turn</td> <td colspan="2">Left</td>		5000		Turn		Left	
Ingress Alt		500 kias		Ref Spd		707 in HUD		Tgt in HUD		Target visible	
Tanker 1		AC Type		TAGN		UHF		LOC		Notes	
Tanker 2											
AIRWKS											
JSTAR											
FAC											
ROC		Class		Altitude				Notes			
Mission Values											

Also all the flights in your package are listed with the task that they have. The flight plan is shown with all the relevant data. The load out of your aircraft is given and with that data available the takeoff performance is calculated. The coordinates of your target are also on the DataCard already. You can see how the bomb profile_1 is set in your DTC. As you can see, it is a lot of data you get with only a couple of clicks.

VRP setup

Type 1

I will start to explain the use of a Type 1 profile and use VRP as the reference point.

As described before the VRP setup is the same as older versions of WDP. So if you are already familiar with older versions this should be easy to understand or you could go to VIP setup now.

The screenshot displays the VRP setup interface with four main panels:

- Pop Up**: Contains a Mode selector and links to Selections, Profile, and DED Data.
- Input Panel**: A form for setting mission parameters.

Parameter	Value	Unit
Ingress Alt	150	feet
Dive Angle	30	deg
Speed	500	kts (CAS)
Release Height	5000	feet
Tracking Time	5	sec
Pulling G's	3	g
Turn To Target	Left	
Attack heading	270	deg
VRP to PUP dist	3	nm

☐ Place OA2 at the Aim Off Point

TAS: 532 kts
Aim Off Dist: 2715 feet
- Turn Data Panel**: A form for turn-related parameters.

Parameter	Value
Offset Angle	35.6 deg
Pull Heading	350.0 deg
Climb Angle	40 deg
Pulldown height	6748 feet
Angle Off	80.0 deg

Save to DTC
- Selections Panel**: A form for selecting mission elements.

Profile: Type 1 (selected), Type 2

Bomb: Low Drag (selected), High Drag

Reference: VIP, VRP (selected)

Coordinates: Campaign (selected), TE

TGT STPT: 7

Target Coordinate:
N 38,01.514 Elv: 346 feet
E 127,29.370

IP Coordinate:
N 37,58.219 Elv: 109 feet
E 127,37.891

Use CCIP or DTOS as Delivery Mode

As you can see in the picture above, I have already set the target STPT to number 7. The reference is set to the VRP so the target is the reference for the NavOffsets.

As we will start with a Type 1 setup, make sure that the switches are set as in the example picture. Set the type to 1, weapon to Low Drag and the Reference to VRP.

Set the values in the Input Panel the same as in the example picture. You will notice that the attack heading is set a heading of 270 deg. During the recon you have seen that the Factory was located East-West. Not only because of this, but also because there are no other buildings in front or behind the Factory that you might hit by accident, we will drop our bombs in an East to West direction.





Switch to the profile view and have a look at the Map. In the upper part you can see a 3d picture which shows you where the points are placed. The lower part will give you a map of the area.

The different colors of the VRP, PUP and OAs should give you a good idea where the points are placed. You can also see how the turns have to be made. If you want to see how it will look like if you select VIP then use the switch to select VIP.

With the “Show PPT Nr” you can still select if you want to see which number the PPTs in the screen have.

You can see on the picture on the previous page that with an attack heading of 270 deg, the attack will have some problems. If you would fly to the IP and then try to find the VRP (blue circle) you have to turn very hard to the south and then back again. This could be solved by flying from STPT 5 to the VRP. You can also changing the type of weapon and attack profile. This we will do later, but for now we only turn the attack heading.

Set the attack heading to 251 deg and have a look at the map. The beginning of the profile, the VRP is very close to the IP now. The route from the IP to the target is also the same as the Pop-Up profile. But even a bigger advantage is that you fly around some mountains now. If you look at the beginning of the profile, between the VRP (blue) and PUP (magenta) circles, you will see that there are mountains just south of the route. These mountains will prevent the SA2 to the south of the target getting a lock on you.

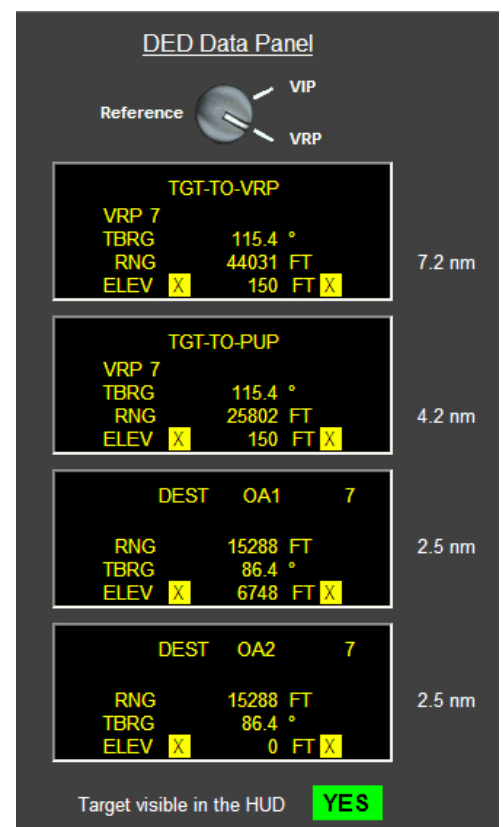
Now you should have an idea of what you have to fly and you are done planning the Pop-Up. Use the “Save Map” to save a jpg. This can be printed and you can have it as a reference when you are flying the mission.

The only thing we need now, are the values to insert into the MMC of the F-16 so that the points are shown in the HUD. Switch to the DED mode, it should look like the picture to the right. To save these values to the DTC and place them on the DataCard click the “Save to DTC” button.

On this panel you can also see if the target will be visual during weapon release or not. Just look at the line at the bottom.

Before climbing in to your cockpit.

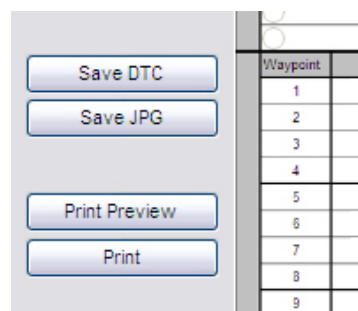
You still have a couple of choices for the type of delivery you want use to drop your bombs. CCRP, CCIP or DTOS. These profiles are made for visual bombing or radar release. If you set the tracking time to a large value it is also possible to get a lock with the targeting pod and drop a laser guided bomb at low level.



Start by using an easy mode like CCIP. Together with DTOS these are the modes that are best suited for a low level pop-up. You can select this mode when you turn towards your target. With CCRP and DTOS you will need enough tracking time to lock the target while fine-tuning your aim. It can be used but it needs practice.

There are a couple of things you want to do when you have some time and peace. Doing them on the ground before you start to taxi or waiting at the runway is a good time. But even better, save the values in the DTC.

- Make sure you got your Radar Altimeter switched to STBY and switch it ON when lining-up on the runway.
- Set your ALOW (Automatic LOW altitude Warning) to about 100' by selecting the 3 button on the ICP and set 100'. (Don't forget to press ENTR) This value is depending on your ingress height. This can be saved in the DTC and can be found on the DTC-System page or on the DataCard.
- Setup you bombs as you planned. Set the ripple, the spacing and the bomb fuse time (Arming Delay). DTC-Weapons page or DataCard.



When you are done with all these decisions and have set then in the DataCard, save the DTC by the use of the button on the DataCard. This will make sure that everything is saved as it should be. Print out your DataCard and jump into the aircraft.

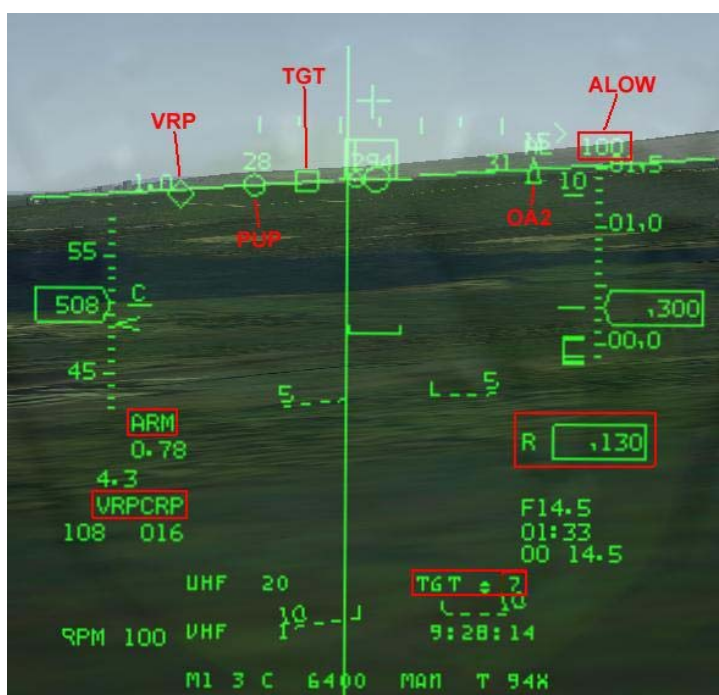
For information about inserting the data into the F-16 computer and how to setup your bombs, please refer to the chapter: Entering the data in the F-16 computer or the chapter DTC.

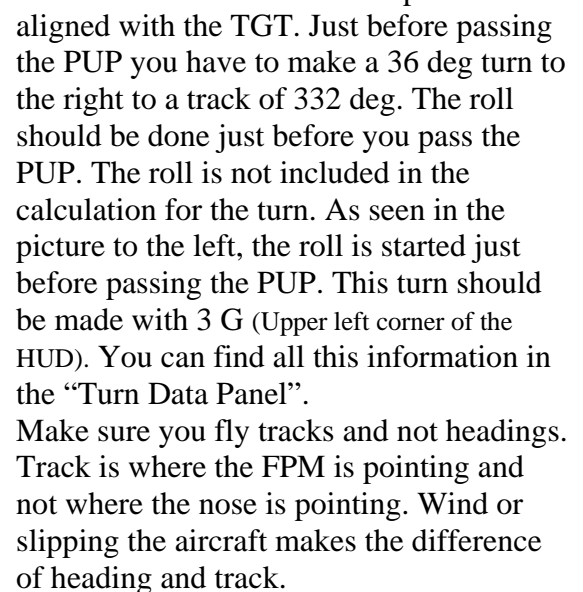
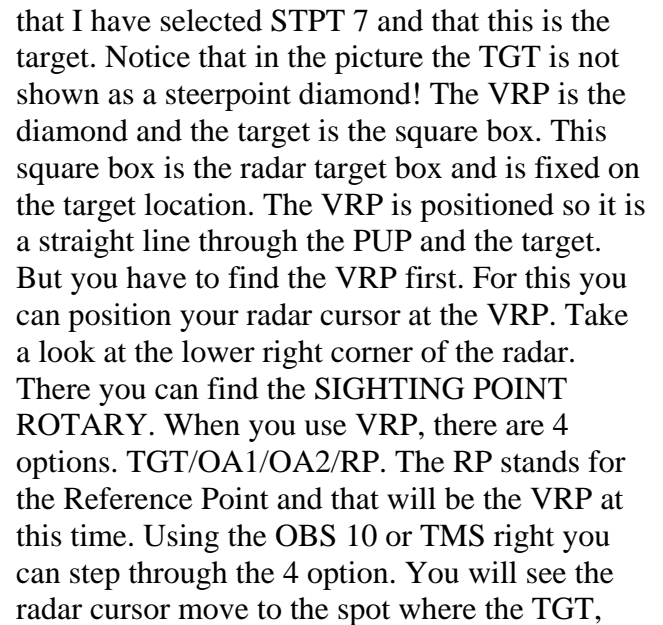
Approaching the target

This is a good time to have a look at the left lower HUD corner. It should say ARM, or else you are doing this all for nothing. (Trust me I know what I'm talking about ☺) Also note the ALOW setting in the upper right part of the HUD. Make sure that you have activated the VRP setup before you start your attack run. You can see what you have activated by going to the LIST page. If VIP or VRP is highlighted, that one is activated. If you

have selected the STPT where you have inserted the NavOffsets, you can also see in the HUD what you have selected. In the lower left corner it will say VIPCRP or VRPCRCP. In the picture to the right you can see that VRPCRCP is selected. You will only see this label and the NavOffset them self if you are in CCRP mode. It is always good to use CCRP for the approach. You will get a lot more info and help this way. You can change to the desired delivery mode if you are in the turn to the target.

Select the target STPT in time. If the IP is very close to where you have the VRP, select the target STPT before you pass the IP. In these example pictures I have set the DED on the HUD. You can see





To make it easier to get to the correct track an Offset Aim point has been placed. This is the OA2 and it is a triangle. This point in your HUD makes it a lot easier to turn to than turning to a heading. As you can see in the picture to the right, I lost half of the height that I had before the turn. If you have to look at the numbers of your compass moving by and trying not to hit the ground, you could make an error easily. Just turning towards a triangle makes it a lot easier and will get you in the correct spot as well.



The pop-up

After completing the turn, roll to wings level and start the climb. Pull the nose up with 3 G's until the FPM is at the planned climb angle. In this example it is 40deg. At the beginning it doesn't matter if you use more than 3g, this way you will see the OA1 a bit earlier. Make only small adjustments to the pitch to keep the FPM on the OA1 and push up the throttles. You are losing your speed at this time. It is not a big problem to lose some speed but you don't want to lose too much speed. You are flying a path up to the point where you are going to pull down again. Losing speed will make the next turn tighter, but you will do that turn by looking at the target and lining up visually. With low speed at this time, you make yourself an easy target, so keep it going. If you can, take a look at the target. It should be on your left 10-11 o'clock and moving towards your 9 o'clock. If you have an IRTracker you now know what it is good for! The steering cue will point to the radar cursor that is placed over the target. This will help you a lot with the last turn to the target. The next thing to keep an eye on is the altitude. This is very tricky. You want to have the height above the target. If you have set the altimeter to Auto the altitude in your HUD is not that height above the target. At very low altitudes it shows the height above the terrain. But climbing a little bit it will give the altitude above MSL and not above terrain. With the nose up high the radar altimeter will not be working or you are flying above a hill that's higher than the target. In the examples I have switched my altimeter to BARO. This way you always get the indication from barometric pressure and a separate box for radar height. In the climbing picture you can clearly see that the Radar Altimeter is not indicating during the climb. The program gives a pull-down altitude of 6748'. If the target is at sea level this is the altitude where you start the pull-down. When the target is at a higher elevation, you have to add the barometric



altitude to the Pull-down altitude. This all needs a bit of practice and you will get your method for this problem. With 40deg nose up and a speed around 400kts, the altimeter is going up very quickly. So to make it a bit easier the program has placed a point for you again. Note that this point is above the OA2. So if you had the OA2 in the HUD before pulling up, you should see it around the 40deg pitch up. The OA1 is placed at the pull-down point. The roll towards the target is also not included after the pull-down point. So just before reaching the pull-down point you should have the altitude that you

need. Now roll the aircraft towards the target. That means that the steering cue should be pointing straight up if you have placed the radar cursor over the target. In the climb picture on the previous page you can see that I have lost quite some speed. I started off with just over 500 and after turning and climbing I have only 330 left. This is because I have 2x MK84 and 2x 370gal tanks on the wing. The penalty for this loss of speed will be seen later.

The dive

Now it's time you start to turn to the target and do the bomb run. What do we know about this part? We know that the dive is planned to be 30deg dive angle. We also know we have to make an 80deg turn (Angle off) to the left and do this all with 3 g's. The combination of the two will make us do a roll to the left that should be more than 90deg bank. The perfect bank is where your lift line is over the Off Aim Point. This is just behind the target. Just before the Pull-down altitude roll the plane and pull the FPM to the Aim Off Point. If you have the "Place OA2 at the Aim Off Point" selected in the WDP, you should see a triangle at the right heading and distance behind the target. Pull the FPM to this point. If you don't have the OA2 at the Aim Off Point, you have to estimate this. In the Input Panel you can see that it is 2715'. This distance is called the Aim Off Distance. But you can also just put the FPM at 30deg dive and make sure it is behind the target. This is what you have to try a couple of times to get the feeling for it. If you don't have an IRTracker, I recommend going to full cockpit view. Then switch the view up 1 time. You can see the HUD now, but also a part above the HUD. This will help you to spot the target as soon as possible and keep a track on the g's you are pulling.

You found the target and pulled the nose on it. Now you can select any delivery mode that you want to use. The easiest should be CCIP. If you placed the radar cursor on top of the target and you had the exact coordinates of the target inserted you can also lock the target in CCRP. Also using DTOS

at this time is a good option. With CCIP, you see the diamond over the target and your track should be 251deg. In the picture you can see that I have already rolled wings level again and that the FPM is around the 30deg down marker of the pitch-ladder. After you have finished the turn you have 5 seconds to roll the wings level and aim. Just maintain the same dive angle; the CCIP piper will come up by it self. When the 5 seconds have passed, you crossed the 5.000' where you want to drop your bombs. As mentioned before, I had lost a lot of speed during the climb. You can see what the result is in the picture. Because of the low speed, the apex of the profile is a bit lower than planned. I also had to build up that lost speed again. But passing the planned 5000' the speed was still too low to meet the correct parameters and the bomb won't reach as far as planned. That means that I got a good aim a bit later and released the bombs 1000' lower than planned.



Leaving the target area

I have hit the target anyway and am on my way back home. Turn to the heading where you planned to leave the area and get out. You can go back to the deck or do a fast climb to higher altitude. This will depend on the type of bomb you used, the release height and the threat you are facing at this time. That's all there is to it...

A better setting for this attack

If you have understood how this works and also the flying was not a big problem, we could change the attack profile a bit so that it will even have a better result.

With the following changes the attack profile will becoming a lot lower and faster.

First change the weapon. Select an MK84 AIR in Falcon. This is a high drag bomb, so in WDP you have to select a high drag bomb as well.

Then set the values as in the picture below.

The screenshot displays the Falcon WDP interface for a 'Pop Up' attack. The interface is divided into several panels:

- Pop Up**: The main title at the top left.
- Mode**: A dropdown menu with options: Selections, Profile, and DED Data.
- Input Panel**: Contains various input fields for the attack profile:
 - Ingress Alt: 150 feet
 - Dive Angle: 15 deg
 - Speed: 500 kts (CAS)
 - Release Height: 1500 feet
 - Tracking Time: 5 sec
 - Pulling G's: 3 g
 - Turn To Target: Left
 - Attack heading: 275 deg
 - VRP to PUP dist: 3 nm
 - ☐ Place OA2 at the Aim Off Point
 - TAS: 509 kts
 - Aim Off Dist: 2576 feet
- Turn Data Panel**: Contains turn-related data:
 - Offset Angle: 19.0 deg
 - Pull Heading: 315.0 deg
 - Climb Angle: 20 deg
 - Pulldown height: 2363 feet
 - Angle Off: 40.0 deg
 - Save to DTC** button
- Profile Panel**: Shows a 3D diagram of the attack profile with labels: VIP, VRP, target, OA1, OA2, PUP, and VRP.
- Map View**: A 2D map showing the attack path. The path starts at the VRP (blue dot), goes to the PUP (purple dot), and then to the target (red square). The map also shows SA2s (red circles) and other targets (yellow squares). The map view includes a legend: OA1 TGT, PUP STPT, VRP.

As you can see the attack heading will be set to 275, so only 5 deg off and you will stay clear of the other buildings. Looking at the map, you can see that the turn after the pop-up has become a lot smaller. Also the height at which you start to pull the nose on the target is a lot smaller, 2363' compared to the 6748'.

You can imagine that this attack is a bit more demanding than the first example, but if flown correctly the chance of surviving is a lot higher. The SA-2s will hardly have any time to shoot at you at all.



Type 2

The type 2 profile is only slightly different from type 1. The difference is in the approach to the PUP. This is not done in a straight line toward the target, but already with the correct offset. For the left picture, imagine for a second that you arrive from the south. Flying past the VRP(blue) to the PUP(magenta), pulling up until you see the OA1(green). At OA1 you start to turn for the first time and this the turn to the target.

For this mission we are not coming from the south but the ingress route comes from the southeast. Turn the attack heading until it reaches a heading of 235 deg. This will bring you to the situation as in the second picture. Just before the

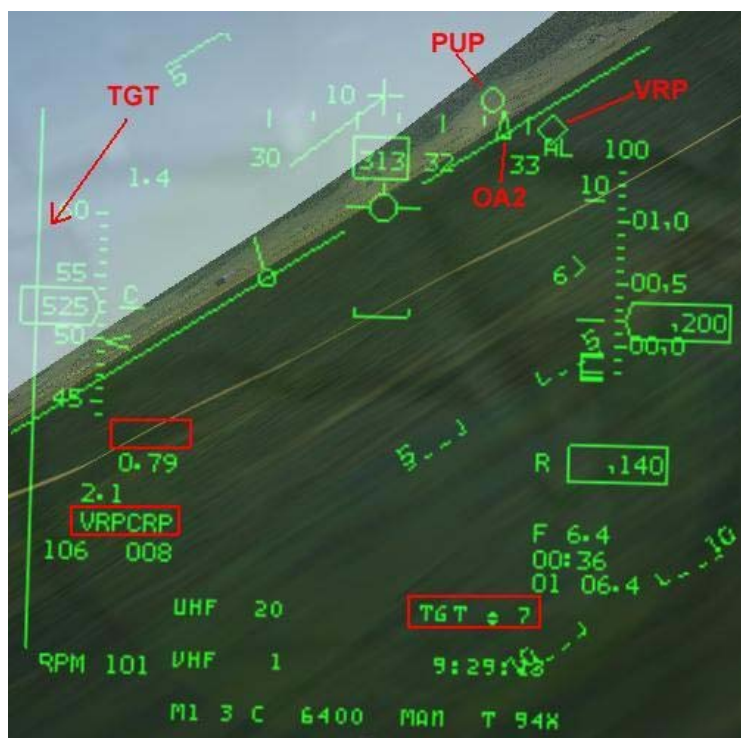
IP you switch to the target STPT and you will see the NavOffsets in your HUD. You only need a small turn to the right and you are line-up for the profile.

You can see that a type 2 profile is easier to fly. For these examples the same values are used to drop the bombs. The only difference is the attack heading. For the Type 1 it was 251 deg and for the Type 2 it is 235 deg.

You can use this difference in attack heading for getting the desired attack heading.

Approaching the target

You can approach the VRP from almost any direction you want, but it will be a bit easier if the approach is already lined up with the pull-up heading. The goal of this profile is that you over fly the PUP with the planned pull-up track. The VRP is placed in such a way to help you to get on that track lined up with the PUP. The pull-up heading can be found in the "Turns Data Panel" and is 315deg in this example. If you do have a large turn to make when flying over the VRP



it is better to fly some degrees left or right of the VRP. Place the VRP at the side of the HUD and just before you get to the VRP, cut the corner on the inside. In the picture to the right you can see the approach to the VRP, making my turn to get the PUP lined up with the OA2. When I pass the VRP, the profile starts. This means that the turn you see in the picture is actually an en route turn and not part of the profile. After passing the VRP the important thing to do is to fly to the PUP with the planned Pull Heading. Make some small error corrections, but don't make large turns. You should have some time to get from the VRP to the PUP, so you could still check some things. As you can see I have forgotten my Master Arm switch. But at least I saw it before I tried to drop my bombs.

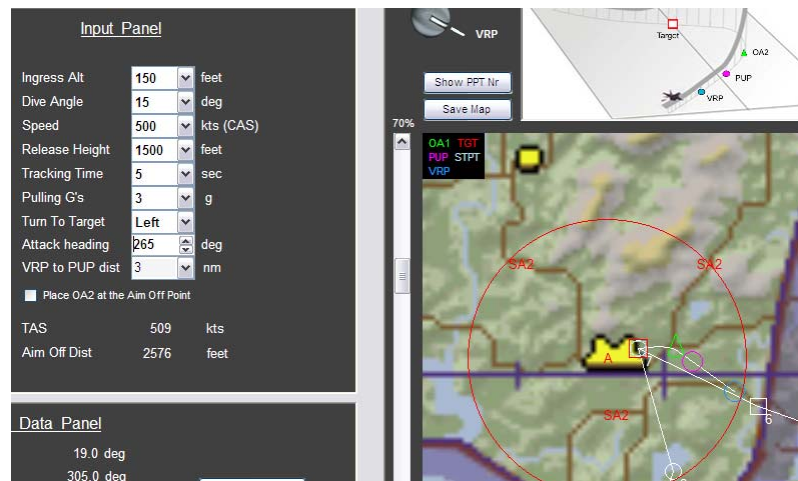
The pop-up



Just before passing the PUP you have to start the pull-up. Pull the nose up with the planned amount of Gs and you should pull it up again to the planned pitch. From this point the profile is exactly the same as Type 1. That means that the OA1 can be found around 40deg pitch. Notice that I have a bit more speed than in the Type 1 example. This is because I did not make the turn passing the PUP and that gave me some more speed. You can also see that I manage to switch the Master Arm on.

A better setting for this attack

As for the Type 1 profile I will also give you some other values that will match the situation a lot better. And again we will use high drag bombs to keep us low. The dive angle is set to 15 deg and the release height is also 1500' again. The attack heading is set to 265 to match the approach and the bombs are dropped in the length of the building.



VRP conclusion

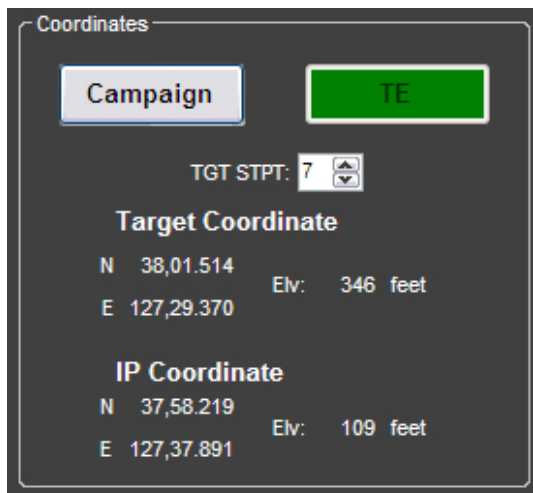
You have learned that the reference point is set at the target when you use VRP. It is possible to fly two types of approaches. An approach with a turn away from the target (Type 1) and one without a turn Type 2). Even within these 2 profiles you can changes many values to get your profile just right for the situation.

VIP setup

You have seen in the previous chapter that with a VRP setup the reference point was placed at the target. Now we use another option and let us place the reference point somewhere else. This could be at any position we like, but if we place it on a smart place it can be very helpful to us.

If you have been using this program before, you might have noticed that it sometimes can be hard to find the first NavOffset point. When you have found it and you are not lined up yet, it can be hard to judge the turn that you will need to make to get onto the right track. And we are not even talking about a high intensity area even. But if the first point would be placed over an object that you can see, it will be a lot easier to fly to.

Try to find an object that you can easily find by radar or by the Mark I eyeball. It should be about 5-10nm from the target. If this object is placed in the direction where you are coming from it is even better. Basically this will be your IP and because you can see the object, it will become the Visual Initial Point.



In real life this will be used to make a radar update of your position so that your navigational precision will be better. In RL your INS will drift and this can be corrected. If you have a GPS installed, this update can be done with this signal. But if you don't have a GPS or it is broken, the navigational position can be updated by TACAN, DME, visual cues using the HUD or by use of the radar. This part can not be done in Falcon, but is nice to know.

The advantage of this VIP will become clear at the moment you start to use it. First we will start with some recon. Look at your map and look for that object that is on your route to the target. If you have found it, you need to note the coordinates of the object or save it to the DTC. You will also need the coordinates of the

target. So save the coordinates of the IP and the target into the DTC. In this example we will use P'anmun Bridge as the IP. The coordinates are N37,58.218 E127,37.890

Again we will start with a Type 1 profile. Set the values as the first example (VRP Type1). If you have loaded the DTC into WDP and you have selected the correct STPT for the target, the coordinates will appear. In the Coordinates screen you can still check if the coordinates are correct. Don't worry about little rounding differences.

Have a look at where the points are placed by selecting the Profile mode. In the picture to the right, the first difference between VIP and VRP that you might notice is that the blue VRP circle is gone and the line is drawn to STPT 6 (IP). Remember that the reference point is the IP now and not the target. The focus is on the IP now. As seen in the picture, the starting point of the attack profile is STPT 6, the IP. With the attack heading still at 270deg, flying from the IP past the PUP towards the TGT is not in a straight line. Turn the attack heading so that the PUP is on the line from the IP to the TGT. To do this, turn the attack heading to 251deg. In the picture to below you will see that it will become one straight line. Now we have the three point lined-up again.



For these examples I have chosen the attack values so that the setup of the VRP and the VIP are very similar. The place of the VRP in the first example is very close to the VIP that we have now. Again, this is all done to make the differences more clear.



Because the active waypoint is the IP, you will not see a diamond over the target. WDP has calculated the bearing and distance from the IP to the target and by inserting these into the “VIP-TO-TGT” page, the FCC will show the target box over the target if you set the FCR cursor to TGT. All the other points will remain the same as a VRP setup.

When you are in the F-16, go to the VIP page using the ICP. Insert the values for the “VIP-TO-TGT” here. The next point to insert is the PUP. With the DCS select SEQ (right) and you will come to the “VIP-TO-PUP” page. Insert the data as seen in the picture to the right. The OA’s can be inserted as normal. One important thing you have to look at when you use VIP is the waypoint where you insert

the data. For VIP the reference point is the IP. In this example the IP is STPT 6. So make sure you insert the data for STPT 6 as well. The only thing that is left to do is activating VIP when you are in the plane.

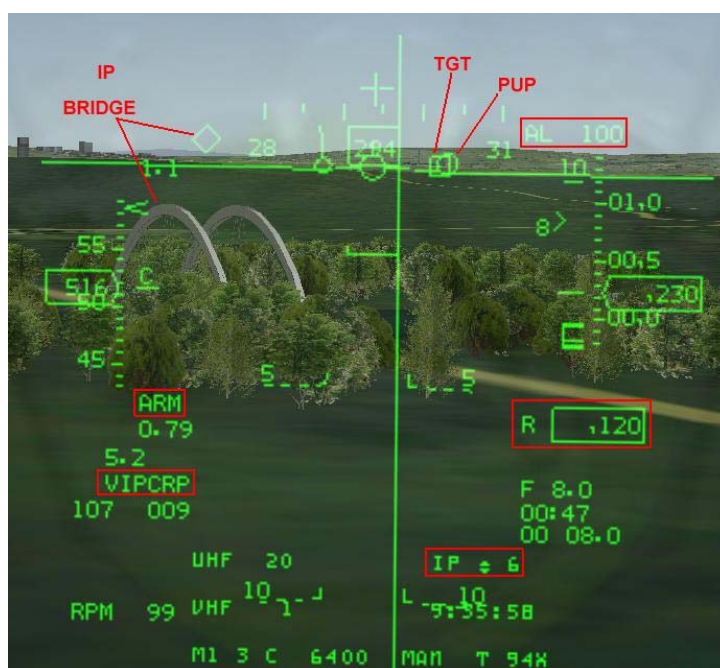
What you have gained by this is more flexibility and you can now easily navigate yourself toward the IP. It will be a STPT that you can see on your HSD and you can see it as an object. Also with the use of the tadpole on the HUD you will be able to get to the correct approach path faster and easier. This is the whole objective of this setup. Even if you lose all the HUD points, you can still fly this by leaving the IP with the planned track. As you get to the planned distance from the IP, just do the pop-up as planned.

There is another advantage of the VIP setup. If you are doing the attack as a two ship, you can now use the same IP but both use a different attack profiles. By this you can stay close to each other until the IP. You can better time the passing of the IP.

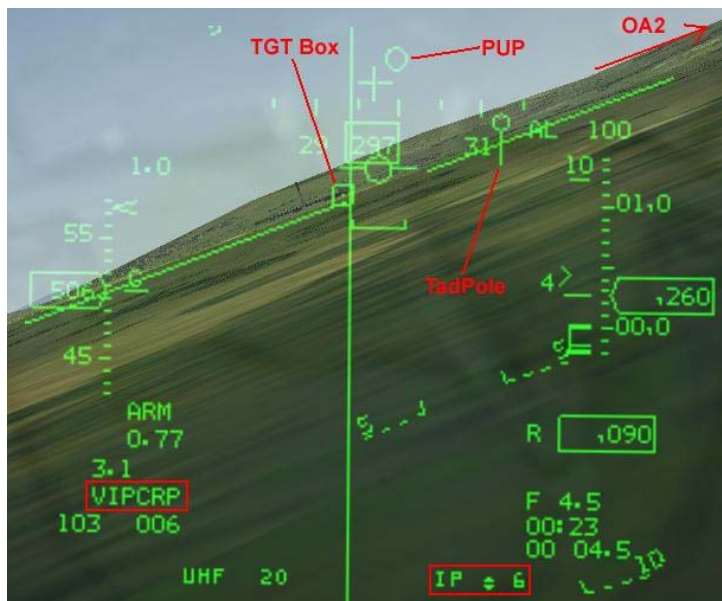
Type 1

In this picture you can see the approach to the VIP. The radar cursor can be seen placed at the TGT. STPT 6 is selected, so you will not see the target as a diamond. You can clearly see the bridge and fly towards it with a heading of 296deg. You can get this value from the DED “VIP-TO-TGT” page. If you don’t have this heading already, you can now easily lead the turn towards the planned track. Now you can be a lot more aggressive and still keep your situational awareness.

In the example picture you can see the VIP, PUP and TGT box. You can also see that STPT 6 (IP) is selected. Passing the IP, you will **NOT** switch the STPT to 7. Just leave it as it is.



You can imagine that it is a lot easier to make some hard turns just before the VIP. Just keep the bridge in sight and you can't be far off.



From this point on the pop-up is flown the same way as the VRP setup. In the HUD you will see some differences. Passing the IP, you will continue toward, the PUP and TGT. Keeping them lined up. As you have not changed the STPT, the active STPT (6) is still behind you. The Tadpole will also be pointing behind you.

Approaching the PUP, as in the picture to the left, you have to turn to the Offset heading again. The Offset and pull heading is 332 again. So make a turn to the right until you see the triangle in the HUD. Roll wings level and start to pull up to 40deg. There you will see OA1 at 6748' above OA2. This is the point where

you start the turn to the target again and start your dive.

Because the active STPT is still nr 6, you won't see a STPT diamond over the target when you switch to CCIP.

Type 2

Personally I find this Type the easiest that you can fly. The first point you have to fly to is the VIP. This point can clearly be seen as the bridge. The VIP, PUP and OA2 are all in one line. Passing the VIP you should be lined up for the pull up.

In the picture to the right you can see that I turn in late, but because you can see the bridge in time, you can also estimate you turn a lot better. Even if the VIP is not in the HUD, you still have it on the HSD and visually.

Passing the VIP fly towards the PUP and OA2. In this example I have turned the attack to 235deg again. The VIP is not on a calculated position, so the 3 points may not be lined up perfectly. This does not matter that much, it will get you on the correct track towards the PUP. The pull up and turning to the target is the same as the previous examples.



For the VIP setup you can also use different values to get a better profile. Try it again with high drag bombs and lower dive angle turn the attack heading again so that the profile fits.

VIP conclusion

Basically the VRP and VIP approach are the same. The reference point has been moved to a useful location. This way you have a visual cue that can be seen outside of the HUD. This makes aggressive turns possible. Flying the VIP profile is the same as the VRP profile.

In the end the main reason to do this is to get the bombs on the target and not get hit!!!



Extra features

Using the OA2

If you want, you can place the OA2 behind the target to help you aim. If you select this option the OA2 will be placed behind the target. It will be line-up and is placed at a distance which will correspond with the Aim Off Distance. This is the distance that you will have to aim the FPM. When you have the FPM at this distance behind the target and you have the planned dive angle, the pipper will be at the target when you reach the planned release height. If you have selected this option, you have to be aware of the sighting rotary. After passing the VIP, step ones for the OA1. During the climb, step again to OA2. Turn to the OA2 by using the steering cue. You now should be lined up with the target and could step the rotary to TGT. The radar cursor is now over the target and you can lock it up.

Placing OA2 at the Aim Off Point will give you an extra point. As point 1 you have the VIP/VRP. The PUP will be the 2nd point. Set the rotary at OA1 and the radar cursor will be shown as point 3, the point to turn to. Pull up and you will find point 4, OA1 as pull down point. OA2 is the 5th and last point as Aim Off Point.

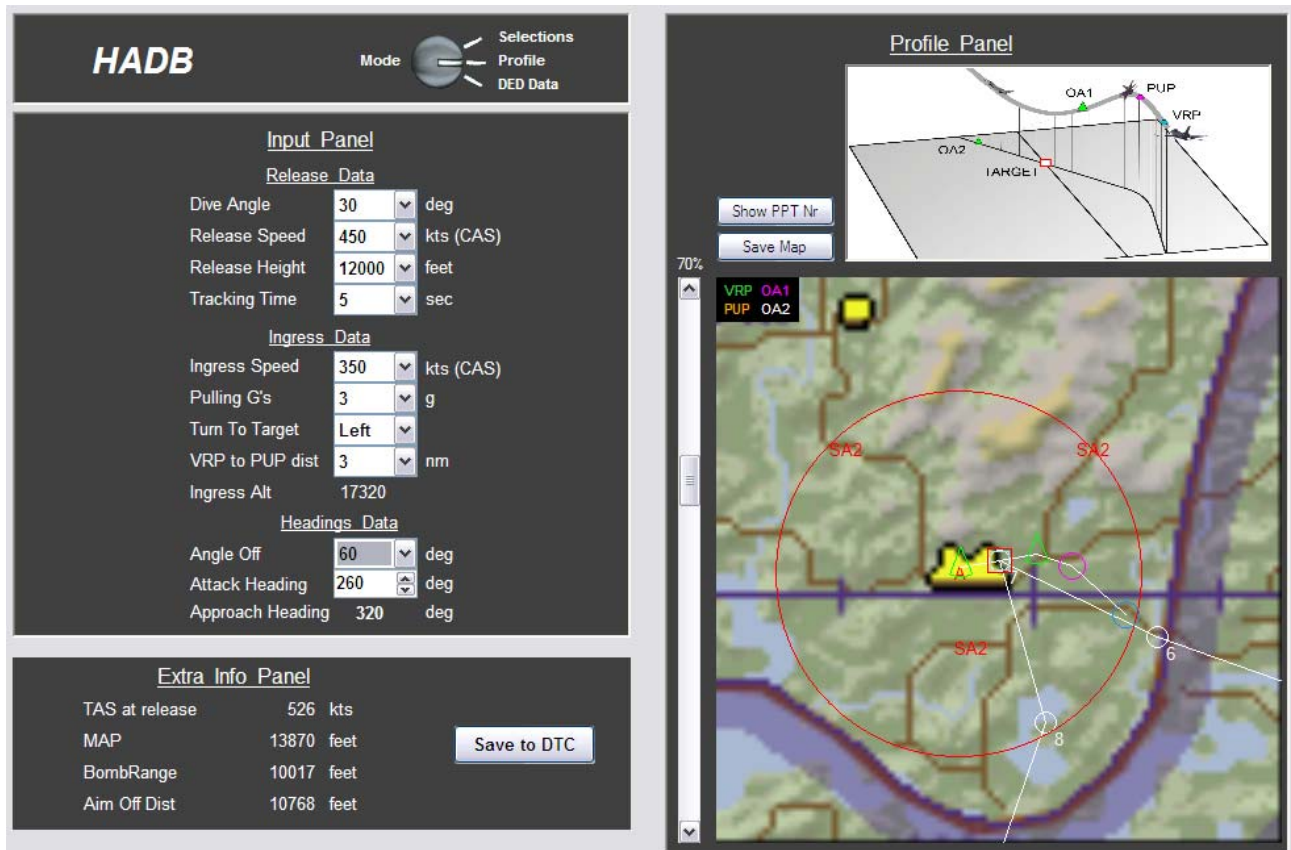
Changing the VIP to PUP distance

You can set the distance between the VIP and the PUP by yourself. In "Auto" the distance will change automatically. It is have the value of 2 times the action range. But in a lot of cases this is to long. It is nice to use this setting in the beginning to get an idea how the profile works. Later you can set it to low values like 1 or 2nm. This will get you close to the PUP and less time to correct, but you can maneuver more before you get to the start of the profile.

HADB

The choice has fallen on high altitude ingress. So there you are at 20.000' and wondering where you want to roll in and start the dive. Start too early and you will get a shallow dive and you have the chance to get below the planned minimum altitude over flying a lot of AAA. When this happens you will see one or more smoke trails coming up and these are not firecrackers for the celebration of a happy new year.

Roll in too late and you could end up missing the target completely or end up in a steep dive and get below the planned altitude again.



The whole idea of the high altitude dive bombing is to stay above the possible threats. Choosing the correct release altitude is the first thing to do. So you are back to step 1 for the mission planning. Do some good recon. This doesn't mean just clicking on the recon screen and have a look around. Keeping track of the complete war would be nice, but that is a bit too much to ask for. But knowing what kind of weapons the enemy might have is a good thing to do. Look for battalions that have the SA-13 or the 2S6. Also the radar guided AAA is a threat at lower altitudes. Check for the ZSU-23-4. If you know the enemy has them and you are not sure if they are in the area, just count with them for this mission.

So let's say the enemy got the SA-13 in its arsenal and you want to hit a power plant. The SA-13 will shoot at you up till an altitude of around 11.000'. If you choose a release height of 12.000' or a bit higher you should be okay. From the recon screen it was not clear if the power plant is defended by AAA or SAMs, so just count on it that it will be.

The input panel

Now the planning of the attack will start. The Selection panel is of the same design as with the pop-up so I don't think much explanation is needed. I will also only explain the use of the advanced panel. If you know how to use this one, it is only easier to use the simple panel.

The advanced panel is been divided into three sections. The first part is the Release Data. In this part you have to make the decisions for the bomb release. Staying above the minimum height is the most important thing to do. Because of this, the release part is also the first thing to set.

- Select a Dive angle for the bomb release.
- Select the Speed at which you plan to release the bomb.
- Select the Release Height to stay above the threats.
- Select the Tracking Time to roll wing level and aim.

The second part of this panel is about the ingress.

The program wants to know how you plan to do the ingress. The first thing you might expect here is an ingress altitude. And that is actually not the case. As said before the main goal is to stay above the threats and not the route towards the target. The combination of the release height, dive angle and tracking time will give you an ingress altitude. If you would like a higher or lower ingress altitude, just change the tracking time and the ingress altitude will change with it.

But the program needs to know the following.

- Select the Ingress Speed.
- Select the Pulling G's with which you want to turn in and dive.
- Select the Turn direction that you want to use to turn to the target.
- Select the distance for the two points that you will over fly during the ingress. The distance between the OA1 and the VIP.

If you have a look at the ingress speed it looks a little bit low. But flying at a higher altitude the selected CAS will give you a much higher TAS. For more explanation of this have a look at the note about the CAS and TAS on page 6.

The third and last part of the panel is the heading data. In this part you can control the attack heading and the amount of degrees you want to turn. The program will give you the approach heading that you will have for the attack.

The screenshot shows a dark-themed interface titled "Input Panel". It is divided into three sections: "Release Data", "Ingress Data", and "Headings Data". Each section contains several input fields with dropdown menus and numerical values.

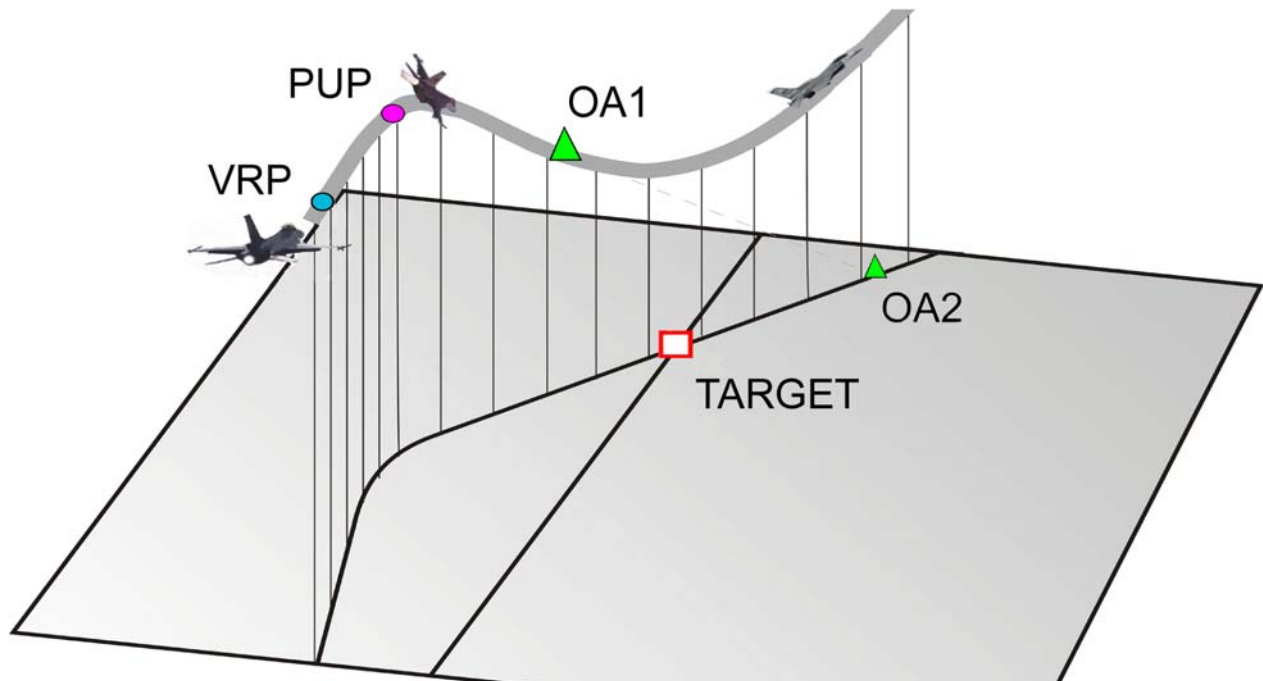
Release Data		
Dive Angle	30	deg
Release Speed	450	kts (CAS)
Release Height	12000	feet
Tracking Time	5	sec

Ingress Data		
Ingress Speed	350	kts (CAS)
Pulling G's	3	g
Turn To Target	Left	
VRP to PUP dist	3	nm
Ingress Alt	17320	

Headings Data		
Angle Off	60	deg
Attack Heading	260	deg
Approach Heading	320	deg

How to fly the HADB profile

This profile is probably the easiest profile of all. It is basically nothing more than what you were doing until now. Just dive down and drop your bombs. Then order a new cup of coffee from the nice stewardess and be home before dinner. (Life can be so good ☺). Get your head out of that cloud and start to fly a planned profile.



For information about getting the data into the F-16 FCC and how to setup your bombs, please refer to the chapter: Entering the data in the F-16 FCC at page 45.

As you can see in the picture above you start at a safe high altitude and line up the OA1 and VIP. The elevation of the ingress has been set at about 17.000'. It is not that important to fly this altitude exactly as possible. But having the OA1 and VIP in the HUD would be nice. In this example the attack heading has been set to 0 deg and the angle off at 60 deg. When you over fly OA1 and you are on your way to the VIP your heading will be 300 deg. This is the time that you should be finished with your setup. Got the correct weapons selected? Got the release pulse and impact distance as you want it? This should be done when you have time and not under a lot of stress.

When you are line up with the OA1 and the VIP, have a quick check if the Master arm switch is set to ARM. Now it is time to focus on the target. I have chosen to do this attack with a CCRP mode and as a backup I could switch to CCIP. Passing OA1 at an altitude of 17.000' and a speed of 350kts CAS, will give me a groundspeed of 443kts (no wind). The VIP is 3nm behind the OA1 and that will give you about 25sec to get a good lock with the ground radar after you have passed the OA1. Getting a good lock also means looking at your target with DSB1 or 2. And that will take you a bit longer than 25 sec! So get your radar work done as early as possible. Some versions of falcon will place the radar cursor very precise over the correct target. When you have entered the coordinates of the target as the exact coordinates of the target waypoint, your life will become very easy. Just locking up the target will do in this case.

Just before the VIP roll the aircraft to the correct bank. You should roll it so the lift line is over the OA2. At the VIP, start to pull the nose toward the target. This should be done with the chosen amount of Gs.

When you start turning it is about time that you give the computer the command to release the bombs. So push down on the weapon release button and hold it down. If you don't do this in time, the chance is that you will fly past the release point and you won't have a release of the bombs. When finishing the turn you should aim over the target so that the FPM is at the same level as the OA2. Now you should have the planned dive angle. If it is a little off it doesn't matter so much. Make sure the bomb line is over the FPM and the bomb should release when you pass the planned release altitude. This is also the place where the VRP is placed.

If you loose radar lock, or come out completely wrong, switch to CCIP and aim using the visual cues. When you descend through the planned release altitude start to pull up. If the bomb won't come off you could have miss aimed or missed the release point. Pull up anyway!!! You don't want to get inside the shooting range of the SA-13 and ZSU-23-4.

At this point you could have two options. Or your bombs came off nicely and you are on your way home, or the bomb didn't come off. If they didn't come off, try to find out why. But do this only when you are in a safe area. If you still have enough fuel and it is still safe to stay in the area, you could have another try. Don't forget that the enemy knows that you are coming this time.

Flying the wheel

The wheel is a quick and easy way to get you into position to start a dive to the target at any time. The idea is made for a 2 ship flight. When number one is diving to the target, number two is circling high and above. The one that is circling can have a good look at the area around the target and can report any missiles or AAA going for the attacking plane.

In your HUD you can see the slant range to the target. This is given in the lower right corner of the HUD. If you stay at the given ingress altitude and making a circle around the target, keeping this slant range the same. When you have these values you are always in the correct position to start a dive attack with the planned values.

Also use for

For this attack profile there are a lot of other uses. When you get a chance to fly a bomber and want to do a planned attack, the use of these points in the HUD are very useful. Select a low dive angle like 10deg and a high release altitude. Also check if the heavy bomber can fly the selected amount of G's.

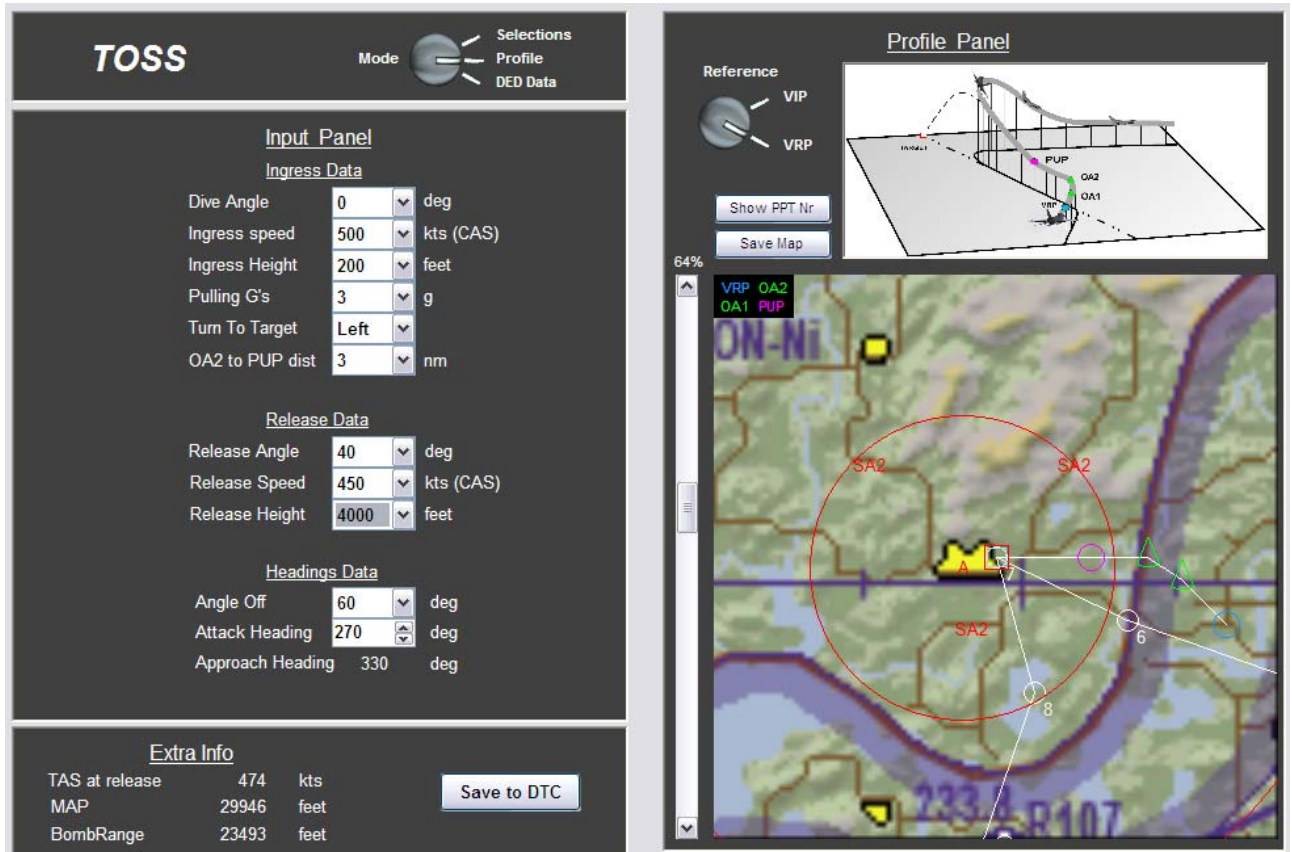
This planning is also very useful if you are attacking with laser guided bombs.

TOSS

The TOSS delivery is not just one delivery. It should also not be mixed up with DTOS.

DTOS is a FCC (Fire Control Computer) mode in the F-16 and TOSS is just the English word for throwing something up in the air.

You can basically divide the TOSS into two sections. A Medium Altitude TOSS (MAT) and a Low Altitude TOSS (LAT). For now the LAT is implemented only.



Low Altitude TOSS

As it already says, this is a low altitude profile. The idea for this delivery is to fly in low and below the radar and also give you some distance from the target at the same time. You will toss the bombs from a distance and turn away before you over fly the target. This will give you the advantage of surprise and you stay as far as possible from the target.

The disadvantage of this delivery is that the accuracy is lower than the other modes. So you have to select this profile only when everything fits to the occasion.

Using guided weapons is a good option, and also cluster bombs will fit very nice. Dumb bombs are not so good for this profile because you will probably miss the target unless the target is very large like a hanger.

The input panel

The advanced input panel is the same design as the one from the HADB. It is also divided into three sections. For this profile the first thing the program wants to know is the data for the ingress. With a known ingress the program will calculate the possible release heights that will fit the profile. So let us start by making the selections for the ingress.

- The Dive angle for the LAT is always zero. This is for later when the MAT is included.
- The Ingress Speed.
- Select an Ingress Height.
- Select the amount of G's with which you want to pull up.
- Select a turn direction if you want to fly a turn before you get lined up with the target.
- OA1 to VIP dist. Select the distance between the line up point and the pull up point.

As you might have noticed the release height will change automatically when you change the ingress height. When it changes the program will set the lowest possible release height and also add a few higher heights.

When the ingress data is set, have a look at the values for the release.

The screenshot shows a software interface titled "Input Panel" with three sections: "Ingress Data", "Release Data", and "Headings Data". Each section contains several input fields with dropdown menus and units.

Ingress Data		
Dive Angle	0	deg
Ingress speed	500	kts (CAS)
Ingress Height	200	feet
Pulling G's	3	g
Turn To Target	Left	
OA2 to PUP dist	3	nm

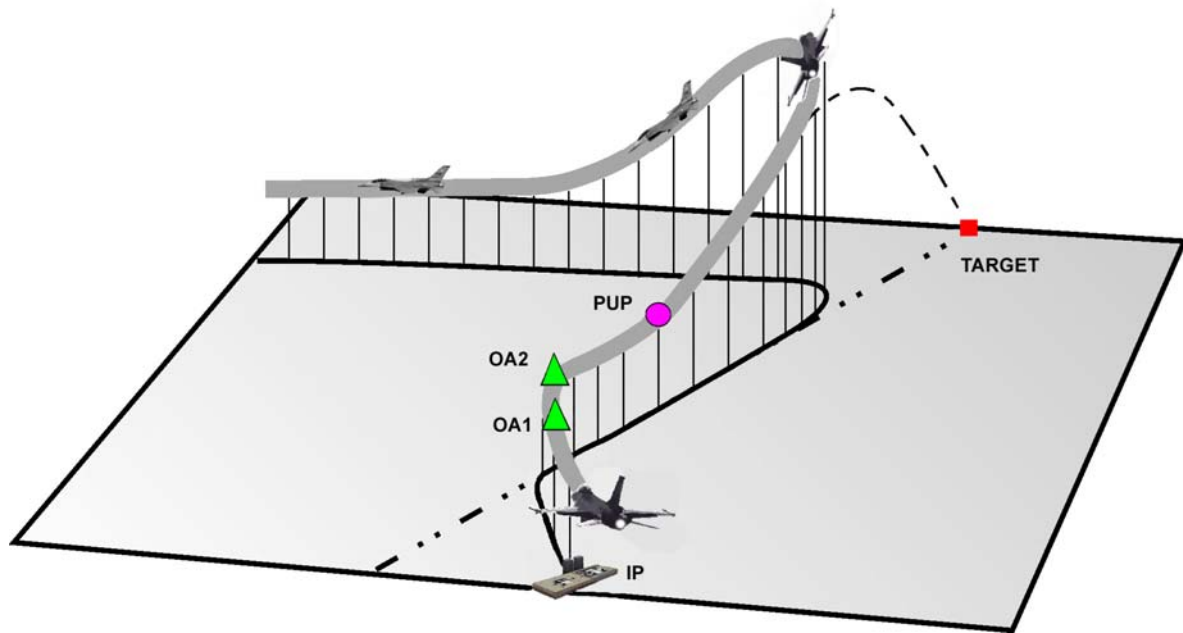
Release Data		
Release Angle	40	deg
Release Speed	450	kts (CAS)
Release Height	4000	feet

Headings Data		
Angle Off	60	deg
Attack Heading	270	deg
Approach Heading	330	deg

- Set the release angle. Because this is a toss this value is always up.
- Select a release speed. This can be the same as the ingress speed or faster/slower. You have to decide for yourself if you can fly the speeds selected.
- Select the release height.

If you don't want to plan any turns before the line up, the profile is done. But if you want to plan a turn to get to the planned attack heading it can be done using the heading data.

How to fly the LAT profile



I will discuss a TOSS profile with a turn. When you don't want to fly this turn you will end up without the OA2 and the VRP.

Get yourself lined up with the OA2 and the VRP. Check the master arm switch! Try to get a lock, but don't fly into the ground. If there are a lot of hills around the target, it is nice to stay below the radar, but could be hard to get a radar lock yourself. When you have done a good recon you know about the surroundings and have chosen a higher ingress height or you just know you can wait until you get lined up with the target. It is even possible to get a radar lock when you are climbing for the bomb release. Getting close to the VRP you get ready to making the turn to the attack heading. At the VRP the turn should be started and after the turn you get the OA1 in the HUD for only a very short time. At this time the important thing to focus at the VIP and the target. Get these two lined up. If you have a radar lock at this time you can do two things. Or you follow the cues from the FCC that can be seen in the HUD, or you follow the pre-calculate point.

When you follow the FCC calculations, pull up when the first cue comes to the FPM. Pull up until the FPM is at the planned release angle. Now would be a nice time to give the bomb release command. So press the weapon release button and hold it. You will see the second cue come down towards the FPM. When this second cue comes together with the FPM, the bomb will be released. When you choose for the pre-calculated points or if you didn't get a radar lock yet, continue to fly until you get to the VIP. Passing the VIP start to pull up and get the FPM at the planned release angle. If you didn't have a radar lock yet, try to get one as soon as possible. If you get a lock, press down on the weapon release button and hold it down. The FCC will calculate a release solution as soon as you get a radar lock. So no matter what which angle you fly at this time, the release cue will come down and as soon as it will come to the FPM the bombs will be released.

So which of the two should be used, the FCC calculation or the pre-calculated points? I would use the first pull up point that I would pass. If that will be the FCC cue or the VIP doesn't matter. This way you will avoid that you will over fly the target at 100' and won't release the bombs.

After the bombs came of the rail, turn hard to the side to stay clear of the AAA. Turn to the planned egress area and regroup.

Useful Tools

Text file

With every change you make in the program, a text file is made. You can find this file in the Weapon Delivery Planner folder. You can use this file to print the data or send it to your squad, after you have closed the program.

Entering the data in the F-16 MMC

How do we use all this data and where can we put it in the F-16's MMC? Using the DTC would be the best option, but if for what reason ever did not work. Where can you insert this data? As said before, you can only see four visual cues on the HUD when you are in NAV or A/G mode and the reference waypoint has been selected. The program gives the data for the VIP, VRP, PUP, OA1, and OA2 and you can save it to the DTC. If you have done that and the DTC is loaded in the jet, there shouldn't be anything that you have to do. But in case that didn't work or you want to change something, here is a description of how to manually insert the data.



The ICP and DED



The Integrated Control Panel, or ICP, is used to enter the data. This is the “keyboard” in the F-16. The changes and inputs given in the system can be seen on the Data Entry Display or DED. Go to your cockpit and start her up. When you have prepared the aircraft for taxi, it's time to insert the reference points.

The first thing to do will be the choice of the reference point. With a VRP setup the reference point is the target. With the VIP setup, the reference waypoint needs to be set and will be the IP.

Changing a waypoint coordinates



If you need to check or change the coordinates of a waypoint for precision or setting of the IP, first press LIST on the ICP. You will see a listing of all the options for other pages. Select the destination page by pressing the “1” button on the ICP. On this page you can see the selected waypoint and its coordinates. Make sure you want to change this waypoint by looking in the upper line. In the right corner the waypoint number is give. If this is not the waypoint you want to change, us the DCS to go to the line and us the Up/Down keys on the ICP to change the

waypoint. When you have selected the waypoint you want, you can change it by using the ICP. After typing the coordinate, it has to be accepted with ENTR. As in real life, WDP gives the coordinates with 3 decimals. All the 3 decimals need to be inserted or else the coordinate is wrong.

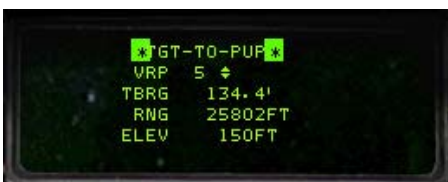


Inserting the NavOffsets



To get back to the main page, move the Data Command Switch (DCS) to the left (RTN). We like to insert the data for the VRP setup. So we have to go to the VRP page. On the ICP click the LIST button and then select (9)VRP. Select the VRP option by clicking on the ICP 9 button. First check if you are using the correct waypoint. For the VRP you should use the TGT and that is WPT 5 in our example. If

on the second line it doesn't say VRP 5, then go to that line and change it to WPT 5. Insert the data given by WDP. The



first thing you enter is TBRG (Bearing). All the

headings/bearings should be inserted with one decimal. So bearing 134.4 should be inserted as shown in the picture. This is done by use of the ICP and the data is entered in the system by clicking the ENTR button. Now do the same with the RNG



(Range) and finish it with the ENTR button. Optionally you can insert an elevation, as you want. Now the PUP data needs to be inserted. With the DCS select SEQ and you will get to the TGT-TO-PUP page. You can only get to this page through the VRP page. Insert the data as you did for the VRP.

The next points to program are the OA1 and OA2. First click the DCS to RTN to set the DED to the default page. Now go to the LIST again. You have to select the DEST page by clicking the 1 on the ICP. With the DCS go to the sub page by clicking right, SEQ. You should now be in the OA1 page.



First check again is you have the correct waypoint. OA's are also placed to the same reference point. Insert the data for the OA1 from the program like you did for the VRP. Again click on SEQ and you are in the OA2 page. Insert the data for OA2 and complete it by pushing the ENTR button.

All the data for the VRP is now inserted, but you have not activated VRP yet. If you want to use VIP or VRP you have to activate one of the two options. At this moment nothing is selected and only the data has been inserted. The OA's will be shown, but not the VIP and PUP. To activate VRP, go back to the VRP page. With the DCS go to the upper line and press the "M-SEL 0" key on the ICP. The line will be highlighted and now VRP is active. You can also deactivate it like this. If you would activate VIP this way, VRP will be deactivated automatically.

Inserting the data for the VIP is exactly the same.

You can insert the data for a VIP and a VRP setup at the same time. Later during the flight you can activate the setup that you want.

For the ones who know how to navigate with the HSI (Horizontal Situation Indicator), this is also the time to set the course for the VIP or the VRP. With this selection you have a good backup to navigate to this point. You could fly the pop-up with the HSI only, but it is a lot easier with the visual cues.

Setting the Release Angle



For this delivery you will be using the CCRP mode of the FCC. This mode will need a radar lock before it can release the bomb. In this case we want to release the bomb when we are flying up and the pitch should be at a plan angle. The FCC needs to know at which angle you want to release the bomb. Together with the radar lock and the planned release angle, it will calculate when you should pull up and it will also release the bomb at the right point.

So where do you tell the FCC what the release angle will be?

As an example I will be using 4 CBU58's and as you can see in the picture to the left I have

already selected them. In the middle of the screen you can see what the FCC thinks what the planned release angle is. 23deg is the basic setting that you will find here.

In the upper right corner you will find the option CNTL. This stands for Control and it will select the page where you can control all the settings for the bomb that you have selected. So push the MFD5 button with the CNTL function and you will see the page as can be seen in the picture on the right. At the left you can select the functions for the Arming Delay and the





Burst Altitude, but at this time we want to change the Release Angle. You can find this on the lower right bottom of the screen. Again you can see that 23deg has been set and by pushing the button MFD10 to the right of the text, you will go to the page where you will change this value.

So you made it to the correct page. And again you will see the value that has been set. And still it is 23deg. For this example I would like to change it to a release angle of 30deg.

With the use of the MFD button, select the value you want. If you don't want to change anything just push the RTN (return) function. When you have made a mistake and would like to correct it, you can use the RCL (recall) function.

When the value is chosen, you have to insert this value by the use of the ENTR button. You will get back to main weapon page and now you can see that the correct value has been set.

Word from the author

I started to make this 'little' program because I got more and more interested in the strike mission. Reading all the material, I found that the way of use of the visual reference points, was different between the SP3 manual and the MCH 11-F16v5. After making the first calculations on a piece of paper I found it too much work to have fun with falcon this way. But if I had a program that would do all the calculations for me, it would be a different ball game all together. So I started making an Excel sheet that would do all those calculations. Because Excel has its limitations, you have to have the Excel installed. So I started learning to write programs and this is the result. Using this program it is a lot more fun to plan and fly a complete mission. It gives an enormous amount of joy when it works as planned. I know that there are still some problems and I hope to solve some of these. I wish everybody a lot of fun with the program.

For feedback, questions or tips how to improve, contact me by Email: burgers6@xs4all.nl

References.

- All the Falcon4 manuals
- SP3 Manual
- RP5 Manual
- MCH 11-F16 Vol5
- MLU-M1
- www.FAS.org

Acknowledgements.

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Heino "Snowman" Burgers for making all the drawings of the profiles and helping me to write this manual.

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Boxer, for making so much possible.

Mirv.

Many, many thanks to Martijn Karsemeijer for helping me out with all those programming problems!!!

Many thanks to the beta testers.

Apex, Husky and Snowman

And of course many thanks to everybody who worked so hard at making Falcon what it is today.