Onboard Performance Tool (OPT)

Administrators & User Guide

v4.92 for Windows and iPad
September 2024

BOEING

Commercial Airplane Group

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Chapter One

About this Guide

Intended Users

This guide addresses all users who wish to use the Onboard Performance Tool to generate takeoff performance information in a real-time environment on the flight deck.

The Onboard Performance Tool consists of two separate applications - *Administrator* and *OPT*. *Administrator*, which this document covers first, is used to set up and maintain the data used by the flight crew. *OPT*, the application used by the crew, utilizes this data to generate the required performance information.

No prior computer programming experience or experience with Boeing performance software is required to use the interface.

What's in it

This guide covers the following topics:

- how to use this guide
- where to find the web-based *Administrator* software
- how to install and setup *OPT*, the crew software
- what's in the software
- how to use the software
- how to get help
- how to find information about a topic—appendix and glossary

What to do next

It is our hope that this guide is helpful to all administrators of the Onboard Performance Tool. If you are unfamiliar with or have not spent much time on a computer you might want to follow this guide for step-by-step instruction. If you are comfortable using Windows® and feel like you're ready to go, follow the quick installation instructions Chapter 3. If at any time you encounter problems, please contact our office as described in Chapter 8.

Chapter Two

How to Use this Guide

Conventions

In order to help you understand the instructions provided, we have adopted the following conventions for presenting information.

- Program names are capitalized and in italics, such as *Administrator*, which refers to the *Administrator* application. This is not to be confused with the airline administrator, who is the person doing all of the work with *Administrator*.
- User input operating system commands and inputs—information typed in by the user is indicated by Courier, 12-pt font.

  examples: `Enter` `Tab` `Shift+F1` `1200.25`
- File, session, group names, locations (names and paths), text, and list entries—are shown in Arial, 10-pt, bold font.

  example: **C:\INTERFACE\SESSION.DAT**
- Buttons, list names, field names, menus, text box names, etc.—any interface control is indicated by Arial, 12-pt, bold font.

  examples: **File** **Add to Group** **Ok**
- Editorial comments—shown in Times, 10-pt, bold font.

  example: **Editor's Note: An alternative to this method is to . . .**
- Example steps for you to follow are shaded, indented and preceded by an arrow.

  example:

  ➢ Access the item from the list that you want to use . . .
- Notes, Cautions, etc.—these notes are identified by the ☞ symbol or exclamation points "**!!**" so that they stand out; they are printed in Arial, 12-pt, bold font with the associated text in Times, 10-pt, bold.

  examples:

☞ **Note:**	**If you select this option before . . .**

!! Caution!	**Be careful to . . .**

Feedback on this guide

It is our hope that you find the software and this guide useful and easy to use. You are invited to send us any questions, comments, and suggestions that you have on the guide and on the interface. Please take the time to fill out the reader comment forms provided on the following pages and e-mail or mail it in.

Our mailing address is:

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reader comment form

Please feel free to copy & paste this form into an email and send it to us at CISCustomerSupport@boeing.com

Onboard Performance Tool (*OPT)* Administrator's Guide

From:	
	Operator:
	Your name:
	Job title:
	email address:
	Phone (including country and city codes): ( )

How can we make this document more useful? Please fill out this form and e-mail or mail it to Boeing Flight Optimization – OPT Group.

Rate this guide by marking one box for each quality.

Rate the guide on these qualities	Excellent	Good	Fair	Poor
Clarity				
Completeness				
Organization				
Ease of Use				
Appearance				
Writing Style				

Comments:

Chapter Three

How to Install and Setup the Software

This chapter describes the computer system requirements for this software, as well as instructions on how to install and run a quick checkout of the Onboard Performance Tool.

System Requirements

In order to install and run the *OPT* software, you must have a personal computer with Microsoft Windows 7 or later installed and operating. Refer to your Windows® user documentation for further information on the system requirements for Windows®. On the iPad, you must have the most recent version, or one version back, of the iPadOS operating system installed. In order to use the web-based *Administrator* application, you must also have internet access, a MyBoeingFleet account, Windows 7 or later, Microsoft Internet Explorer® 11 or Firefox browser, and Acrobat Reader® 10.x or more recent.

Please refer to the appropriate application release notes for Operating System applicability. In addition, some combinations of font size and resolution selected via your choice of display driver on Windows can cause labels and text on the Onboard Performance Tool Windows Stand-alone dialog boxes to appear distorted or too large for the space allocated. *OPT* has the capability of adjusting these settings from within its config file, which controls several aspects of the display properties. Please reference the "*EFB Onboard Performance Tool, Initialization and Configuration File Design Description*" document for more information on the config file.

Installing *OPT* for Windows

The typical method for using *Administrator* is through the *Administrator* application available as a web application on MyBoeingFleet (MBF). Access to this application will be through the MBF Flight Operations Performance Software page using your normal MBF account and password. Access to the MBF *Administrator* application is discussed below.

In addition to the Administrator application on MBF, one also needs to download the required takeoff and landing performance databases, DDG databases, secureCode2 file, and (for some customers) a Stab Trim and a go-around database. These links are also accessed via the MBF Performance Software download page. The Administrator link is found with the other OPT links on the MBF >> Flight Operations>> Performance Software download page.

Normal Setup

In the Windows 7® or later environment, the simplest way to setup the Onboard Performance Tool is to allow the installer program available on the MBF Performance Software download page to create all necessary directories and place all of the program elements and their associated files in their default locations. Responding to prompts for

directory location/name by clicking **Continue** or **Next** will create the following directories for the purpose described. These are the typically recommended settings for the Windows 7® environment.

Directories

C:\Users\Public\OPT

The executable file (**OPT.EXE**) and a few files for internal use are located in this directory.

C: \Users\Public\OPT\db

This directory is created to store BTM & BLM (Boeing Takeoff Module & Landing Module) databases, BTOPS (Boeing Takeoff Performance Subroutine) databases, and MLAS databases, brake cooling and non-normal databases that are needed to generate takeoff or landing performance information for your airplanes. If enabled, the BCOP (Boeing ClimbOut Program) databases that generate the All Engine climb gradients will also be stored here. The airline policy (policy.sdb), airport (airport.sdb), and DDG databases (***.sdb) should also be stored here after they are created by Administrator and downloaded. The stabTrim.sdb and goAround.sdb files are also stored here.

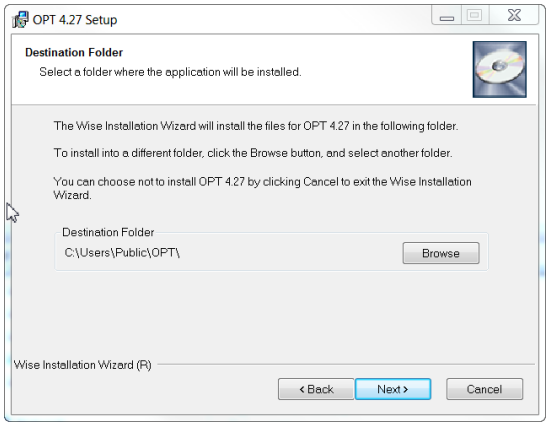
C: \Users\Public\OPT\documentation

This directory is created to store a complete set of the *OPT* documentation, including this document, the databases (airport, policy and ddg) and config file design documents, and release notes.

Path definitions for executables and internal databases will default to the directory specified during setup.

Customized Setup

If you wish, you may install the Onboard Performance Tool into a directory other than the default location provided. This can be done by simply clicking on the **Browse** button and typing over the directory highlighted in the directory specification box displayed during the Onboard Performance Tool installation and setup. The sub-directories for the remainder of the software will be automatically placed as sub-directories of the location you specify.



File Locations

After the setup is complete, all files and databases for executing the software should be available for use as discussed above.

☞ Note:	**It is necessary to first develop a set of database files using *Administrator* and create an airplane definition and at least one airport before one can successfully start the Onboard Performance Tool software.**

Installing *OPT* for the iPad

The iPad version of OPT may be obtained from the Apple App Store, a link to which is found on the iPad Home page. Simply go to the App Store, search for "Boeing Onboard Performance Tool" and you'll find the *OPT* application. Follow your standard App Store procedure to download the application and install it. The *OPT* App comes with demonstration data for a FLYBOEING configuration.

☞ Note:	**As most operators test a new version of OPT before permitting their crews to use it, it is important that you be aware of whether you have any airline policies concerning this matter and whether it is okay to download a new version of OPT.**

Installing *OPT* Windows 10 App

The native Windows 10 version of *OPT* may be obtained from the Microsoft Store. Simply go to the Microsoft Store, search for "Boeing Onboard Performance Tool" and you'll find the *OPT* Universal Windows Platform (UWP) application under Apps. Follow your standard Store procedure to download the application and install it.

The *OPT* UWP App can also be found using a web browser and navigating to the official Microsoft site. Once in the Microsoft site, go to Store, Software & Apps, Windows apps and search for "Boeing Onboard Performance Tool". If the system requirements are met you will be able to download the *OPT* App.

The OPT Windows 10 App comes with demonstration data for a FLYBOEING configuration.

☞ Note:	**As most operators test a new version of OPT before permitting their crews to use it, it is important that you be aware of whether you have any airline policies concerning this matter and whether it is okay to download a new version of OPT.**

Chapter Six

How to Use the Onboard Performance Tool for the iPad

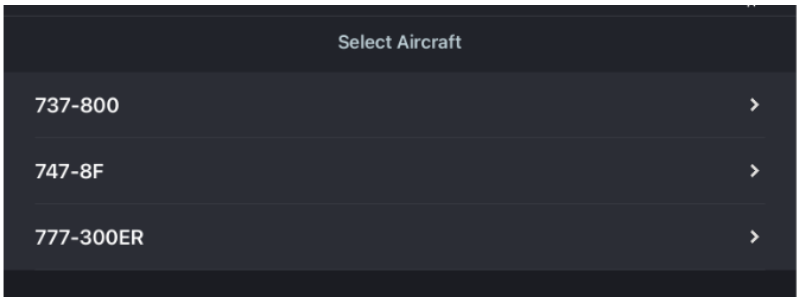
What it's for

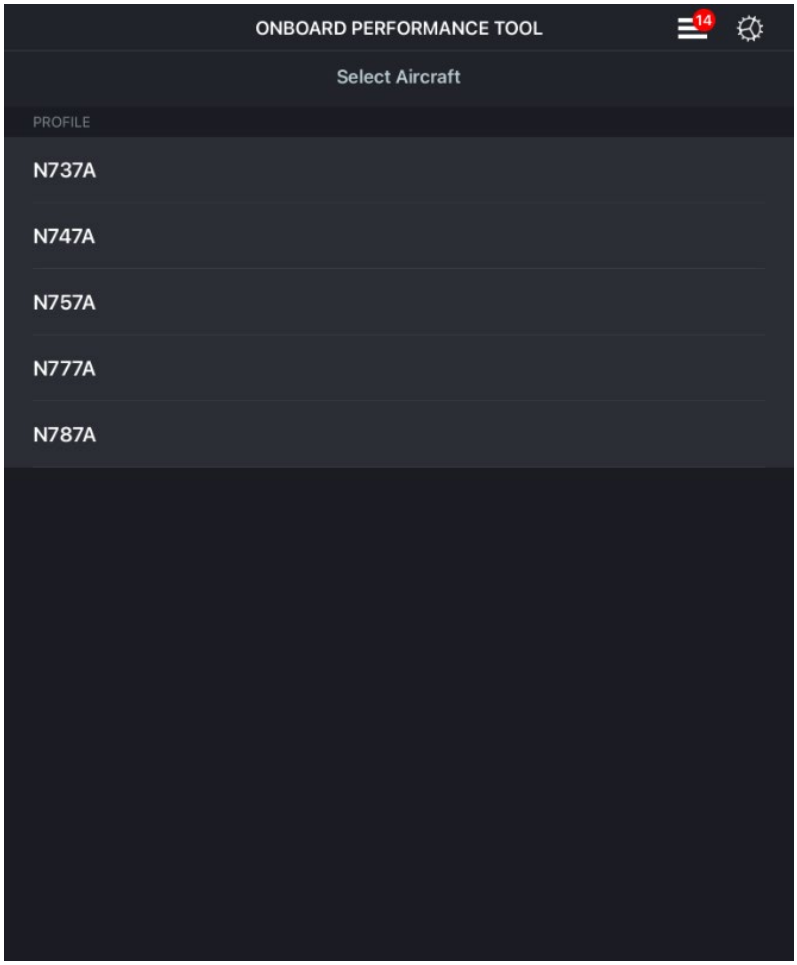
The Onboard Performance Tool application is intended to be an easy-to-use interface that produces airplane performance related data for the flight crew. It is an iPad®-based application and makes use of an intuitive user interface. It is assumed that prior to using the Onboard Performance Tool, the administrator has set up and transmitted the airplane, airport, and DDG databases for the OPT user and the *OPT* users are sufficiently knowledgeable about the iOS® operating system and typical user interfaces to accomplish the tasks.

Because *OPT* is a very easily customizable application, your administrator may have created an appearance that differs in several ways from the examples shown in this chapter. Questions about these differences should be directed to your company administrator.

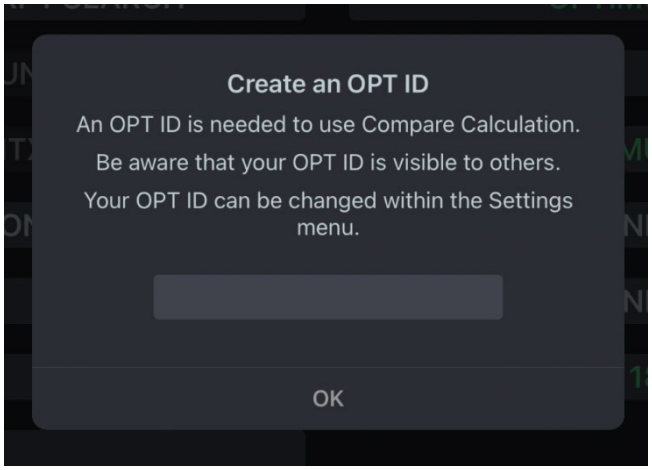
Using the Onboard Performance Tool for Takeoff – Apple iOS

Depending on how your administrator has set up the application, *OPT* may or may not display an airplane selection menu when the application is launched. If your *OPT* installation has more than one airplane tail or aircraft type loaded, then you will be presented with a list of tails, or airplanes, to choose from. The first example shows a folder structure where the user can select the aircraft by clicking on aircraft type. The second shows a list of all available tails.

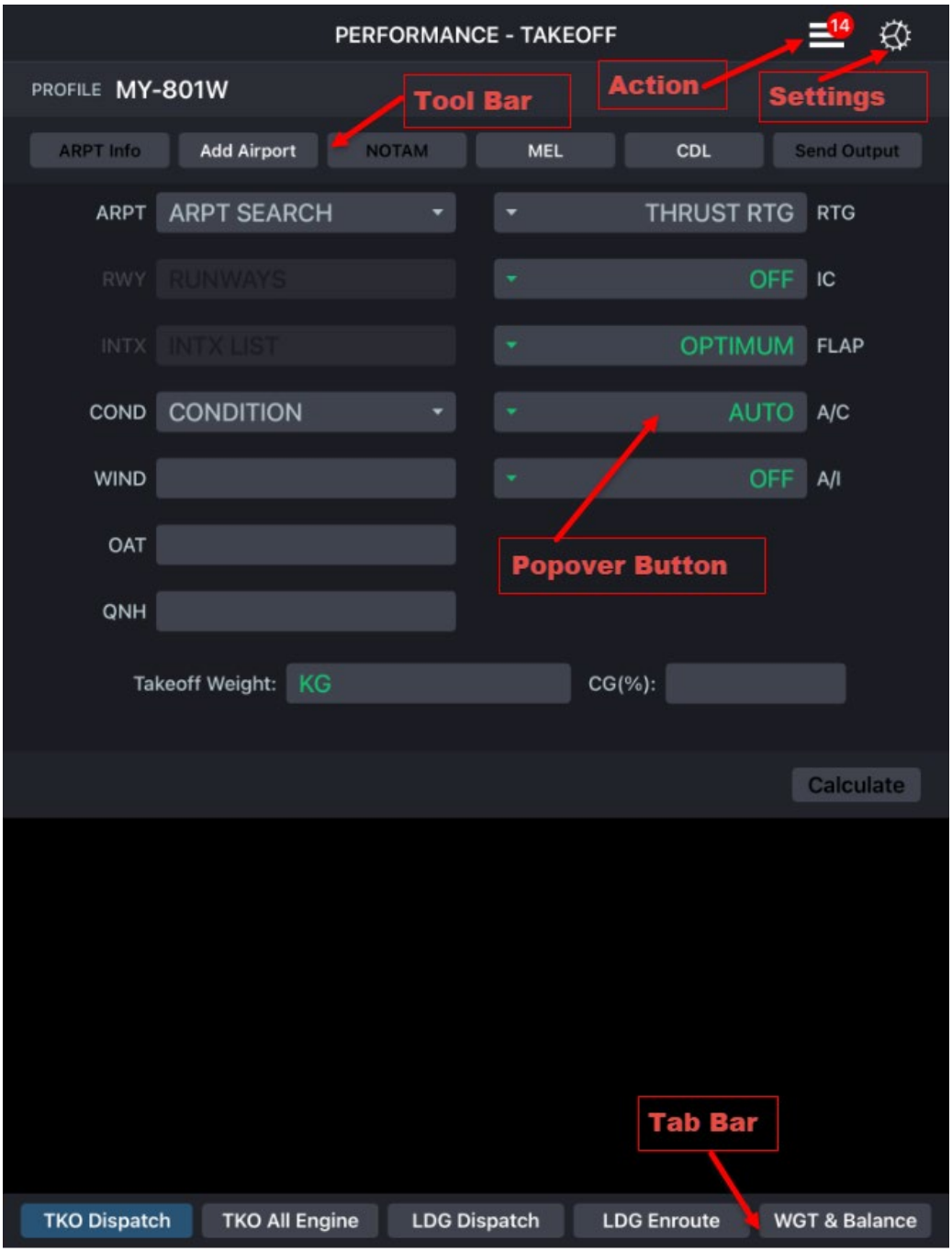




In OPT version 4.80 and higher, if the user has the Compare Calculation feature enabled, selecting the appropriate tail number or airplane will bring up the "**Create an OPT ID"** screen shown below to create an OPT ID. The user must type and OPT in order to continue. This OPT ID can be changed at a later time under the Settings Menu. This OPT ID will be shown on the Compare Calculation screen to identify the iPad being compared with when the user compares calculations between devices. After entering the OPT ID, the user will be taken to the main screen shown in the next paragraph.

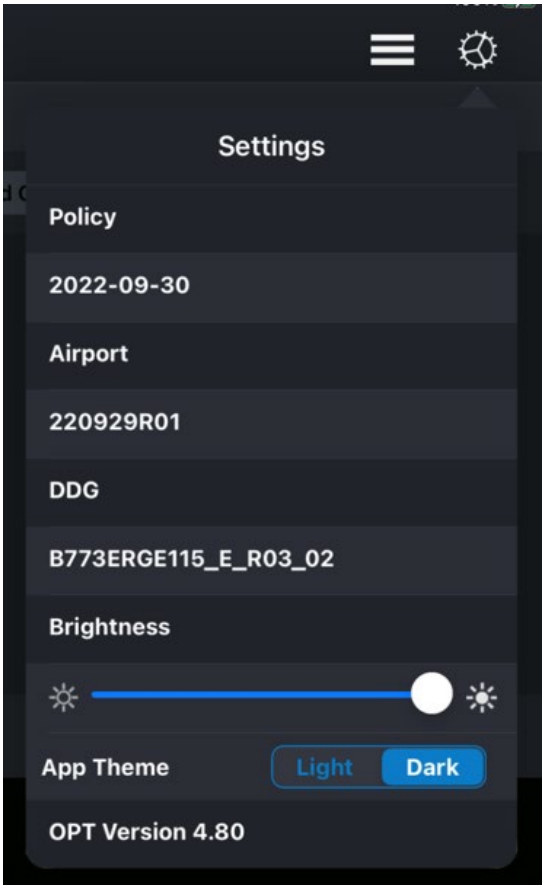


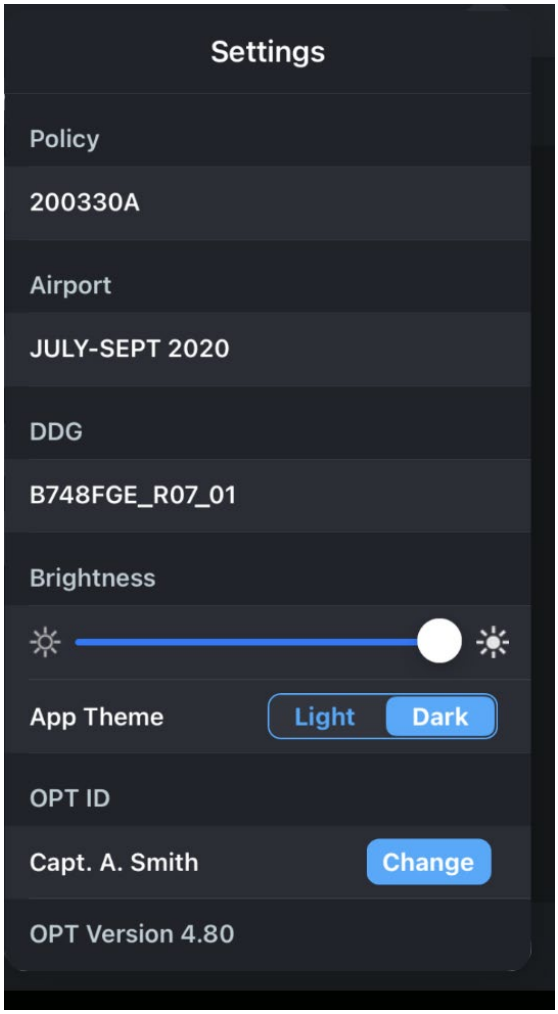
If Compare Calculations was not enabled, selecting the appropriate tail number or airplane will load the appropriate databases and start *OPT*. Once the loading process is complete, the main screen for takeoff appears, entitled at the top of the page PERFORMANCE - TAKEOFF.



The above screen may be used to illustrate five different features; the Settings menu, the Action menu, the Tool bar, the Popover buttons, and Tab bar.

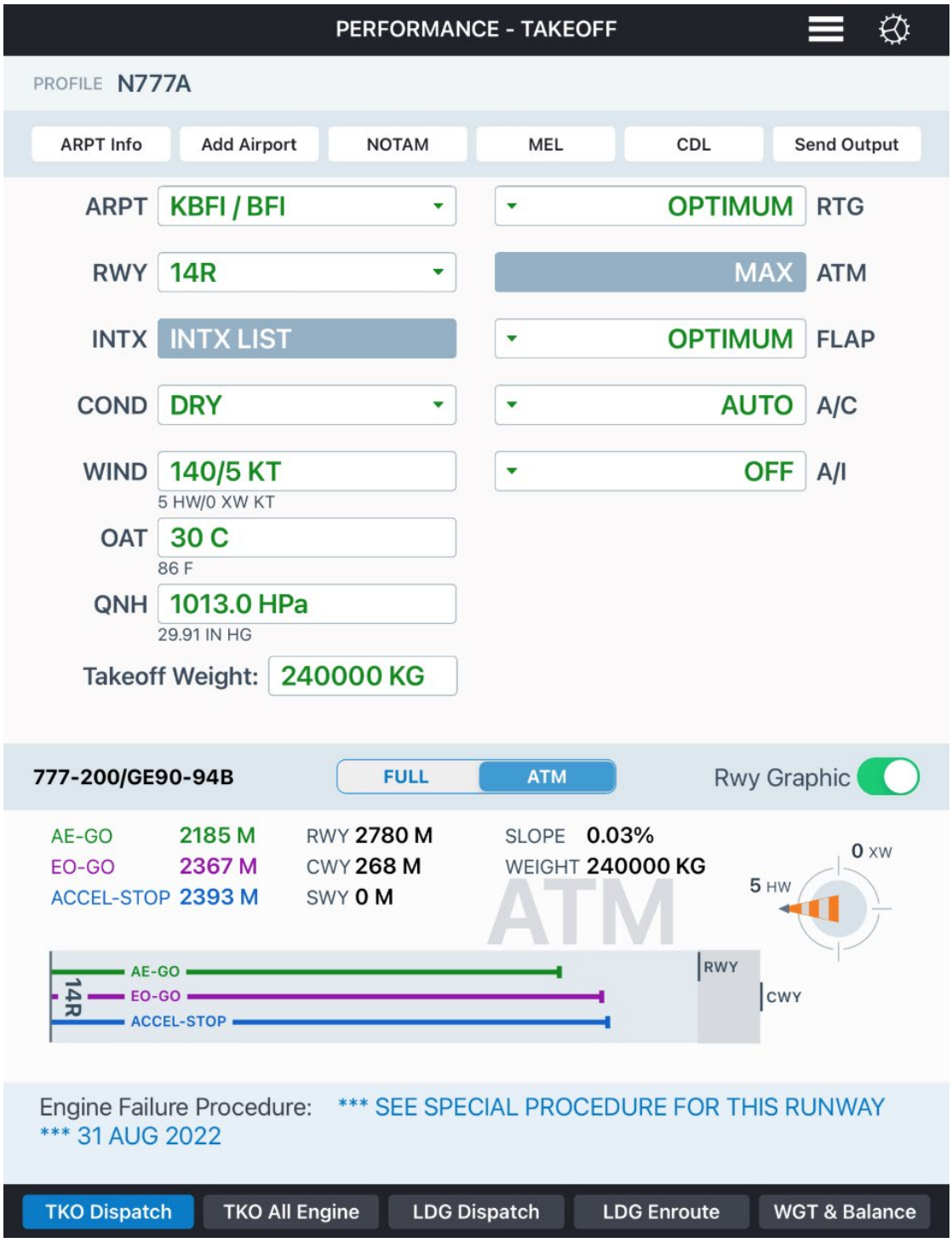
When the Settings icon is selected, the menu shown to the left is displayed if the tail does not have the Compare Calculation feature active and the menu shown to the right is displayed if the user has Compare Calculations enabled:



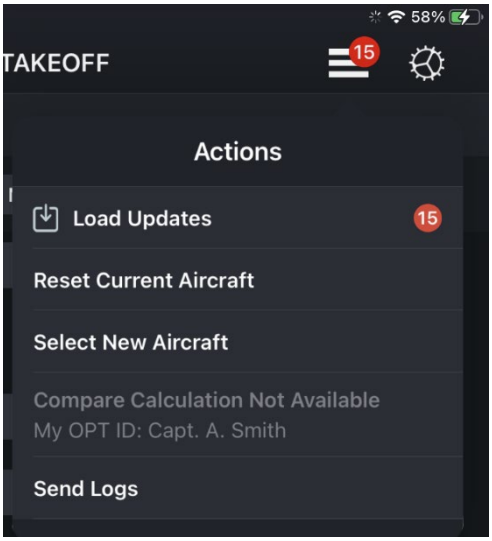


The Settings menu allows the user to view the current software and database information as well as adjust the brightness level using the control at the bottom of the menu. There is also the ability to switch the display from Dark Mode to Light Mode. The Light Mode is intended to help use the application under bright conditions for easier viewing. The OPT ID is shown for those users that have compared Calculations enabled. This OPT ID will be shown on the Compare Calculation screen to identify the iPad being compared with when the user compares calculations between devices. The user can also change the OPT ID by clicking on the "Change" button.

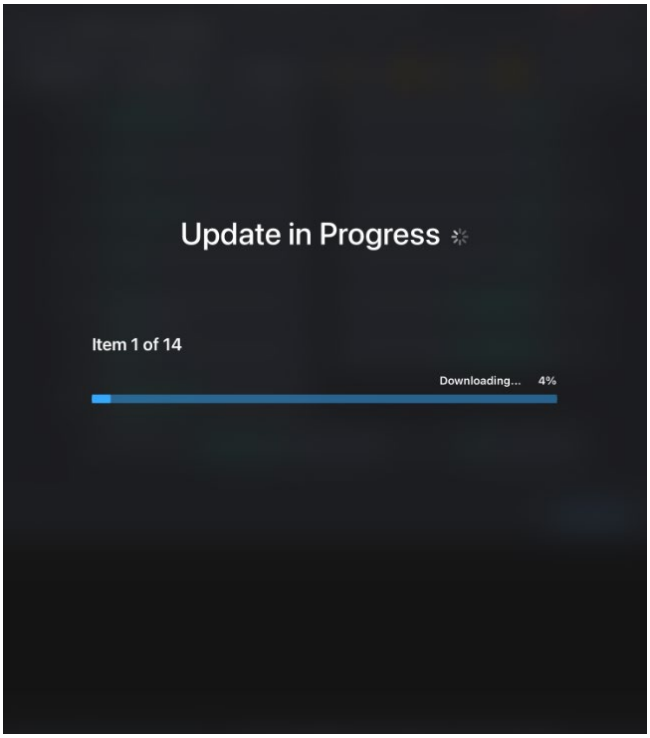
The application in Light Mode can be seen in the example below:



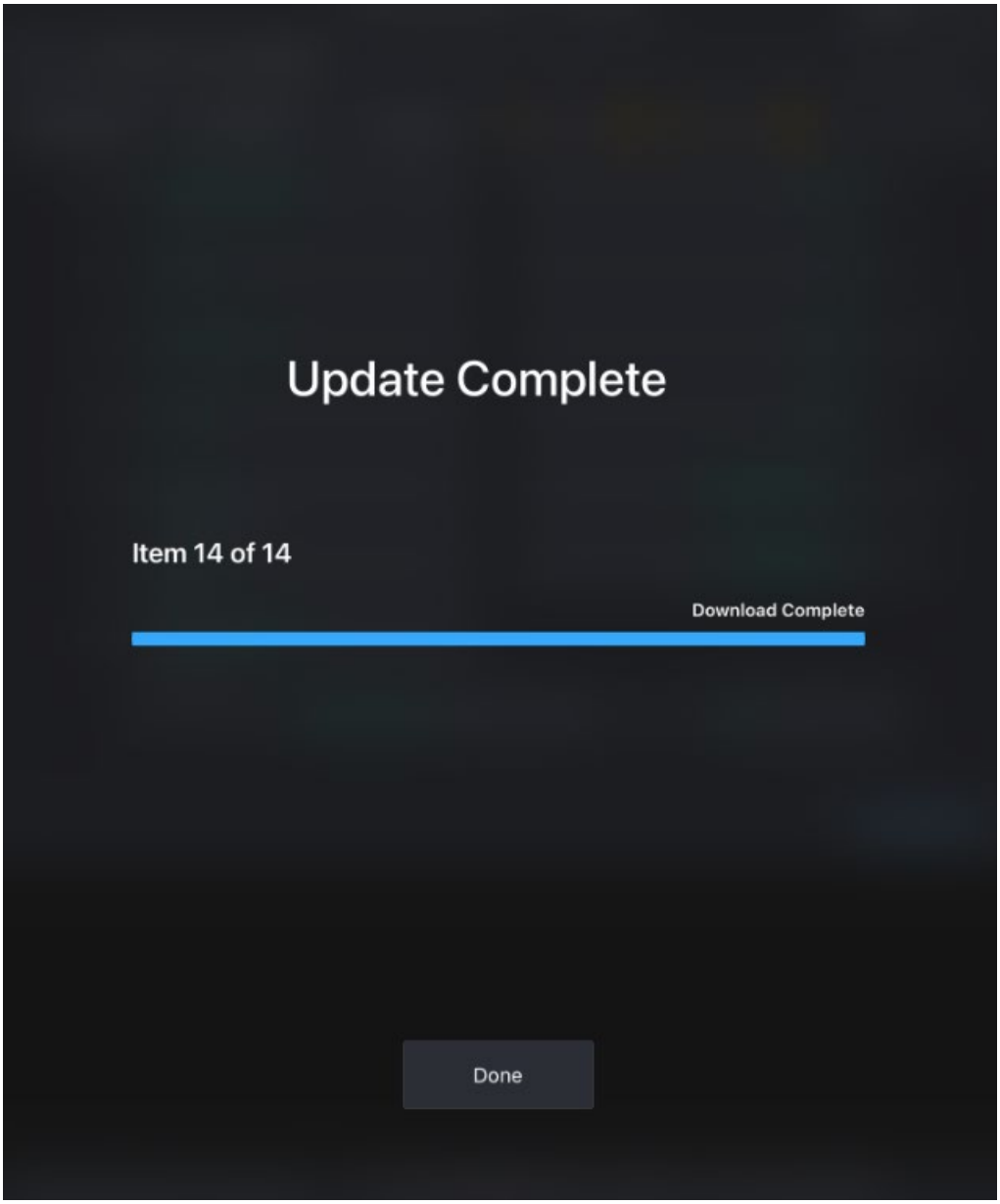
To the left of the Settings menu is the Actions menu. This menu, shown below, allows the user to check for updates and then load updates that have been staged to the cloud by the administrator, reset the inputs for the currently selected tail number, select a new tail number, send logs to Boeing or your company via e-mail, or compare calculations for the different calculation modules (if enabled).



If there are updates waiting, the user can click on Load Updates and the update process will begin. Wi-Fi or cellular connectivity is required for this option to work. When the update is commenced a screen similar to the one shown below is displayed.



When the update is completed a message as shown below is displayed and the user should select Done to get back to the selection menu.



Once the loading process is complete and after selecting an aircraft, the Tab Bar at the bottom of the iPad screen is used to switch between the five main *OPT* functions – Takeoff-Dispatch, Takeoff-All Engine (if enabled), Landing-Dispatch, Landing-Enroute, and Weight & Balance (if enabled). Selecting any of the functions shown on the Tab Bar will switch to the appropriate OPT screen and highlight the background color of that button to denote the active screen.

The Tool Bar near the top of the screen is used to display various context sensitive actions that are dependent upon which screen is currently being displayed. Selecting any of the items, when active, will display a new screen to make further selections or input. Items on the tool bar which have a name that has been "grayed-out" are inactive and not available for selection.

Popovers are denoted by a gray button with rounded corners and a name to describe its function. When selected, the application will display a menu to make a selection from. For instance, the THRUST RTG popover button will display a menu similar to this when selected:

Simply selecting any of the items will enable that menu option, while touching somewhere off the menu will cause the menu to close with no change made to the current selection.

The main crew screen, for the most part, is set up in three basic functional areas. In portrait mode, the upper left portion is devoted mainly to crew input of airport and atmospheric information, the upper right portion is devoted to crew input of airplane configuration information, while the lower portion is devoted to output and results. Some buttons and/or input boxes may not be available on your screen, depending on the airplane model and other options controlled by the administrator.

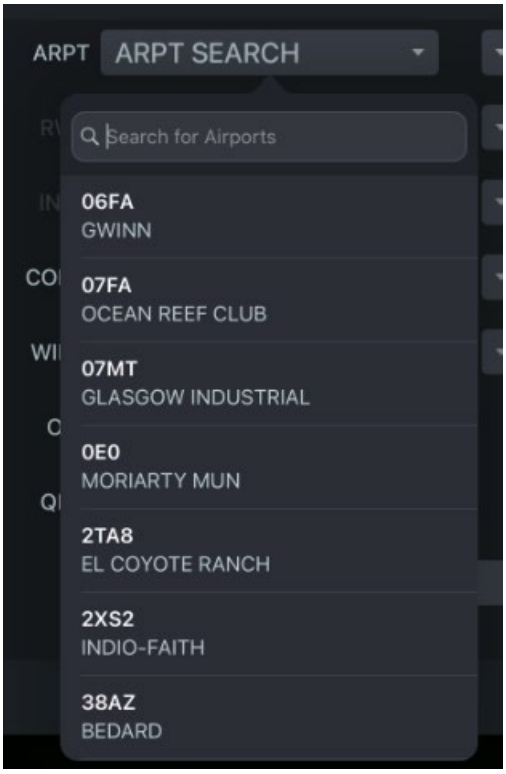
Runway/Atmospheric Inputs

As noted above, the crew input is mainly divided up into airport/atmospheric inputs and airplane configuration inputs. The airport/atmospheric inputs would typically vary little between different *OPT* installations and consists at a minimum of the airport search button, the runway search button, and edit boxes for wind, OAT, and altimeter setting (QNH). In addition, there is an optional button to make selections for intersection calculations. Note that the tail number or configuration is also generally listed in the upper left corner of this area.

Airport Search

Selecting the ARPT popover button will display the airport search popover menu. This popover is enhanced to allow the user to either select the airport from the scrollable menu or to start typing in the airport code or name to narrow the selection down. If the user

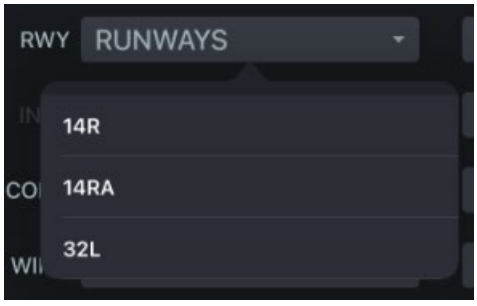
continues to type until *OPT* has made a unique match, it will automatically select that airport and close the menu.



Selecting a new airport for the takeoff screen will also affect data that is displayed on the takeoff screen by clearing the wind, OAT, QNH, and Weight & Balance information; the assumption being that calculations for a new flight are about to begin.

Selecting the Runway

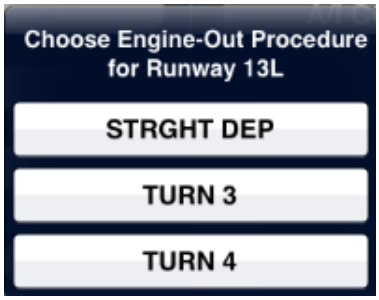
Once the airport has been selected, selecting the **RWY** button will display a dropdown button selection that might look like that shown below:



Selecting any of the available runways will load that runway for use, change the button name to the (green) runway ID, and check for existing departure and intersection information in the airport database.

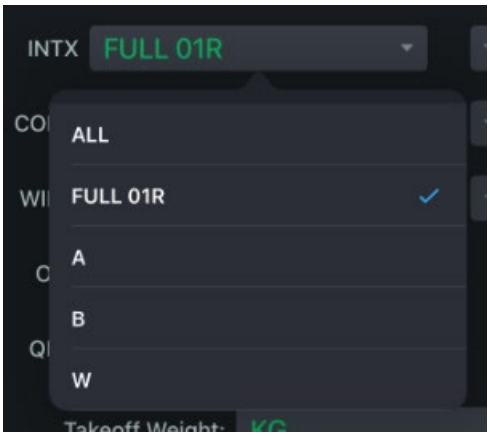
Selecting Departure Procedures (if available)

If your administrator has included different departure procedures for a specific runway, a new selection screen is displayed when there is a choice to be made. This screen looks like this:



Selecting Intersections (if available)

If your administrator has included intersection data in your airport database and, if there is intersection data available for the selected runway, the INTX button will become active. A typical selection is shown below.

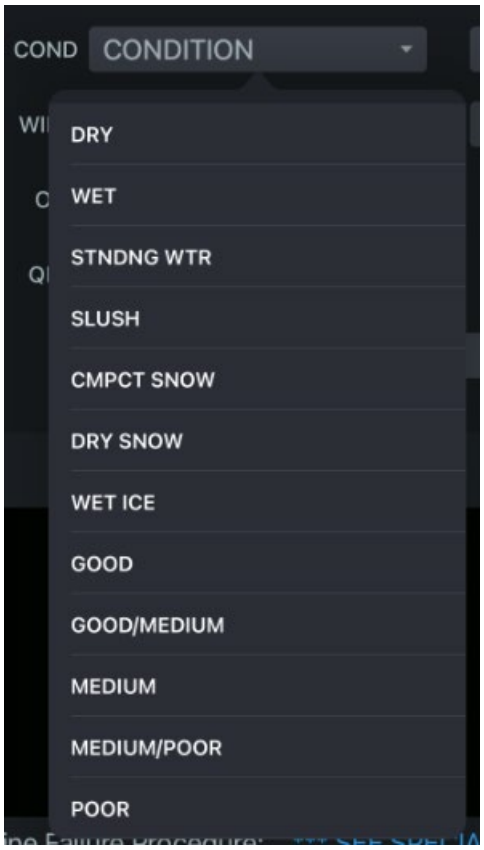


Selecting the **ALL** button will calculate takeoff information for the full length runway (01R) and each of the available intersections. Selecting any single entry will limit the calculation to just that entry, such as intersection "A".

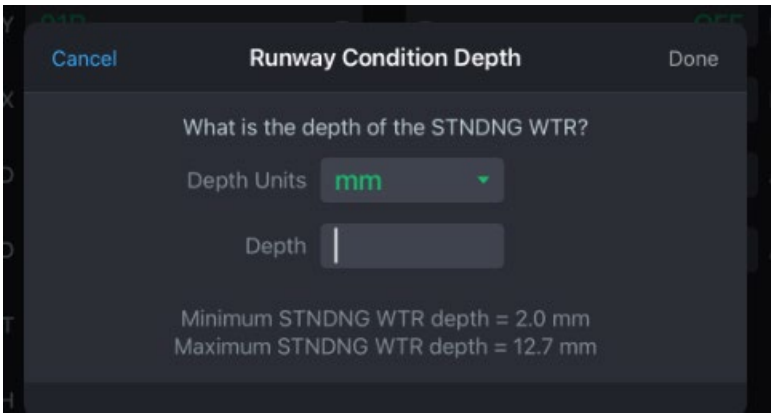
If your administrator has excluded the **ALL** selection, **ALL** will not be shown as an available selection and only individual calculations are available.

Selecting Runway Condition

Selecting the CONDITION button will display the list of runway conditions that your administrator has set up. A typical selection might look like this:

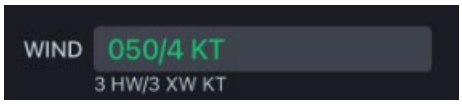


In this example, the possible choices are for dry, wet, standing water, other contaminants and slippery runway conditions of good, good-to-medium, medium, medium-to-poor, and poor. These options depend on your aircraft engine combination. If the user selects STANDING WATER, *OPT* will then display a window to ask how deep the standing water is.



Entering Wind

Wind inputs may be made in either wind component or direction and magnitude into the **WIND** edit box. Depending on how your installation of *OPT* is set up, you may also see the head/tail and crosswind components displayed under the wind input box as shown below. If the wind is input in wind component, headwinds are considered to be positive and tailwinds negative. The correct format for wind in the direction/magnitude format is just that, direction/magnitude, e.g. 040/20 would be a 20 knot wind coming from a magnetic heading of 40 degrees. The wind component is then resolved by comparing this information with the runway heading. After the user has tapped outside of the input box or moved to the next entry, units are appended to the user's input to show how *OPT* has interpreted the input. If only inputting the headwind or tailwind magnitude, one may change the input units by adding, for instance, an "M" (for meters) to the input component, such as -5M. This would then be interpreted as a 5 m/s tailwind. An input of 5K would be interpreted as a 5 kt headwind. Additionally, a headwind or tailwind may be denoted in the entry by appending an "H" or a "T" to the wind magnitude, such as 5T for a 5 kt tailwind.

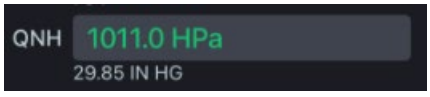


Entering OAT

OAT is entered into the **OAT** edit box. Again, depending on your installation, the alternate unit (C or F) may be shown under your input. If the user desires to input temperature in units not expected by *OPT*, however, simply place a 'C' or 'F' after the temperature (e.g. 59F) and *OPT* will make the correct conversion. Similar to the wind input, the units that are assumed are displayed in the edit box as shown below and the alternate units are shown below the edit box.

Entering QNH

QNH, or pressure variation, may also be input in two different units, namely HPa (mb), or inches of Mercury (Hg). *OPT* will check the magnitude of this input and convert accordingly. Any inputs greater than 100 will be interpreted as HPa, while anything less will be interpreted as inches Hg. Depending on your installation, the converted values may be displayed under your input.



Airplane Configuration Inputs

Once the airport, runway, and atmospheric inputs are made, the crew may specify the required airplane configuration inputs. When there are selectable derates available, the *OPT* user interface (UI) will include a rating dropdown button. If it is allowed by the

administrator, this list may also include **Optimum** and **Windshear** selections. These selections will compute the best combination of fixed derate plus assumed temperature for maximum derate or special windshear guidance information respectively.

Other common airplane configuration and policy inputs are made through several other available dropdown buttons. Depending on your airplane type, these buttons might include:

- Flaps
- Air conditioning
- Anti-ice
- APU
- V1 policy
- Improved climb policy
- Reverse thrust availability
- Alternate forward c.g. limit

If allowed by the administrator, the flap selection pull down menu may include an **Optimum** selection. If this option is chosen, the software will find the optimum takeoff flap position between the highest and lowest setting available in the allowable list set up by the administrator. If optimum is the only setting allowed, the Onboard Performance Tool will choose between all of the certified flap positions for that airplane. In some cases, when a departure procedure is selected that is valid for only a specific flap(s), the flap selection list will only contain that flap position(s).

If selected by the administrator, the flap selection pull down menu may include a **Preferred** selection. If this option is chosen, the software will attempt to use a single, preferred flap position specified by the administrator. If the performance available is not sufficient, OPT will revert to using Optimum flaps for its calculation.

Miscellaneous Inputs

Takeoff Weight and CG

In **Takeoff Weight** edit box, the crew should enter the actual, or planned weight for the flight. The weight may be entered in either ones or thousands (102500 or 102.5). After this is done, and the **Calculate** button becomes active and is selected, *OPT* will then calculate both max thrust and assumed temperature information based on this weight. If the weight that is input exceeds the performance limited maximum takeoff weight, *OPT* will display an error message during the calculation process to alert the user and display the maximum weight. When returning from the Weight & Balance screen, this field will be automatically populated with the takeoff weight from that page.

If available, once the takeoff weight has been input, the **CG** edit box becomes active and is available for input. This input is used only for the calculation of stab trim and does not

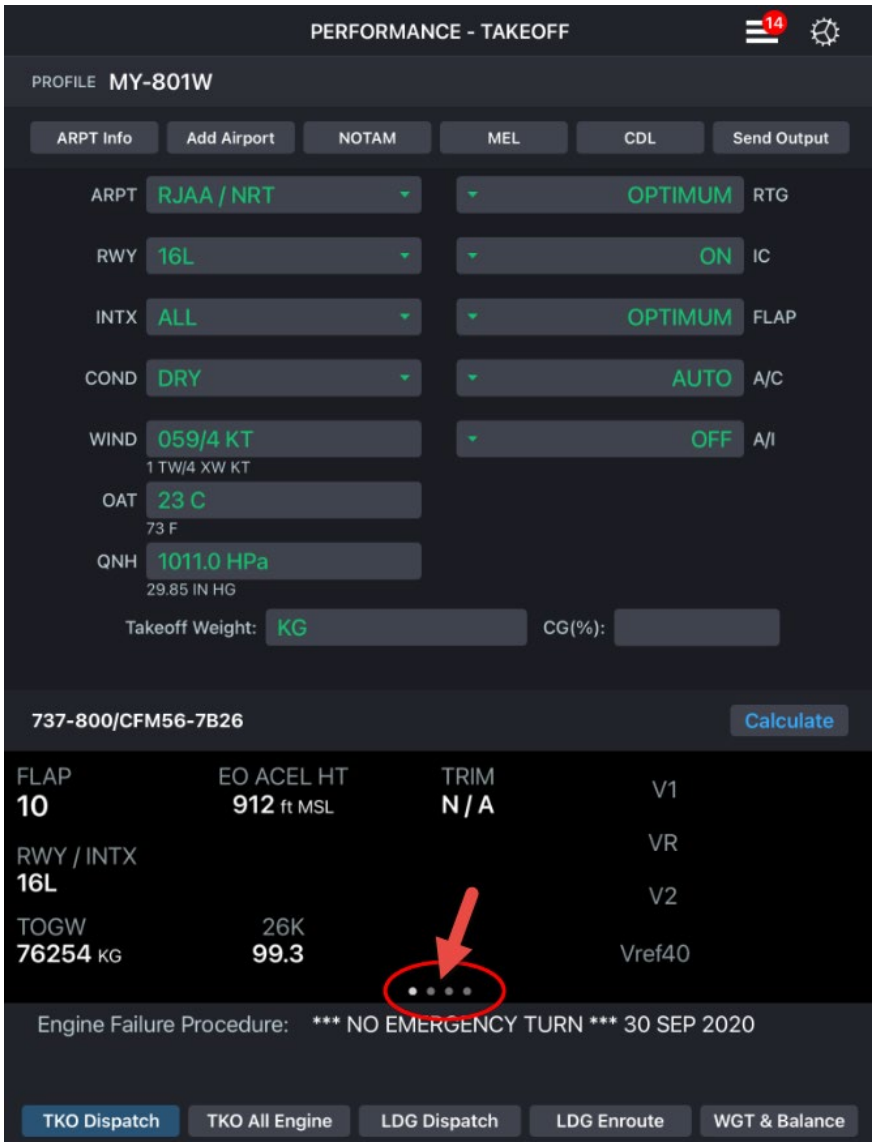
affect takeoff performance. Like the Takeoff Weight input, this field will automatically be populated when returning from the Weight and Balance screen.

Assumed Temp

The **ATM** edit box also becomes active when a value is entered into the **Takeoff Weight** box. For this input, any number entered that is less than or equal to zero will be treated as a decrement from the maximum possible assumed temperature that the Onboard Performance Tool calculates. For a maximum assumed temperature calculation the user may input either a zero or "MAX". Any number greater than zero will be considered to be a user desired assumed temperature. If the user-input temperature is greater than the maximum allowable, an error message will be displayed to alert the user. The user should then either input a new assumed temperature or let the Onboard Performance Tool calculate the maximum assumed temperature as described above.

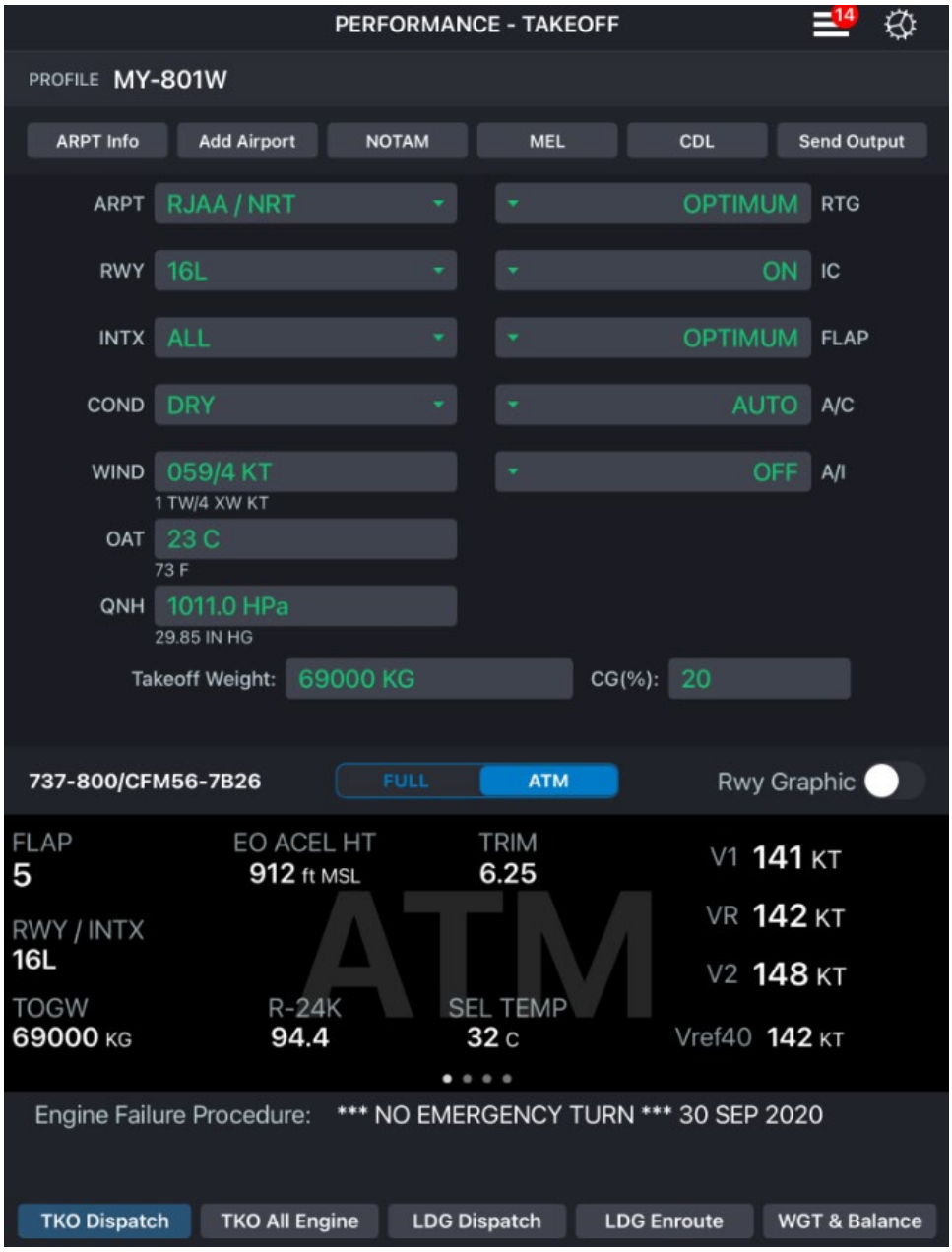
Calculating Takeoff Performance

Once all of the required inputs are made and the **CALCULATE** button becomes active (blue), the user may perform a calculation by selecting this button. If the takeoff weight has not been input, then *OPT* will calculate the maximum takeoff weight for each of the runways/intersections selected. In the example shown below, there are four (4) sets of results returned. Those are denoted by the four (4) small dots below the output which are circled. In the iOS environment, this means that the user should "swipe" across the screen with their finger to scroll across and reveal more pages. The current runway/intersection being viewed is displayed on the left side of the output.



For this example, the results shown are for the full length runway 16L, the optimum flap position (for max weight) is flaps10, and full rated (TO-26K) thrust was used.

If the planned takeoff weight has been entered in the **Takeoff Weight** edit box, then *OPT* will calculate all required parameters for both the maximum takeoff thrust and best assumed temperature cases. The example shown below includes several interesting features.

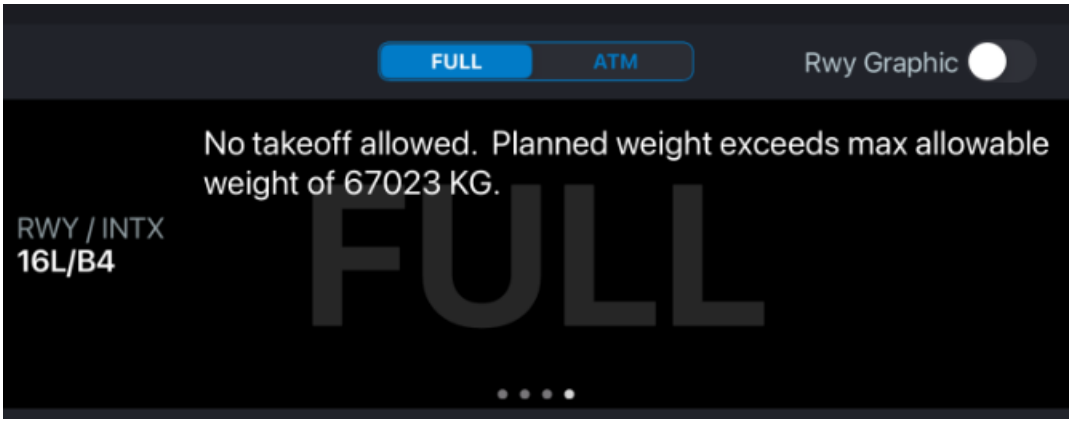


The first, most noticeable feature, is the "ATM" watermark behind the output. This enables the user to quickly recognize which mode is being viewed. To switch to the full thrust view, simply tap the FULL/ATM button just above the output section. In this example, a planned takeoff weight of 69000 kg has been entered. When the results became available after the calculation was done, they showed that an assumed temperature of 32 degrees Celsius was available if using the full length of the runway. When viewing the results from

the different intersections, however, the output shows that a point is reached where this is no more assumed temperature capability to use because the results for that intersection were too close to the performance limit of the airplane. That is shown with the following message:

When results are initially displayed, *OPT* will display the ATM results for the first runway/intersection listed.

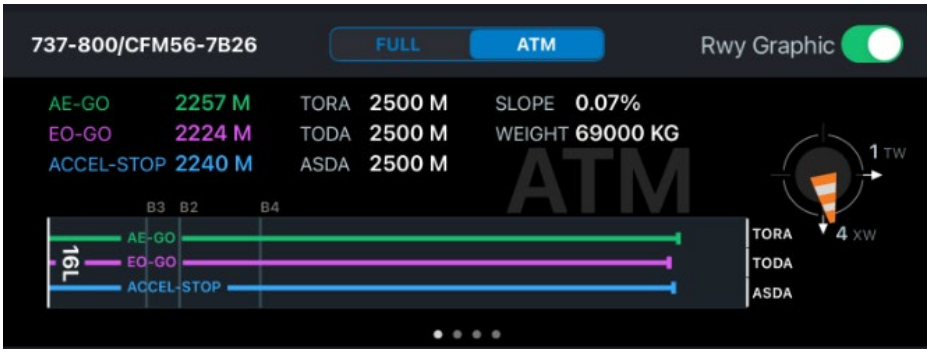
By swiping across the output area, one may display the results for the next runway, in either the ATM mode or the full thrust mode, as currently selected. In this example, because there are no valid results in either case, *OPT* will return the appropriate error message to further describe why there is no ATM available or no takeoff allowed. For instance, if the 16L/B4 output is selected, the following error message is displayed:



Note that this error message also displays the maximum weight which is allowed to help with a quick assessment of the problem.

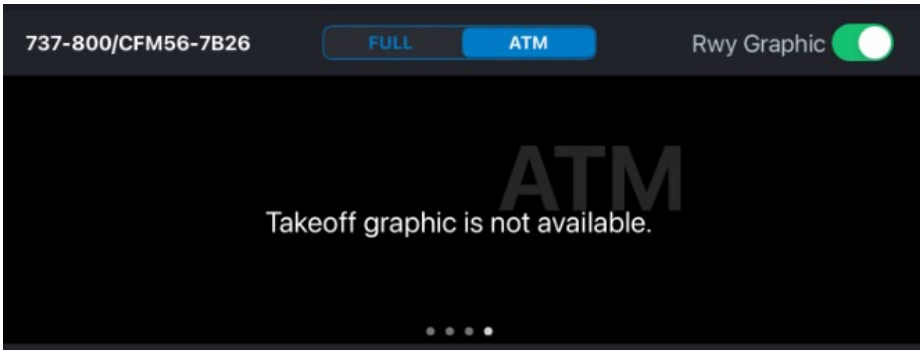
While in the takeoff results, if the Administrator enabled the takeoff graph, the CALC button is now replaced with a **Rwy Graphic** toggle switch, after the calculation is complete as shown below. If the user makes any changes to the inputs the CALC button reappears.

To switch to the takeoff graph toggle the switch and a takeoff graph of the runway lengths required are displayed as shown below:



The "FULL/ATM" button when selected in blue lets the user know which results are being viewed. The starting point of the runway is shown in a vertical white line. The all-engine go, engine-out go and accel-stop distances are shown in various colors with the distances also matching. In the above results, the atm runway results are being displayed. The presence of the small dots below the output, indicate that the user should "swipe" across the screen with their finger to scroll and reveal more pages in the graphical view. The windsock, shown in orange and white, display the direction and strength of the wind.

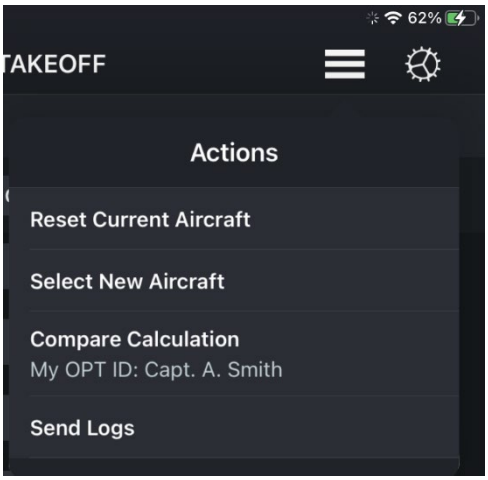
When there are no valid results in either full or ATM in the graphical view, *OPT* will return the following error message:



The example below shows the graphical view of an intersection takeoff, RWY 16L/B2. Again using the toggle switch will take the user to the numerical results.

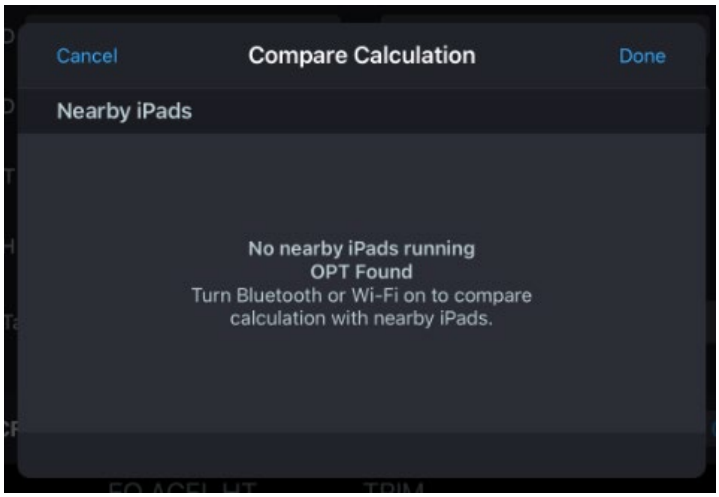
Comparing Calculations

The user has the ability to compare the calculations (inputs/outputs) from one iPad to another. This functionality is meant to aid in the crew cross-check of the inputs and outputs. This capability is available for any Calculation type and also for the Weight and Balance inputs. After a calculation is completed, to the left of the Settings menu, in the Actions menu, select Compare Calculation. Note that your OPT ID is also displayed for awareness. This OPT ID will be shown on the Compare Calculation screen to identify the iPad being compared with when the compare calculation feature is used.

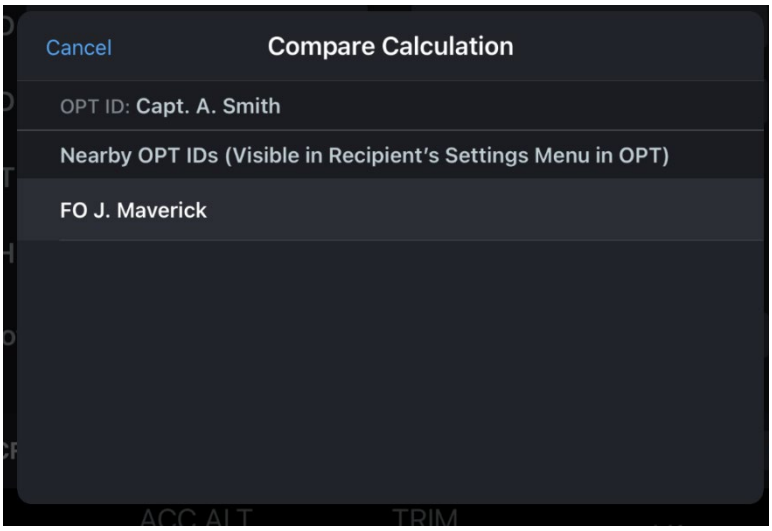


To be able to use this feature both iPads must have Wi-Fi turned on and both iPads should have completed a calculation of the same type (i.e. takeoff-dispatch). The iPads do not have to be connected to a network, they just need Wi-Fi turned on. For this example, we will use a completed Takeoff – Dispatch calculation. First complete the calculation and after selecting Compare Calculations you might encounter the following:

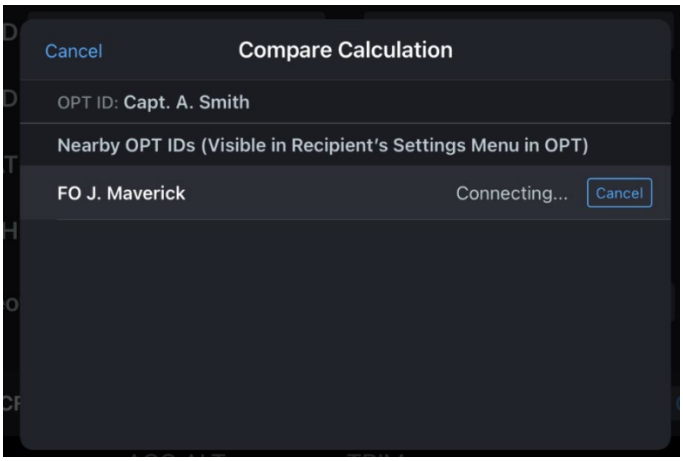
- If no nearby iPad(s) with a completed calculation are found you will see the following:



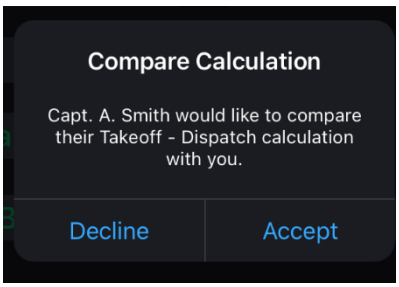
- If iPad(s) with a completed calculation are found you will see the following Compare Calculation screen. Note that your OPT ID is shown at the top and all nearby iPads are listed under Nearby OPT IDs. There can be more than one iPad shown:



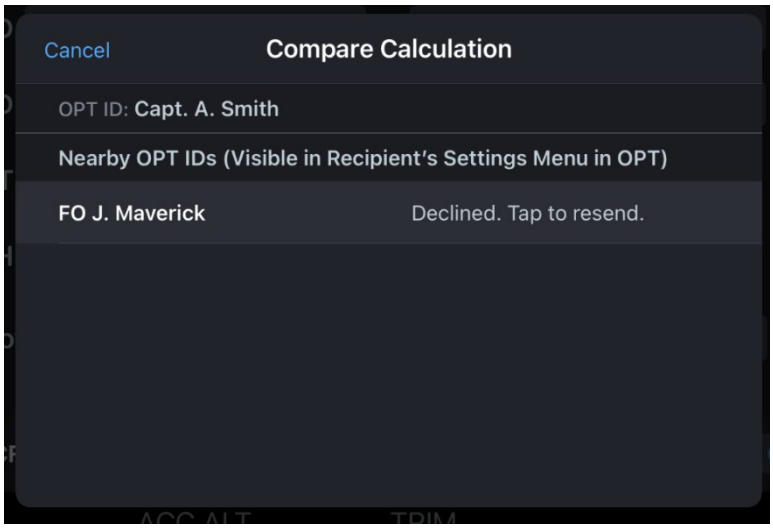
- After selecting the iPad to Compare the calculation you will see the following:



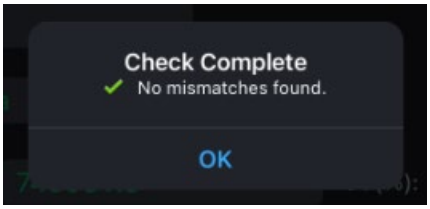
- While the iPad that was selected to compare the calculation will receive the following message:



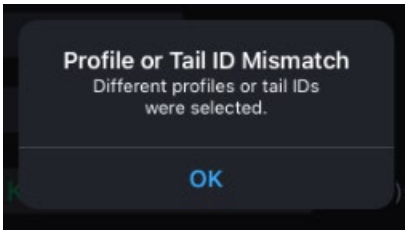
- If the other user decides to not accept the request (Decline), you will receive the following "DECLINED" message.



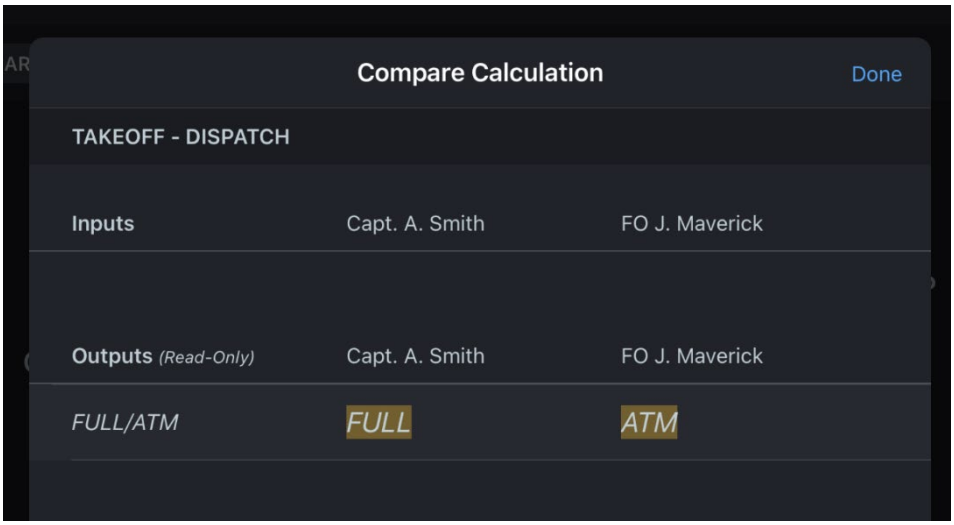
- If the other user decides to accept your request for the comparison and both iPads match all inputs/outputs then the following message is displayed.



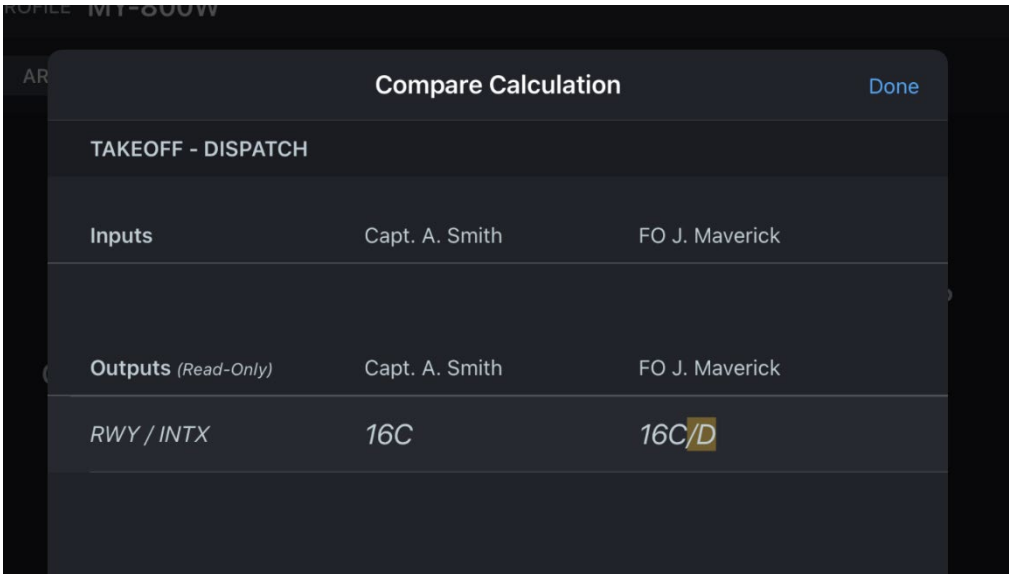
- If the other user decides to accept your request for the comparison and there is a mismatch at the tail level, the following message is displayed.



- If the other user decides to accept your request for the comparison and the inputs were exactly the same, however, they were not viewing the same output screen, the following message is displayed. The user should go back to the correct screen and redo the Compare Calculation request.



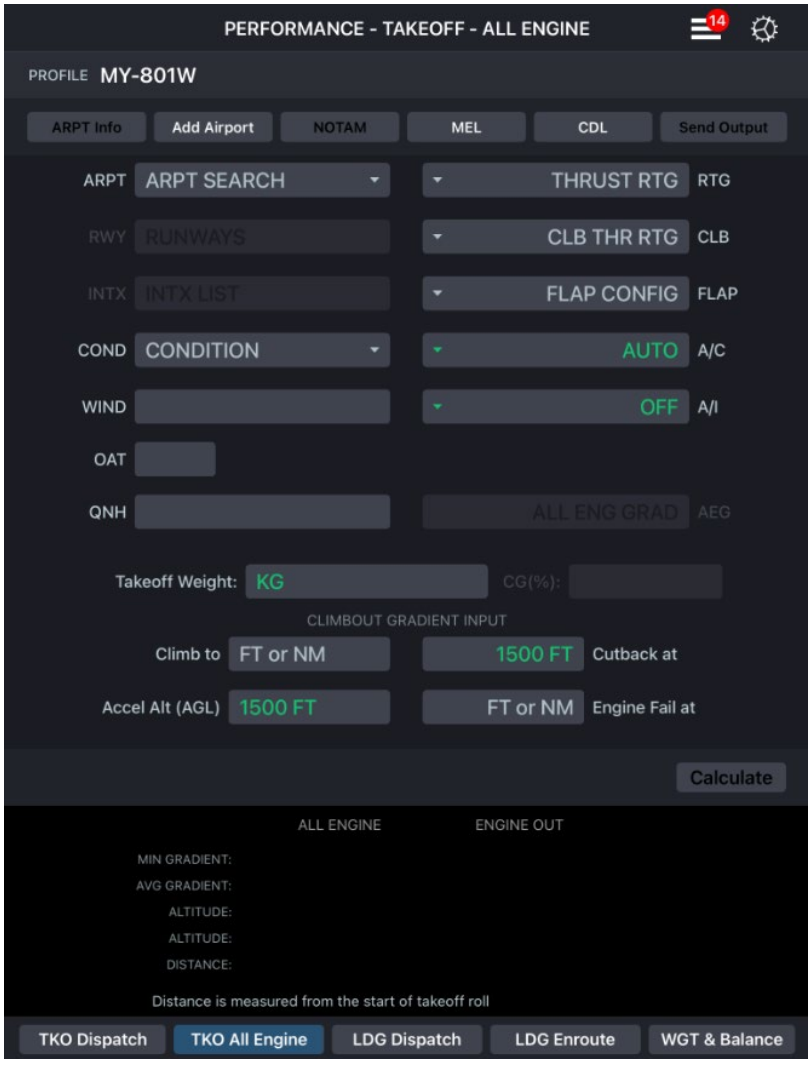
- If the other user decides to accept your request for the comparison and the inputs were exactly the same, however, they were viewing a different intersection, the following message is displayed. The user should go back to the correct screen and redo the Compare Calculation request.



- If the other user decides to accept your request for the comparison and there are any differences in the inputs, a screen similar to the one shown below will be displayed. Clicking on any of the blue text (i.e. Takeoff Weight) will take the user to the input field and clear the weight for this instance. The crew should talk to ensure the weight is the same and the comparison should be conducted again until "No mismatches found" is displayed.

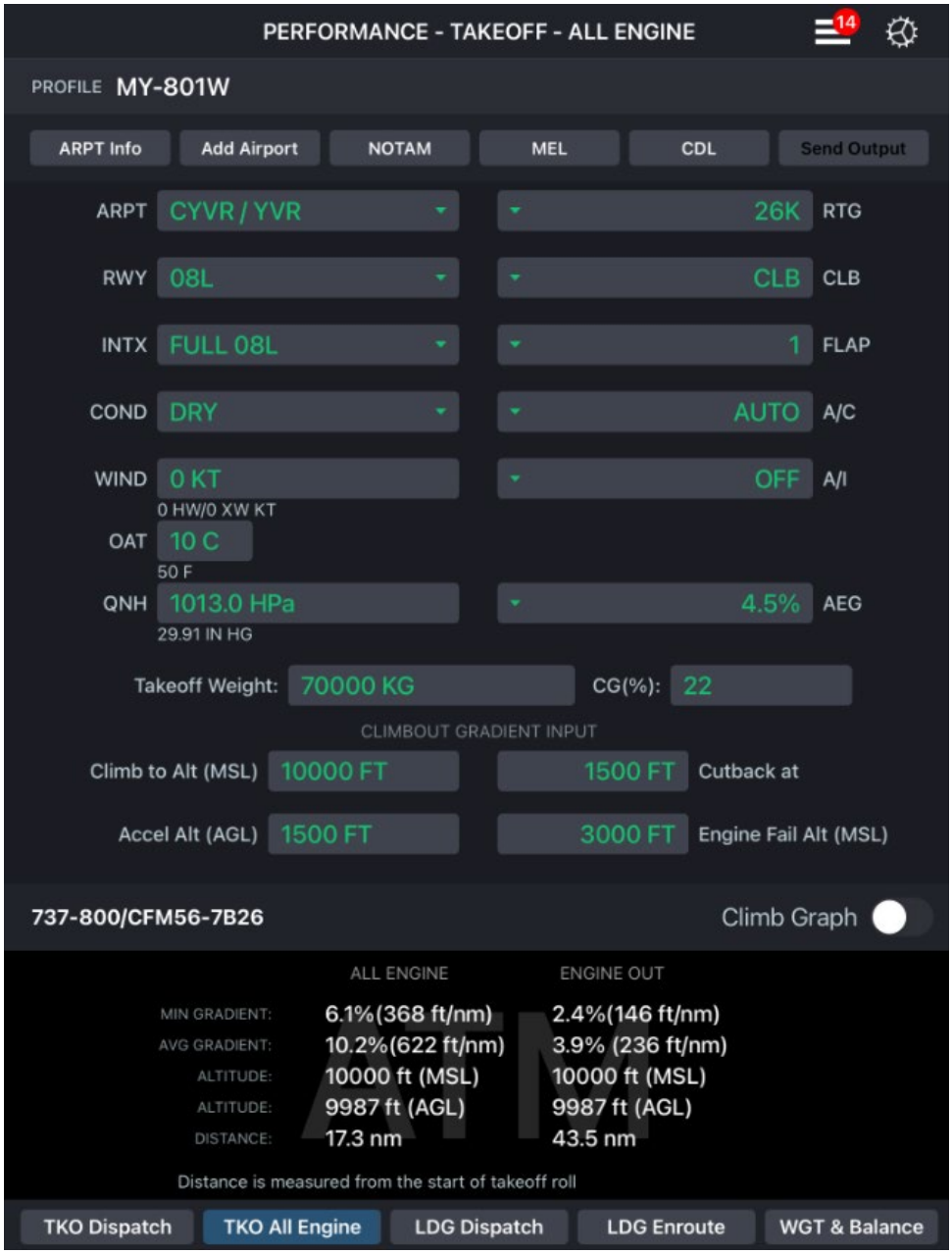
Using the Onboard Performance Tool *for* Takeoff - All Engine Gradient Checks

OPT will display two screens to calculate takeoff performance, Dispatch & All Engine. All Engine is only available if it has been activated by your company Administrator. The intent of the all engine climb module is primarily to determine compliance with a published SID gradient requirement. It is presented by using the **TKO – All Engine** button on the tab bar at the bottom. Once selected, the user will be able to calculate all-engine climb capability following a takeoff that includes distance-to-height or height-at-distance calculations, and a screen similar to that shown below appears. The actual buttons and selections available are a subset of those defined for the Takeoff screen. The inputs under **Climbout Gradient Input** are activated by your administrator.



The user can select inputs to perform calculations. However, we recommend that the user first performs a **TKO – Dispatch** calculation and then visit the **TKO – All Engine** page,

this way all values are automatically transferred from the takeoff calculation and the page might look something like that shown below.

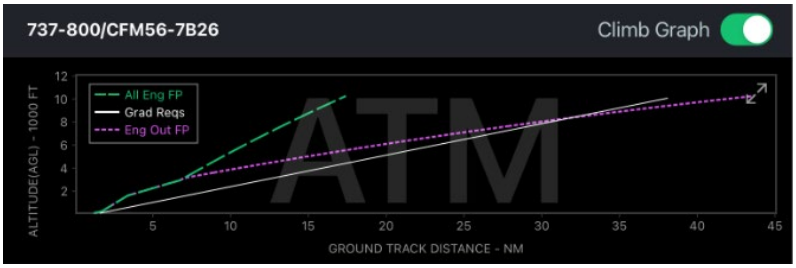


The All Engine gradient calculations also require additional inputs under CLIMBOUT GRADIENT INPUT. For **Climb to** the choices are Altitude (MSL) or Distance and the user is presented with a pop-up for which they can only enter one or the other. This value specifies the end of the flight profile. The **Cutback at** (which is the thrust reduction) has choices of Height (AGL) or Flap and can be pre-populated by your Administrator or left blank for the crew to enter at runtime. The same applies to the **Accel Ht (AGL)** which is the All-Engine Acceleration Height. The ability to display **Engine Fail at** is an optional

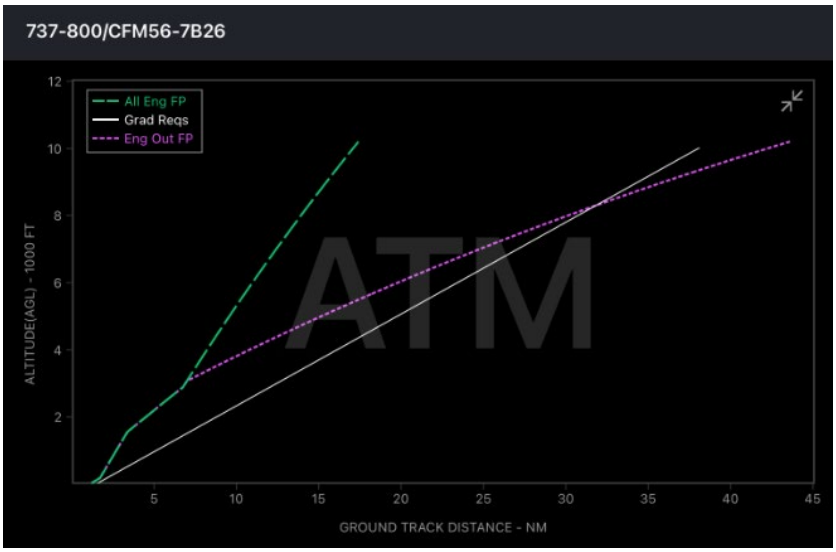
input selected by your Administrator. Your OPT configuration might not have this input. If this input is available, the user will have the ability to fail an engine at an Altitude (MSL) or Distance. Please be advised that *OPT* cannot simulate an engine failure prior to the gear up point. The results show the watermark indicating if the calculation was an assumed temperature calculation (ATM) or a FULL thrust calculation. The outputs are explained below:

- Min Gradient: The Minimum Gradient is the lowest geometric gradient (point) encountered from the 35 foot point until the end of the profile.
- Avg Gradient: The average gradient is the delta height / delta distance from 35 foot point to the end of the profile.
- Altitude: The Altitude Mean Sea Level (MSL) and the Altitude (AGL) which is the altitude above the airfield elevation.
- Distance: The distance to the end of the profile in nautical miles which is measured from the start of the takeoff roll.

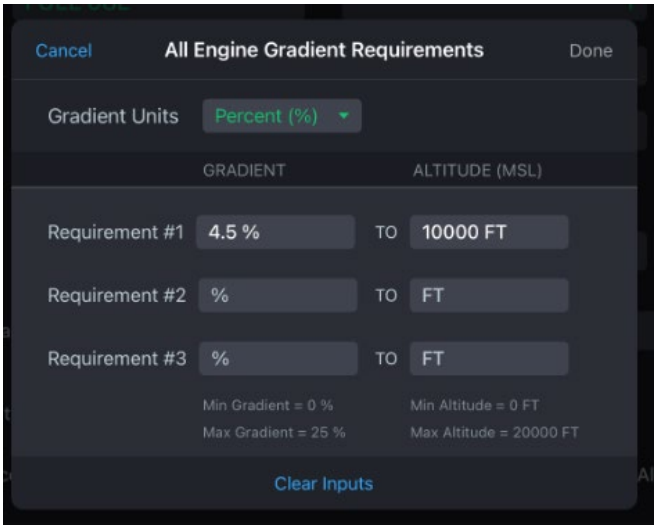
If the *Administrator* activated the all engine graph, a toggle switch is shown after the calculation is completed. When the switch is toggled, a graph of the gross all engine flight path, gross engine-out flight path (if calculated) and the gradient requirements (if selected in the **AEG** button) is displayed as shown below:



The user can expand the graph by clicking on the two arrows in the upper right hand corner. But to return to the numerical results the graph must be minimized again.



If the **AEG button** is available, the user can manually input up to three (3) gradient requirements that will be used to draw the Gradient Requirements line (white line) in the above graph. The crew can enter gradients by selecting the **AEG button, Enter Gradient** in ft/nm or % as shown below:

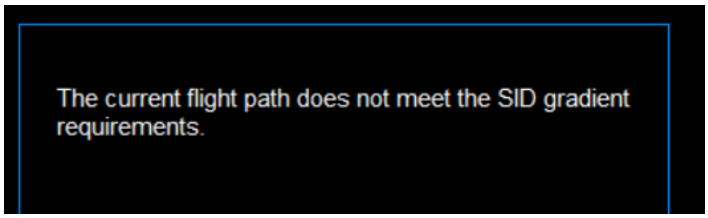


If the crew needs to check the Gradient Requirement for example at WSSS/SIN Runway 20C, they can use the All Engine Gradient requirements (AEG) button and enter the information as shown in the SID chart.

Rwy 20C: See 10-3A.
SID shall be on a minimum climb gradient of 7.0% until reaching or passing 2500.

Gnd speed-KT	75	100	150	200	250	300
7.0% V/V (fpm)	532	709	1063	1418	1772	2127

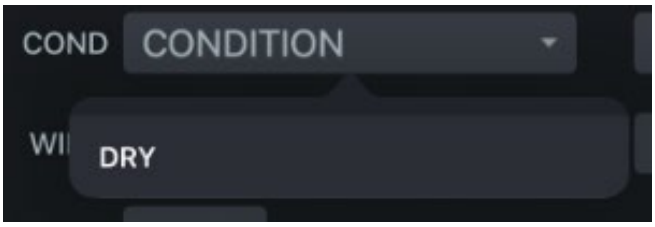
For this departure the requirement is 7% to 2500-ft and 3.3% to 10000-ft. The crew would select **Percent (%)** for Gradient Units and for **Requirement #1** enter 7 for **Gradient** and 2500 ft for **Altitude (MSL)** and for **Requirement #2** enter 3.3 for **Gradient** and 10000 ft for **Altitude (MSL)**. Then enter the final conditions and calculate the Climb to 10000 feet. With the Graph enabled the user can easily tell if they meet the gradient requirement. If the all engine gradient is not met, OPT will issue a warning as shown below. In this case the user will need to change some of the inputs and recalculate until the gradient is met. Please refer to your company guidance/procedures when this situation is encountered.



Additional information about the flight profiles. The calculations assume a straight-out departure with no accounting for the gradient loss in a turn. The profiles created to calculate the gradient requirements assume all engines operating, minimum thrust, the first takeoff segment is using an end condition of Gear Up Speed = V2 + X (i.e. 20) at whatever takeoff rating was selected, the next segment to the cutback altitude or flap is done at the same takeoff rating chosen, then accelerate to 250 knots and the final acceleration segment is at full climb thrust unless a different rating is selected via the **CLB** button (added via back office Administration). The acceleration is based on an assumption that 45% of any excess thrust is allocated to climbing the aircraft, and 55% is used to accelerate the aircraft (excess thrust is available thrust in excess of what is needed to maintain a constant altitude and constant speed). The value of X is taken from the default value that was specified in the Boeing Climbout Database (cnf file) which is typically the value specified in the Flight Crew Training Manual.

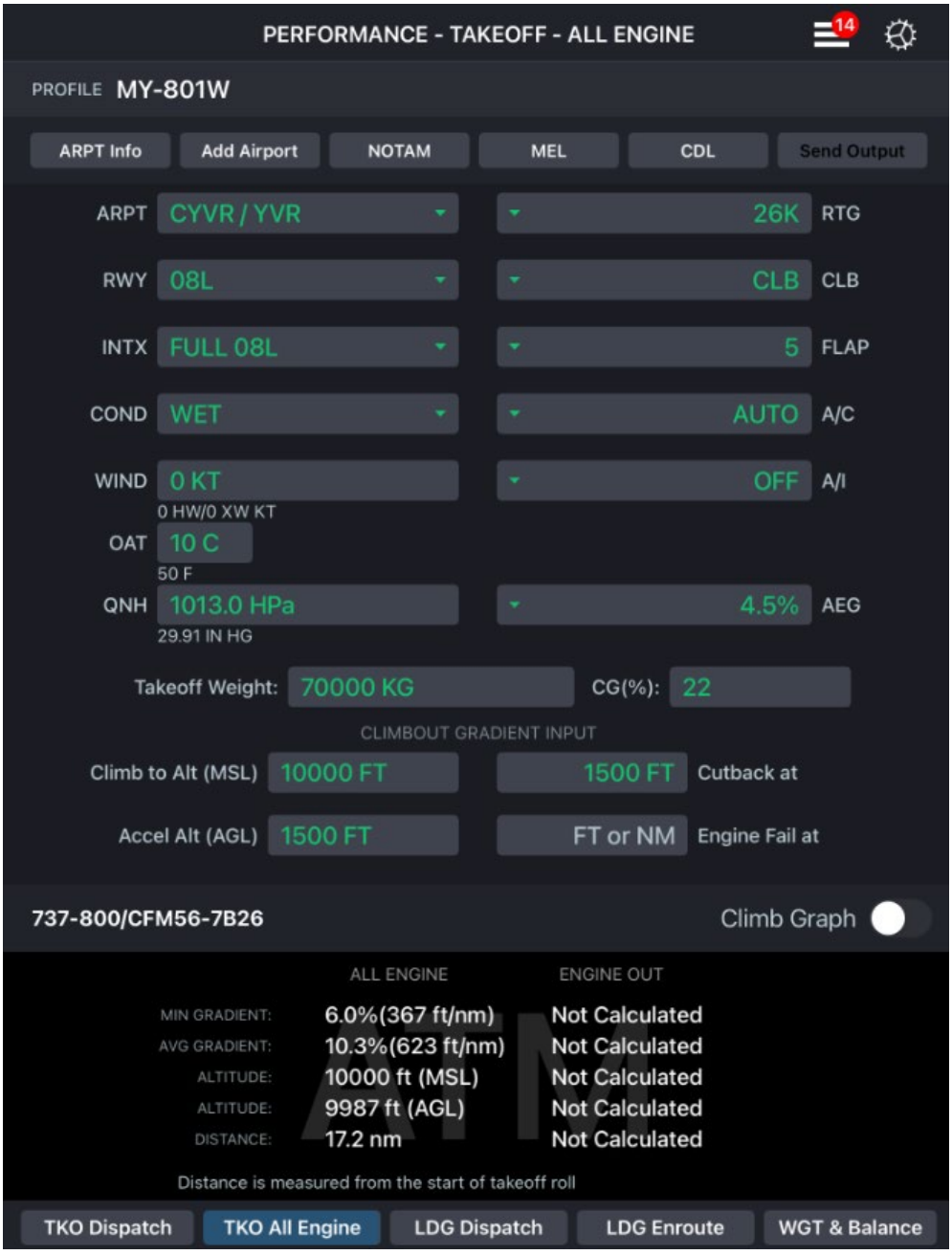
The ability to display **Engine Fail Alt (MSL) or Distance** is an optional input selected by your Administrator. Your OPT configuration might not have this input. If the user elects to calculate the gradient by using the input of Engine Fail Altitude or Distance, OPT starts the takeoff segment using the all engine profile and it continues the flight profile as described in the above paragraph until it encounters the engine failure altitude or distance, or finishes the thrust time limit, after this point the thrust is set to Maximum Continuous Thrust (MCT) until the end of the profile. FYI, OPT will not allow an engine failure prior to the gear up point. The main purpose of publishing the engine out gradient is to determine if the gradient requirements stipulated for the planned Standard Instrument Departure (SID) can still be met even if an engine failure occurs. This calculation is not intended to ensure obstacle clearance capabilities; the intention is to provide a simple check on meeting the SID minimum gradient requirements based on an assumed flight path. The **TKO – Dispatch** calculation ensures that one engine inoperative takeoff flight path and obstacle clearances calculations as per the regulatory requirements are met.

Other capabilities: The ability to calculate for runway conditions other than **DRY** exists, however, if the user starts with the **TKO – All Engine** tab, the only selectable runway condition will be **DRY** as shown below.



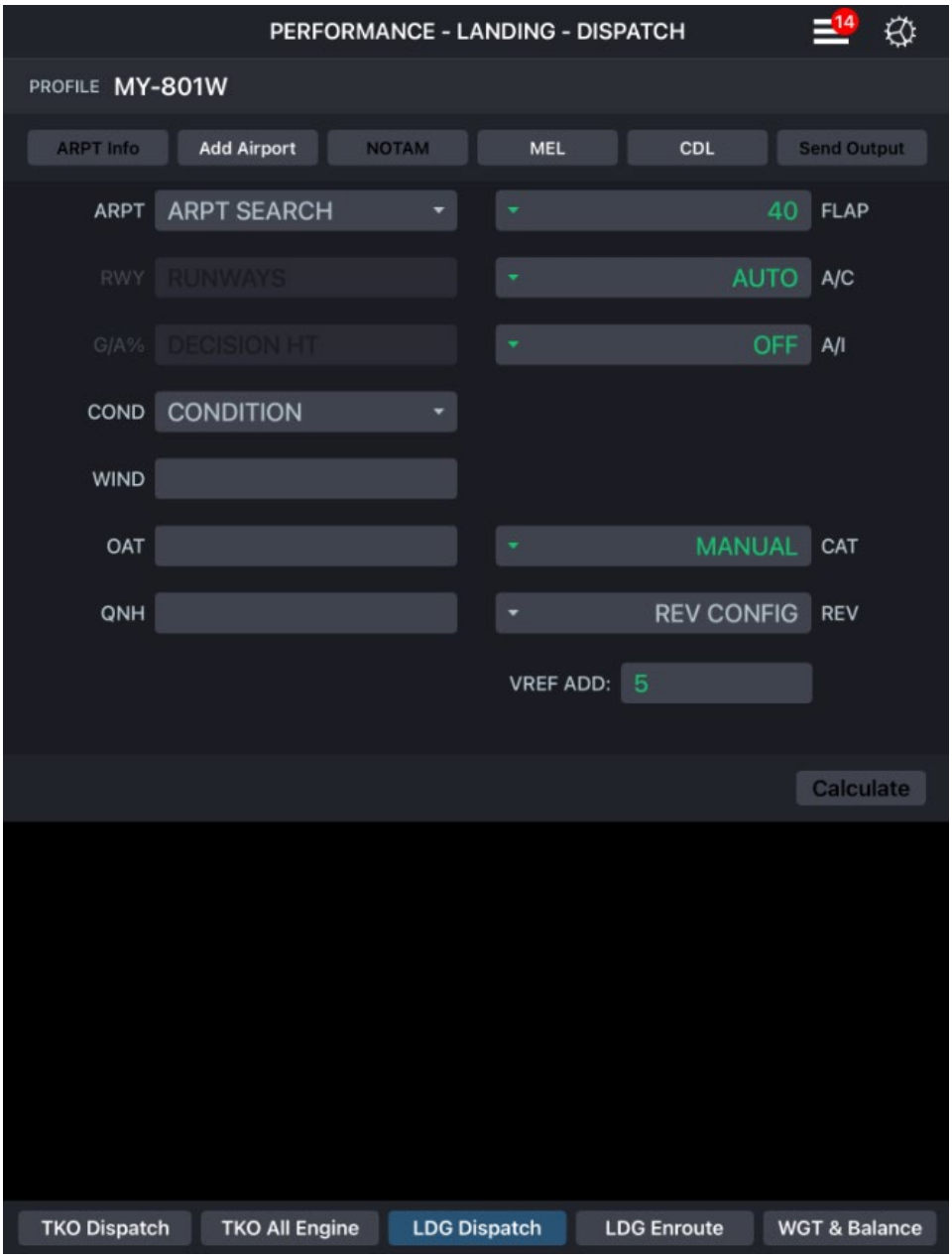
In order to be able to conduct an analysis for other runway conditions, i.e. **WET**, the user must first perform a **TKO – Dispatch** calculation and then after the calculation is completed, select the **TKO – All Engine** tab, this will automatically transfer all the values and the required distances and speeds to be able to compute the all engine gradients for the

runway condition from the takeoff calculation. An all engine gradient calculation at a runway condition of WET is illustrated below. The engine fail altitude or distance inputs were left blank and that is why the results show "Not Calculated" for Engine Out.



Using the Onboard Performance Tool for Landing

OPT will display two screens to calculate landing performance. This information is only available if it has been activated by the Administrator and is presented for LANDING – DISPATCH and LANDING – ENROUTE. These two very similar pages are displayed by using the **LDG DISPATCH** and **LDG ENROUTE** tabs on the tab bar at the bottom. When the **LDG DISPATCH** button is selected, a screen similar to that shown below appears. As with takeoff, the actual buttons available in the configuration section are defined by your administrator.

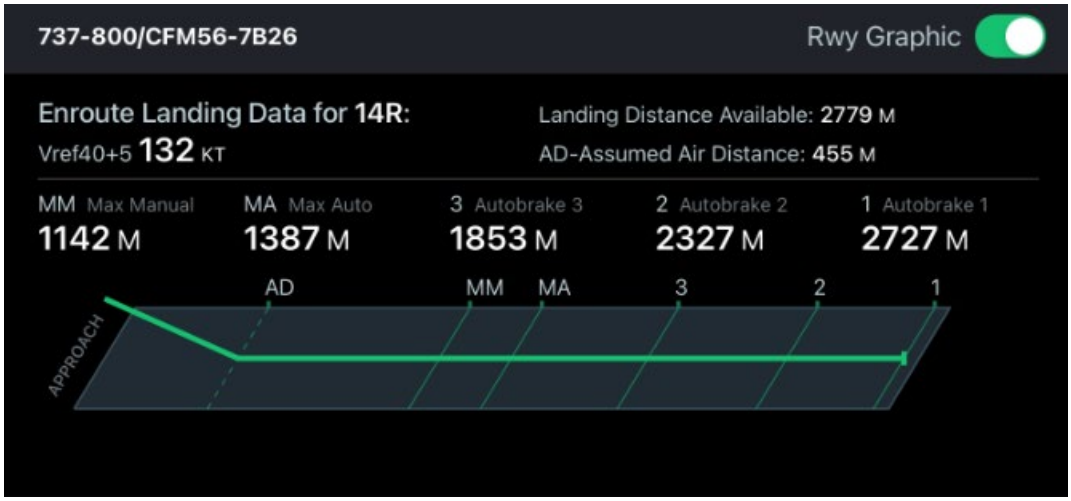


To display the PERFORMANCE - LANDING – ENROUTE page, which would typically be used for landing distance assessment at the time of arrival, the **LDG ENROUTE** tab is selected. This will display two or three additional buttons to select from – the **BRAKES** and **NON-NORM (NNC)** buttons. These two buttons are used to select the braking configuration for landing and any non-normal configurations that might be applicable. The third button, Thrust Reversers, can be enabled for landing enroute only if configured by your company Administrator. After making all of the inputs, the LANDING - ENROUTE information might look something like that shown below.

The enroute section contains the approach speed, the required landing field length and available landing field length for the input landing weight. These distances are, in general,

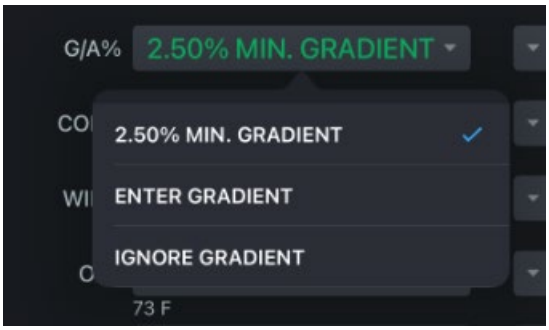
based on the information shown in the Boeing QRH and may or may not be factored by company policy. They may, or may not, include the effect of reverse thrust. Ensure that you know what your company's *OPT* installation is based on. In addition, some models will have brake cooling information available.

There is also the ability to display a graph of the distances by toggling the RWY Graphic. Shown below is a runway graphic with landing distances shown for ALL brakes.



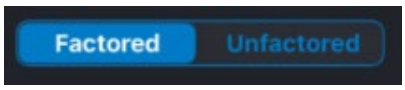
> ☞ **Note:** **Enroute distances displayed by *OPT* may or may not contain factors and may or may not include the effect of reverse thrust. Make sure that you know what your company's data is based on.**

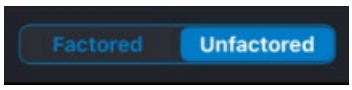
In some cases, your company Administrator may activate an option to also calculate limit conditions for required go-around gradients. If that is the case, a button appears typically under the runway selection. This button will typically have a minimum gradient, one or more decision heights which have been equated to other gradient requirements in the back office, a selection to input a custom gradient requirement, and a selection to ignore this missed approach gradient calculation but still consider the approach and landing climb regulatory requirements. A typical screen is shown below:



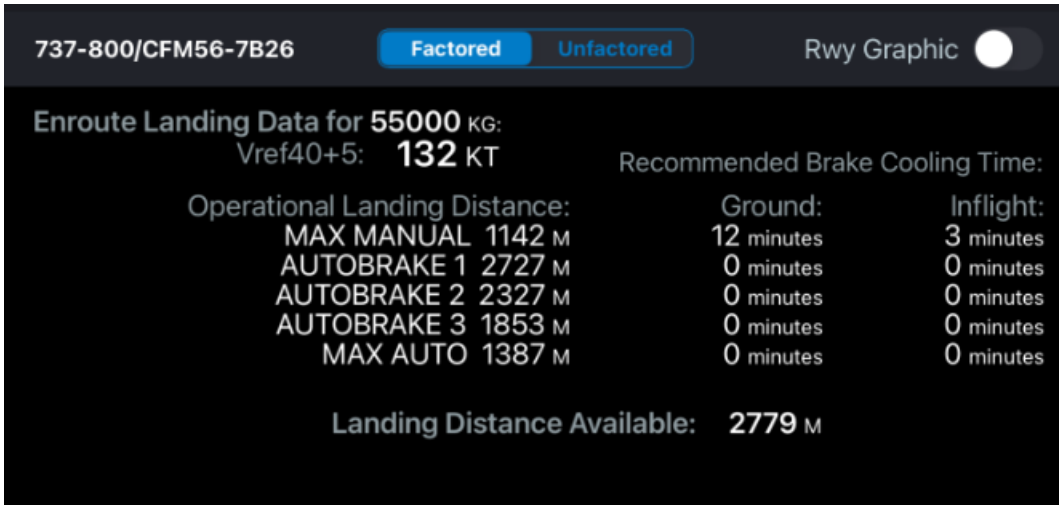
When used in the Landing – Dispatch mode, the choice on this button will be included in the limit weight calculation and can, therefore, limit the landing weight. In the Landing – Enroute mode, this button will cause the go-around calculation to take place and *OPT* will alert the crew if the input weight is too high to achieve the requested go-around performance.

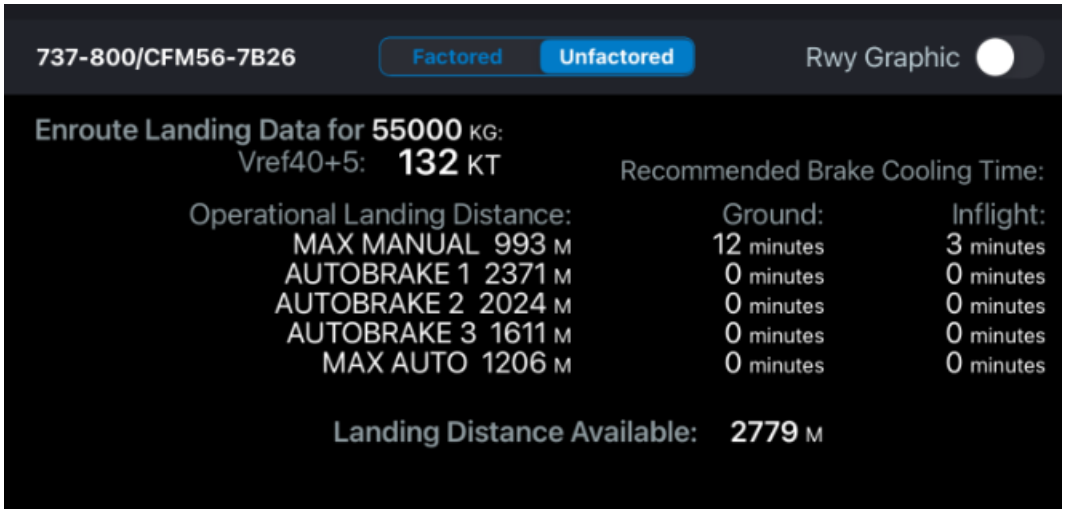
There is a new feature only for the *OPT* iPad Application, where your company Administrator can elect to show both Factored and Unfactored distances in the output display of the **LDG ENROUTE**. This is denoted by a toggle button where the user has the ability to toggle the results shown. The highlighted button is the set of results being displayed.



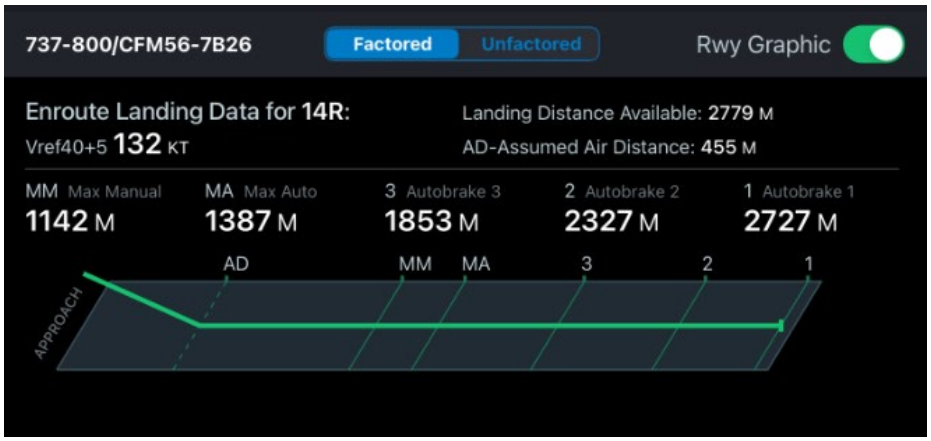


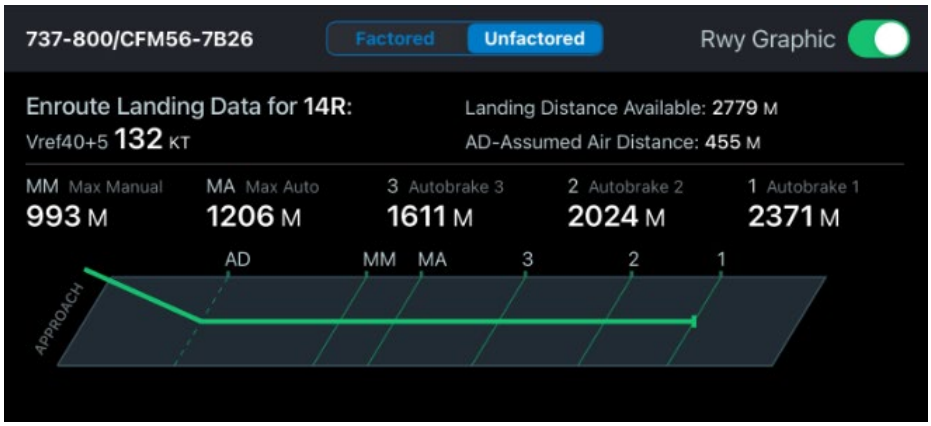
Make sure that you understand what your company's data is based on. If the option to display both Factored and Unfactored distances is selected, it will be shown as follows:





Similarly, the graph will also have the toggle at the top, as shown below:





Please note that at this time, only one set of output is available for Non-Normal Landing configurations as determined by your company policy. If the Factored/Unfactored switch is selected, the NNL is only shown in one category as shown below. If there is no data, no results are shown:

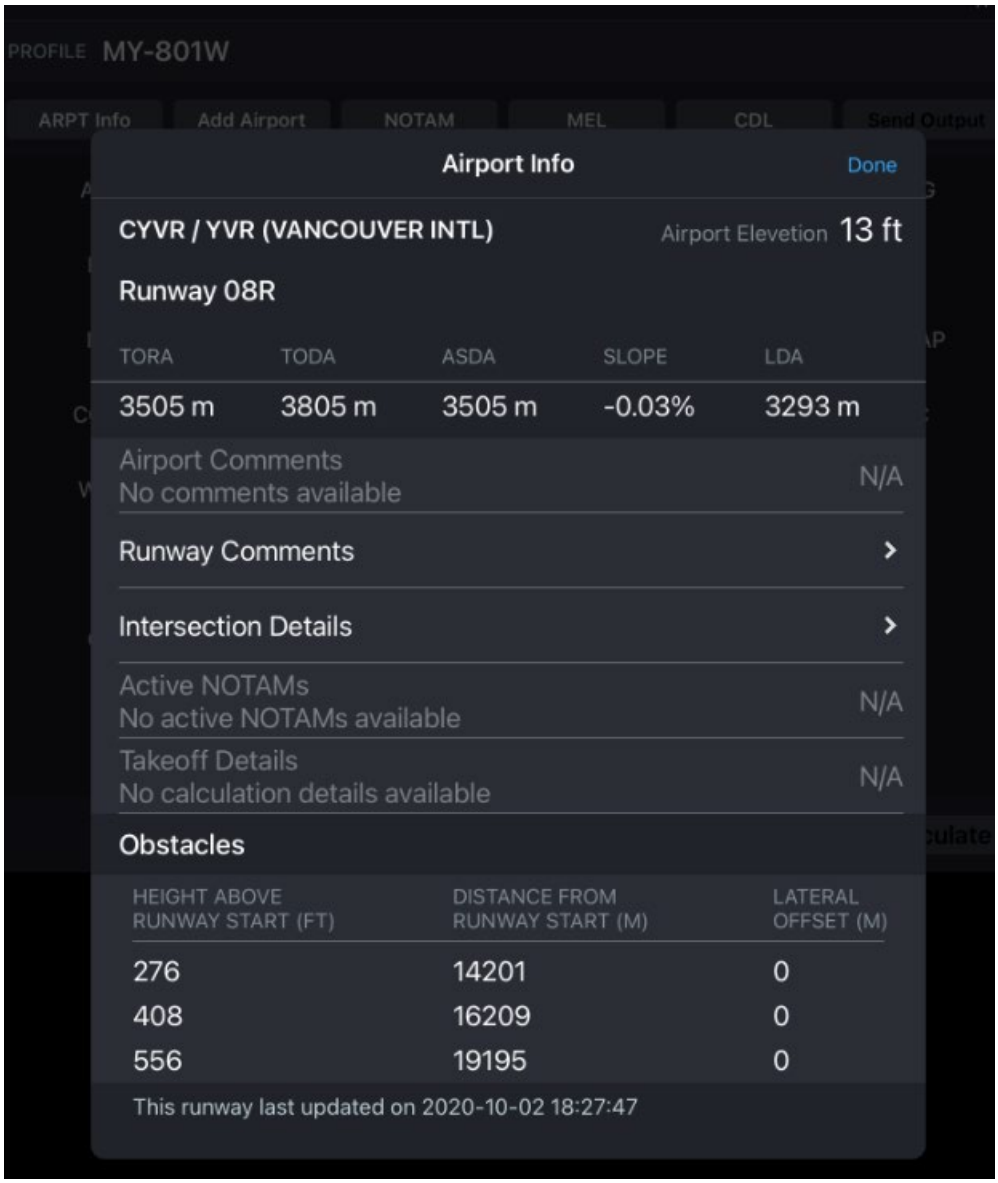
Note: **Enroute distances displayed by *OPT* with Factored / Unfactored may or may not include the effect of reverse thrust. Make sure that you know what your company's data is based on.**

Other Available Functions

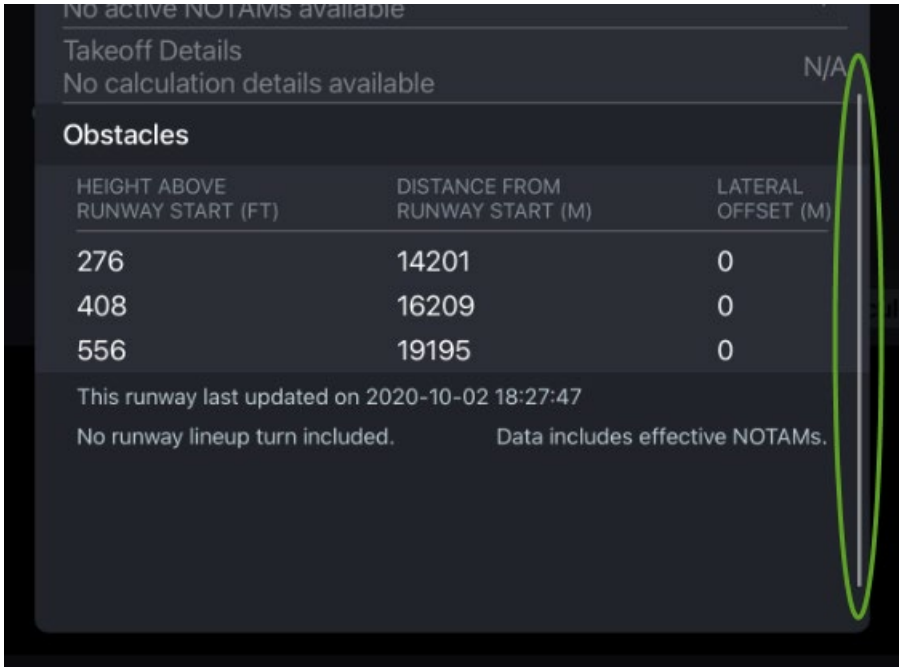
From the takeoff screen, there are several other functions available to the user. These functions are accessed from the tool bar near the top of the screen and are described below.

Viewing Airport Information

The **ARPT INFO** tool displays a screen which summarizes the airport data for the selected airport and runway. This selection is only active if both an airport and runway have been selected. The runway length and other parameters can be cross-checked with the available airport information of your latest Airport Chart. A typical airport information screen is shown below.



The only available button is **Done** which returns the user to the previous screen. Please note that the user will have to scroll as there might be other information hidden.

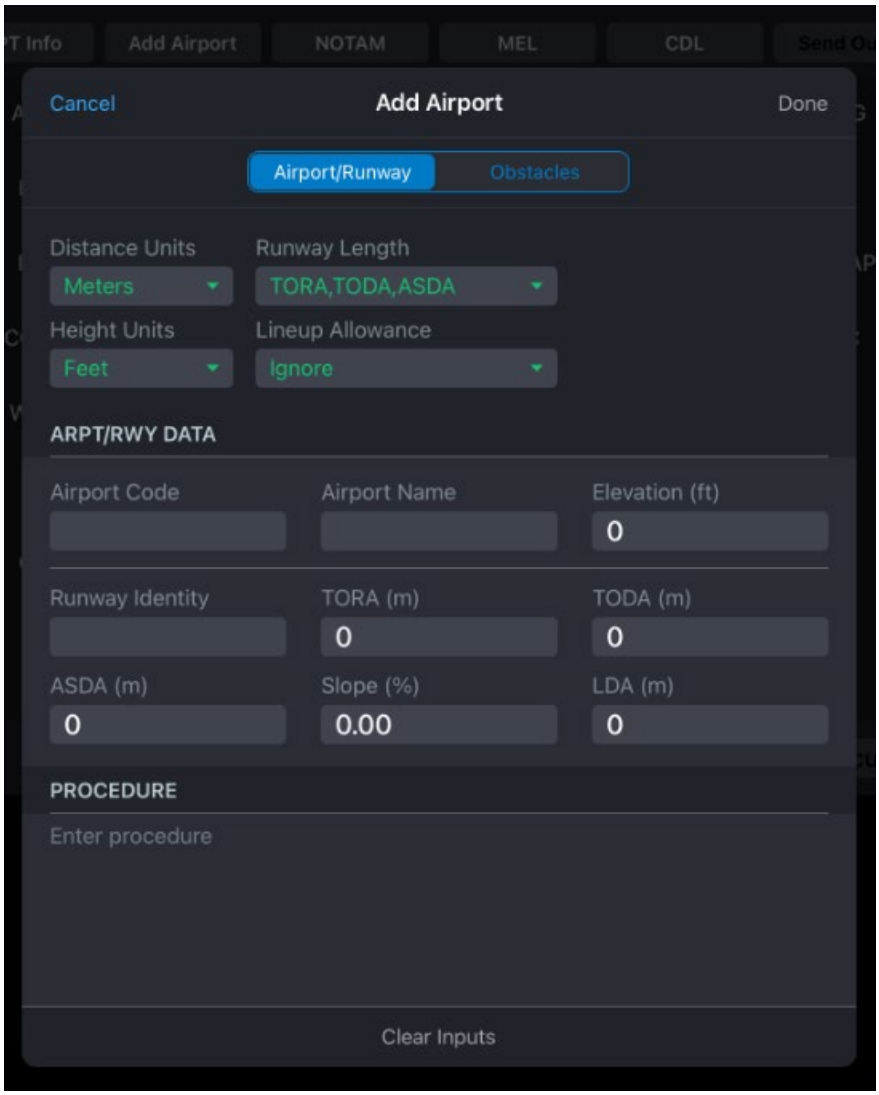


The following might have further information and can be retrieved by tapping on the line:

- **Airport Comments** – if airport comments are available, this line becomes enabled with a right arrow.
- **Runway Comments** – if runway comments are available, this line becomes enabled with a right arrow.
- **Intersection Details** – if there is intersection data associated with the selected airport and runway, this line becomes enabled with a right arrow.
- **Active NOTAMs** – if there are currently active NOTAMs being applied to the calculations, this this line becomes active with a right arrow and will list those NOTAMs. Active NOTAMs may be disabled or re-enabled from that screen, if that option was selected in *Administrator*.

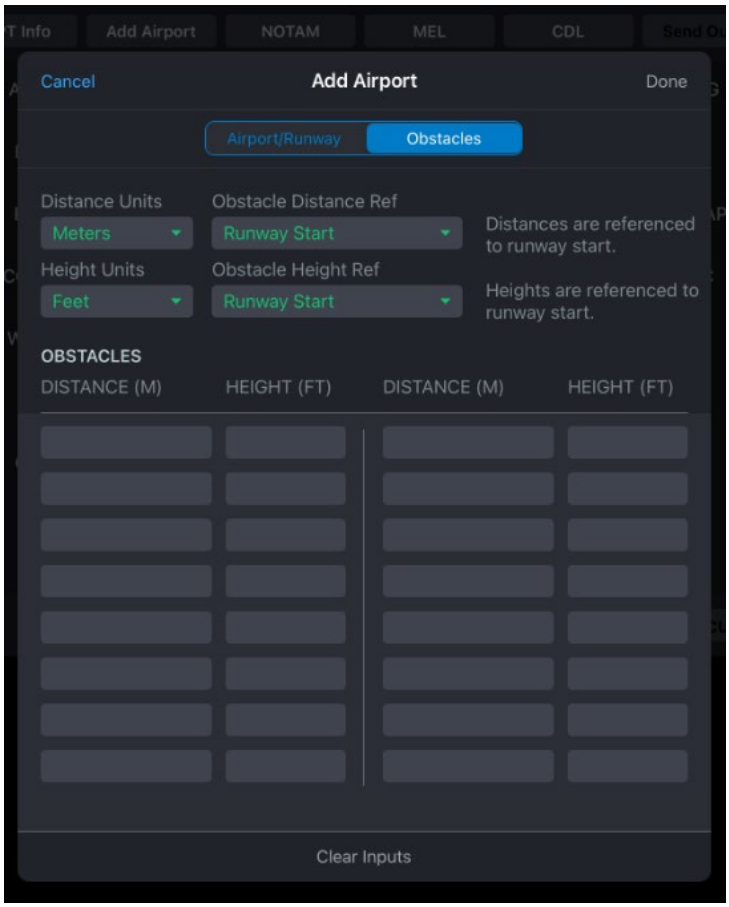
Adding a Temporary Airport

The **Add Airport** button, if available, will display an entry screen to allow the user to enter airport information for an airport that is not currently in the airport database supplied by your administrator. This information is retained only on a temporary basis and will be deleted when the *OPT* application is closed. When the **Add Airport** button is selected, *OPT* displays the following screen.



The top portion of the inputs are used to select the appropriate units and obstacle reference points for the input information. Then there are several edit boxes into which one enters the necessary information to describe the airport.

In addition to the information required in the screen above, the user should also add any available obstacle information. This is done by selecting the **Obstacles** button, which changes the top portion of the screen to display the following:



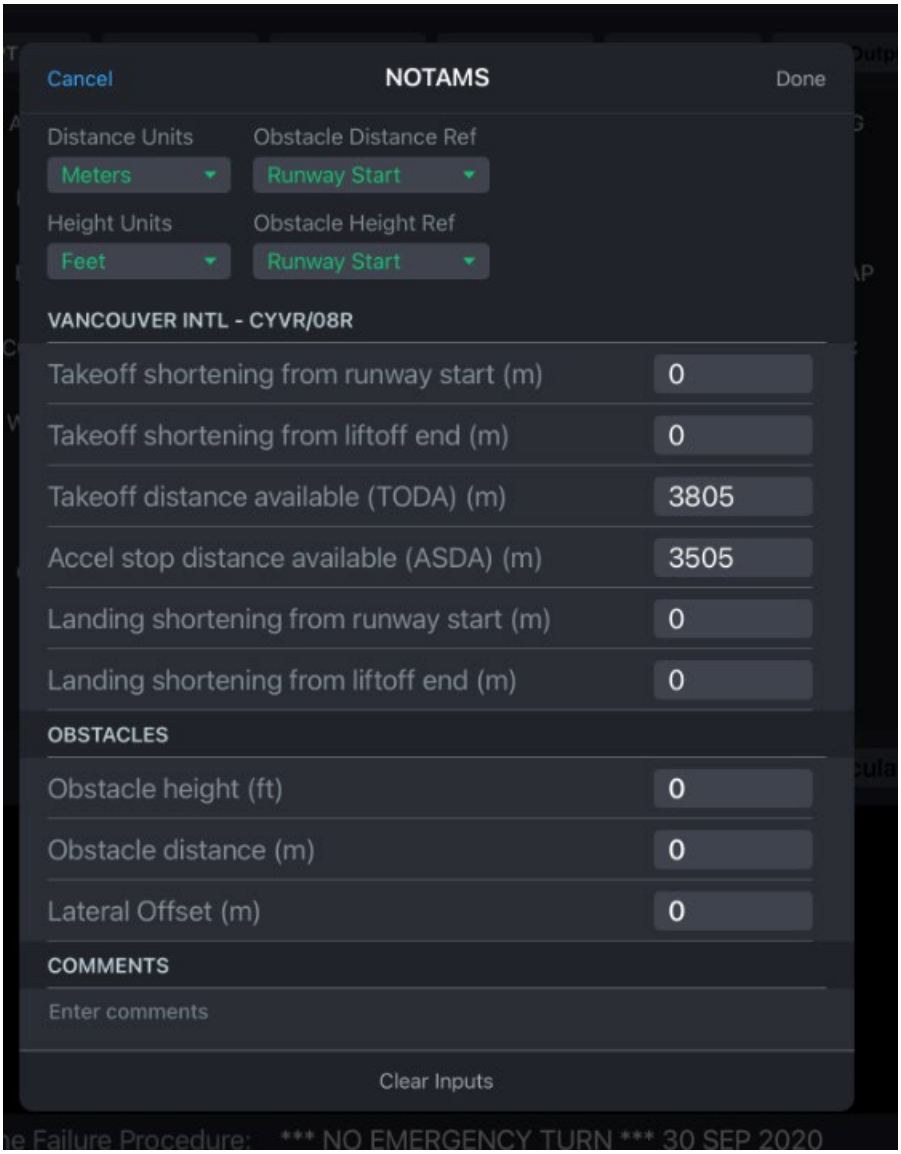
With the edit boxes, the user may enter any obstacle height and distance information. The obstacle distance and height information that is entered should be referenced to the choices designated in the top half of the screen, and should be relative to the flight path of the departure route and, ideally, corrected for any gradient loss during a turn. Further information about the specifics for this should be obtained from your airline's *OPT* administrator. Selecting the **Airport/Runway** button will return the user to the original add airport screen.

The remaining button functions are as follows:

- **DONE** (appears after data has been entered) – once enough required information has been entered, the **DONE** button becomes active. It will save the information, return the user to the previous screen, and select the temporary airport for use.
- **CANCEL** – this button will discard any changes that have been made and return the user to the previous screen without making any changes to the selected airport.
- **CLEAR INPUTS** – this button will clear all edit box inputs that have been made on this screen.

Adding a Temporary NOTAM

The **NOTAMS** button, if available, will display an entry screen to allow the user to input temporary NOTAM information that affects takeoff or landing performance. This capability exists in addition to the time-effective NOTAM capability the administrator uses to input NOTAMs. The temporary NOTAM information that is input is retained by *OPT* until cleared by the user; it is not deleted in a manner similar to the temporary runways. When the NOTAMS button is selected, the following screen is displayed:



Note that the above screen does not display any information for an ACTIVE NOTAM that was pre-defined in your OPT airport database by your company Administrator. The Active NOTAM information is found under ARPT INFO >> Active NOTAMs. The above screen is to define the NOTAM information by using this interface directly. The airport and runway to which this NOTAM will apply is displayed as the title on the shortening section.

This enables the user to verify that the correct runway is being used. As with the temporary airport input, there are buttons at the top of the screen to specify the input units and obstacle reference points. The inputs are used for the actual calculations. The TODA and ASDA are automatically adjusted based on the takeoff shortening from runway start adjustment. The user can also elect to apply a NOTAM to the TODA and ASDA only. If the shortening is from the liftoff end, a clearway or stopway greater than zero are not allowed.

A summary of the inputs for the current functionality is as follows. These values are based on the distance units selected by the user:

Takeoff shortening from runway start:

The distance that the runway is to be shortened from the start of the takeoff roll. When a value is entered in this field it is subtracted from the original runway length, subtracted from the original TODA or clearway and subtracted from the original ASDA or Stopway. The user is not allowed to increase the TODA or ASDA values.

Takeoff shortening from liftoff end:

The distance that is to be taken from the liftoff end of the runway. When a value is entered in this field it is subtracted from the original runway length, the TODA is set to the runway length or no clearway is available and the ASDA also set to the runway length or no Stopway is available. The user is not allowed to increase the TODA or ASDA values and these are now set to the runway length.

Takeoff distance available (TODA):

The length of the runway plus any clearway if it exists. It will be automatically adjusted if a takeoff shortening from the runway start or liftoff end of the runway is entered. The user can select to decrease only the TODA up to the runway length. The user is not allowed to enter a TODA less than TORA.

Accelerate stop distance available (ASDA):

The runway's declared Accelerate Stop Distance Available (ASDA). It will be automatically adjusted if a takeoff shortening from the runway start or liftoff end of the runway is entered. The user can enter an ASDA value that is less than the TORA. The user cannot increase the available stopway from the original available stopway.

Landing shortening from runway start:

The distance that is to be subtracted from the start of the available landing distance

Landing shortening from liftoff end:

The distance that is to be subtracted from the end of the available landing distance

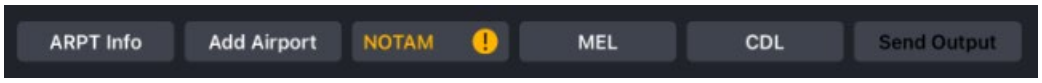
The reason for having the differentiation between liftoff end and runway start for the landing shortening is to help the display of the landing distance when the results are sent to FD Pro or for use with future graphing functionality.

In the Obstacle section only one (1) obstacle can be added to simplify crew workload. If more than one obstacle is required, your airline may consider utilizing the OPT Administrator time-effective NOTAM function which allows the back office Administrator to manually set up multiple obstacle data and follow the normal process for building the airport database and the associated part for loading the new airport.sdb into OPT. The crew in this case can run OPT without having to enter the NOTAM as it will be prepopulated in OPT when the Runway is selected. The other possible option is still consulting your back office and ask them to filter obstacles that are outside the approved splay, eliminate obstacles that will clearly not be limiting and run your back office performance tool to determine which obstacle is limiting and pass this information to the flight crew.

The Comments input is used only to allow a note to be written to remind others what the NOTAM is based on. The **DONE** and **CANCEL** buttons function as on the temporary runways screen. The remaining buttons function as follows:

- **CLEAR INPUTS** – resets all of the current inputs to blank with the exception of TODA and ASDA.

After inputs have been made and the user returns to the main takeoff or landing screen, there will be an amber exclamation displayed in the NOTAMS button. This amber alert is used to alert the user that there is currently an active NOTAM on the selected runway. This amber icon also appears automatically if a time-effective NOTAM is in effect.



If the OPT airport database has pre-defined NOTAMs (a time-effective NOTAM is in effect) that can be viewed in the Active NOTAMs section of the Airport Info page and the flight crew also applies additional NOTAM reductions via the NOTAM screen described earlier, the following declared distances will be used by OPT for the takeoff or landing calculations.

TORA is further reduced only if the pilot entered NOTAM is:

a) from the opposite side of the Active NOTAM

b) and or/ the distance entered from the same side of the Active NOTAM is greater than the original runway shortening. If the pilot entered shortening is greater

than the Active NOTAM, OPT will subtract this distance from the original published runway length and not the active NOTAM distance.

TODA is used from the pilot entered NOTAM only if the value is lower than TODA defined in ACTIVE NOTAMs.

ASDA is used from the pilot entered NOTAM only if the value is lower than ASDA defined in ACTIVE NOTAMs.

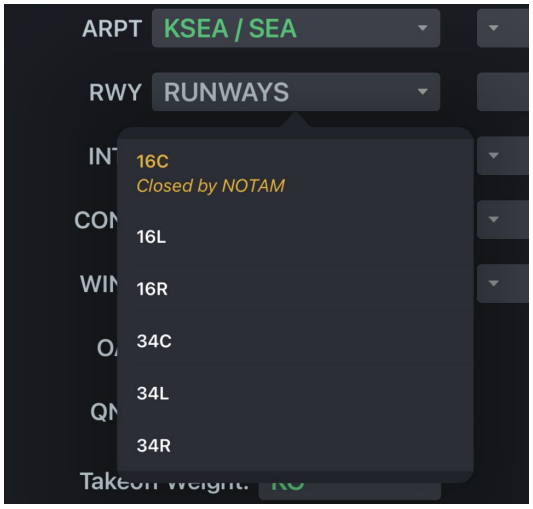
LDA is further reduced only if the pilot entered NOTAM is:

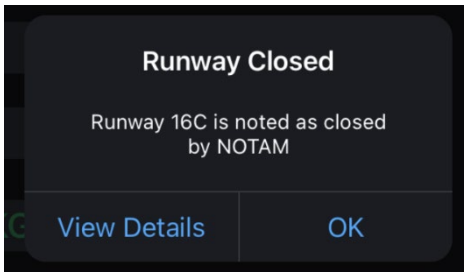
a) from the opposite side of the Active NOTAM

b) and or/ the distance entered from the same side of the Active NOTAM is greater than the original landing distance shortening. If the pilot entered shortening on the same side is greater than the Active NOTAM, OPT will subtract this distance from the original published runway length.

The final reduced distances used by the OPT calculation can be found by viewing the ARPT INFO button >> PERFORMANCE – Airport Data.

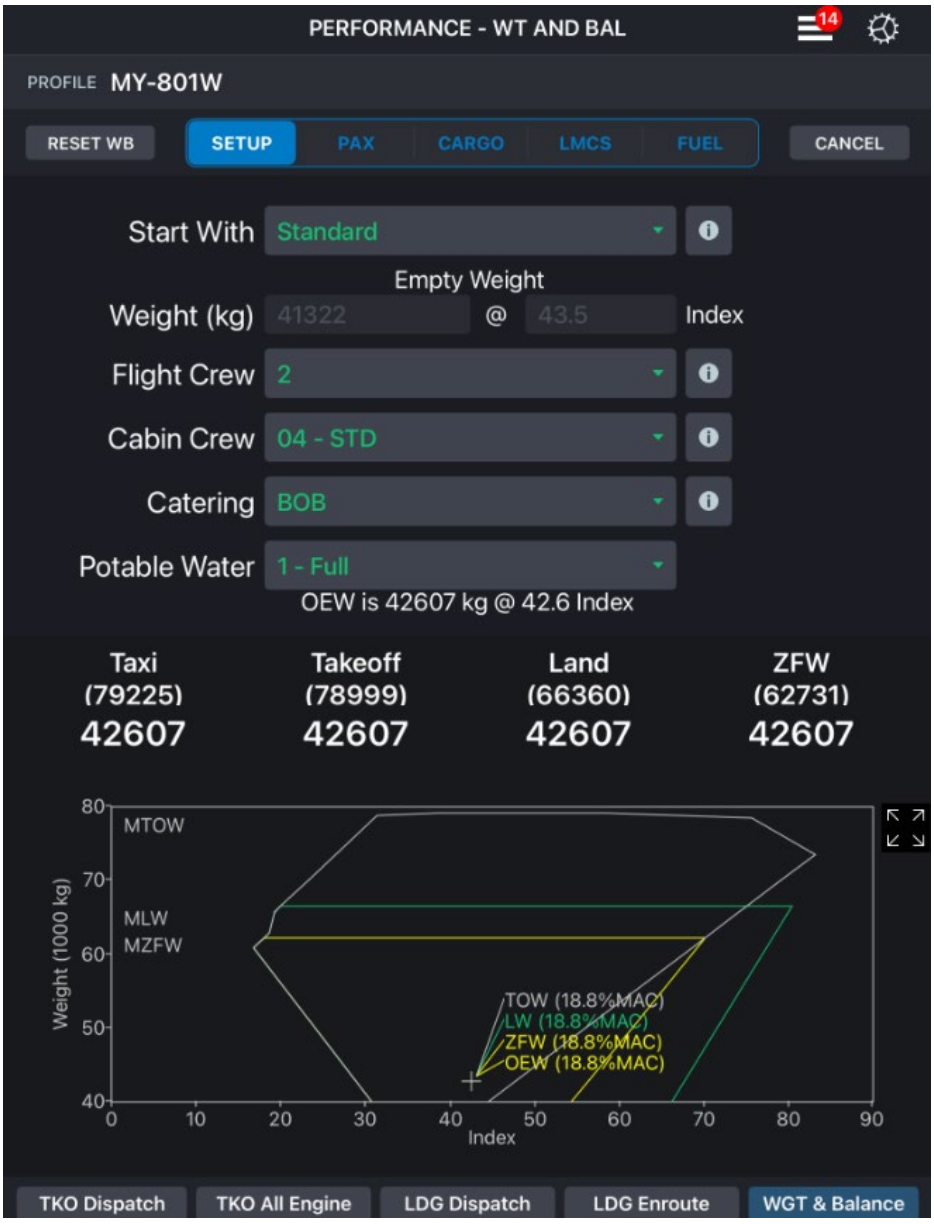
If a runway is closed by a time-effective NOTAM, the runway is shown in amber from the dropdown menu and the below message is displayed once selected. A calculation can be completed without any issues.





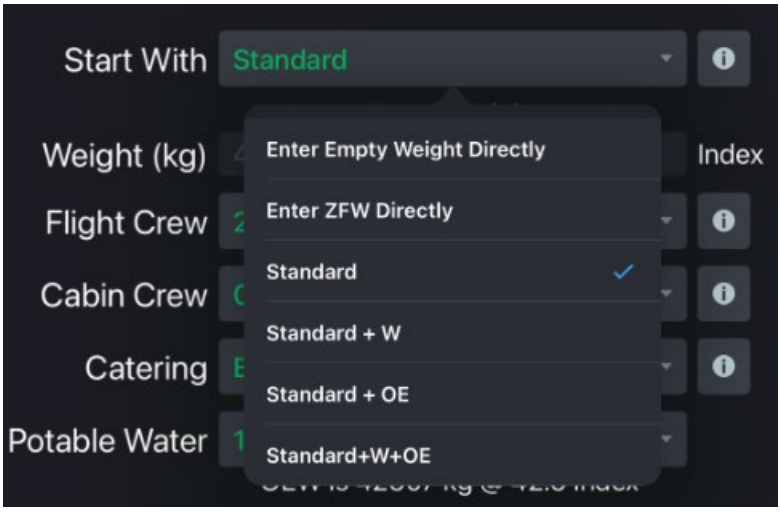
Weight and Balance

The **WGT & Balance** button, if available, will display an entry screen to allow the user to input and calculate W&B information. A typical W&B entry screen is shown below, with many inputs having already been made to illustrate different aspects of the display. The SETUP tab is optional and has to be activated by your Administrator. The choices available depend on your specific configuration and are determined by your administrator.



The **SETUP, PAX**, **CARGO**, **FIXED (LMCs)**, and **FUEL** buttons shown in the tool bar area are used to switch between the different weights inputs available. The button that is highlighted blue is the currently active input area.

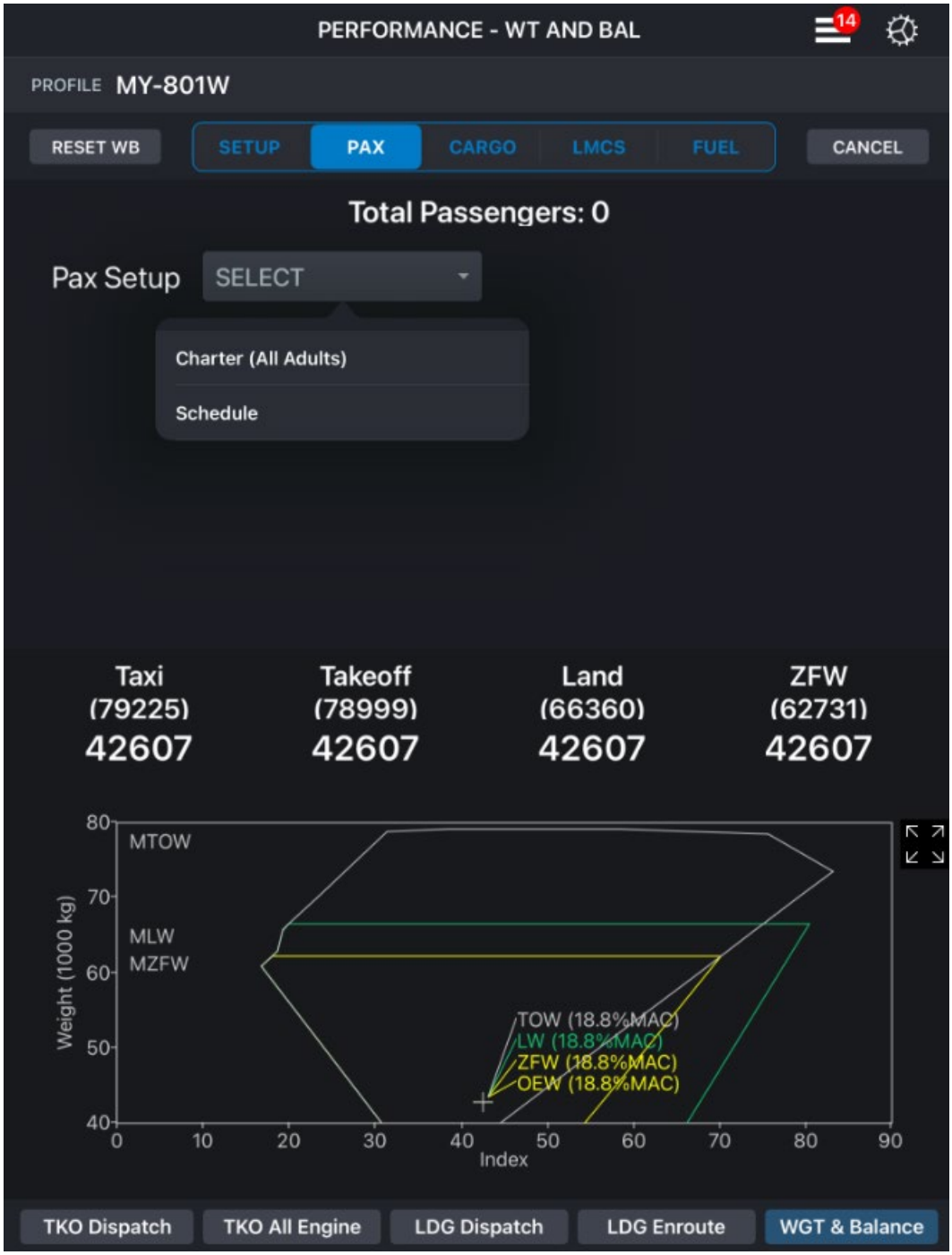
In this example, the SETUP button is blue and all fields have values selected. The following are the choices defined by the Administrator for Start With.



If Enter ZFW Directly is selected, the remainder of the popups on this page will be disabled and so will the PAX, CARGO, LMCs tabs. The Enter Empty Weight Directly allows the user to define a new Weight that is not on the list.

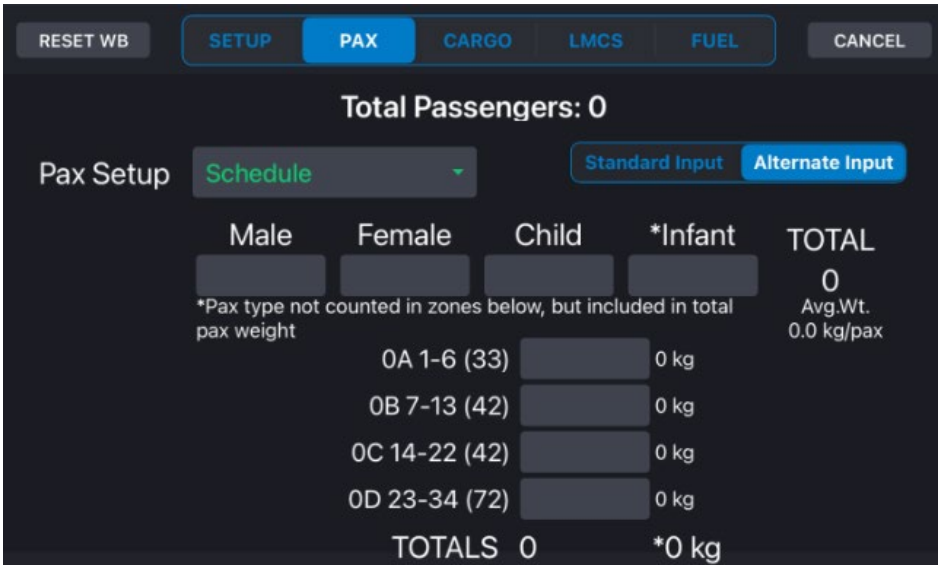
If defined by the Administrator the **i** can be useful in providing help information. To obtain the help information simply click on the **i**. The example shown below shows the help information defined for Flight Crew.

The Administrator can choose to define multiple passenger setups. If this is the case with your OPT the PAX entry screen will look as follows:

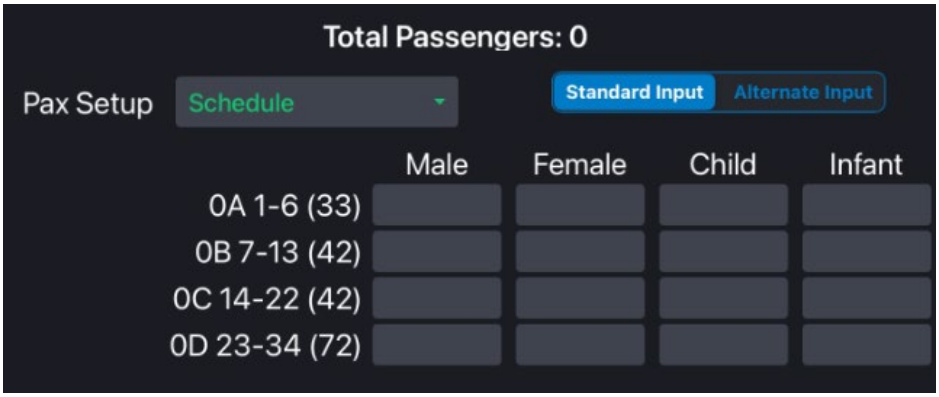


Selecting one of the setups will display the different passenger zones. The number of zones, passenger types and names (if applicable) are determined by your administrator. In addition, the weight for each passenger type and whether they count in the total zone count are also determined by the administrator.

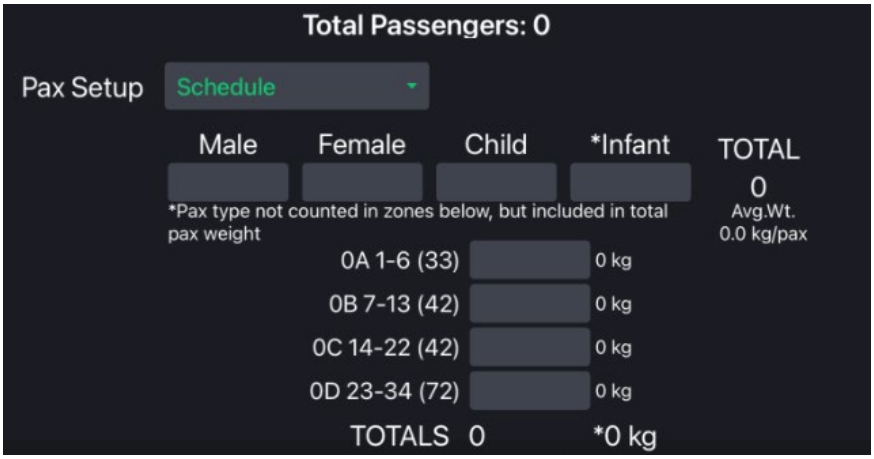
In the example below, the Alternate Input for passengers is shown. The ability to have the toggle button between Standard/Alternate options are also determined by your Administrator.



While the Standard Input is shown below for the same interior.

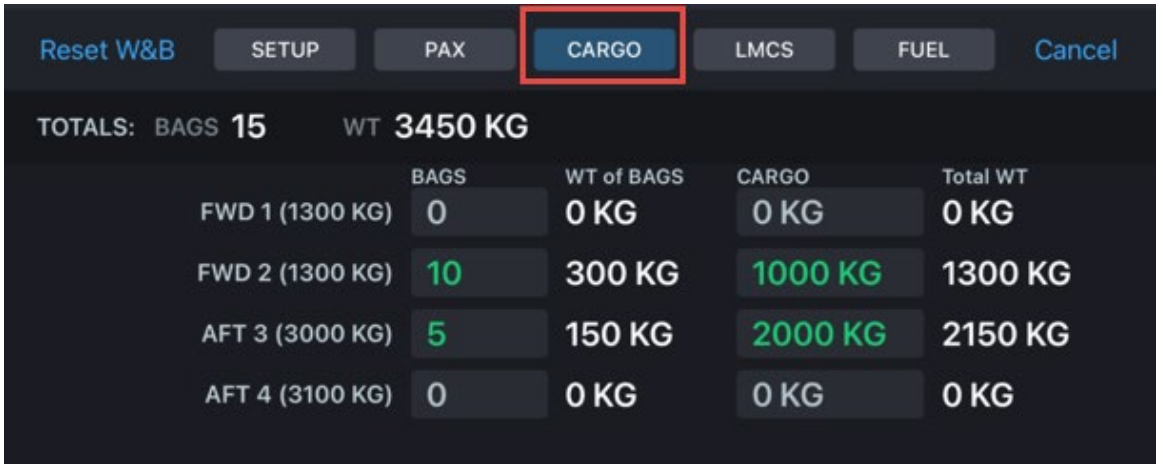


Shown below is an OPT configuration that is only displaying the Alternate Input.



Cargo may be input either by zone, zones including bags or position, depending on how the administrator has set up your application. A typical cargo input screen based on loading by zone compartments might look like the picture below. If loading by positions, selecting the buttons will display another input screen for each position in that zone.

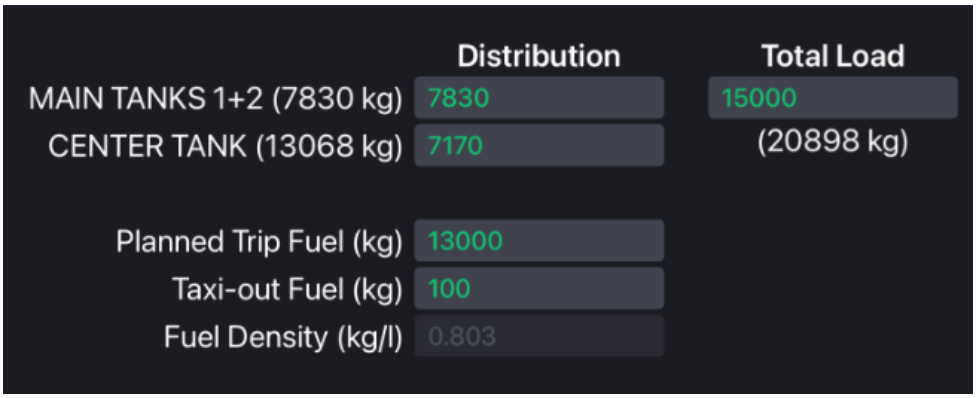
The below screenshot displays a Cargo Zone that has both Cargo and Bags. The **BAGS** entry will be multiplied by the weight per bag set by the back office administrator and the total weight of bags will be displayed under **WT of BAGS**. The **CARGO** weight excluding the bag weight can also be entered for each zone. **Total WT** includes both the weight of bags and cargo for each zone. The total weight cannot exceed the **Max. Cargo Weight per Zone** which is displayed in parenthesis () for each zone. On the upper right hand corner the **TOTALS:** include the total number of bags added for all zones and the total weight **(WT)** which includes both the bag and cargo weight. Variations of a Cargo Zone with and without Bag can also be present depending on how it was defined by your Administrator.



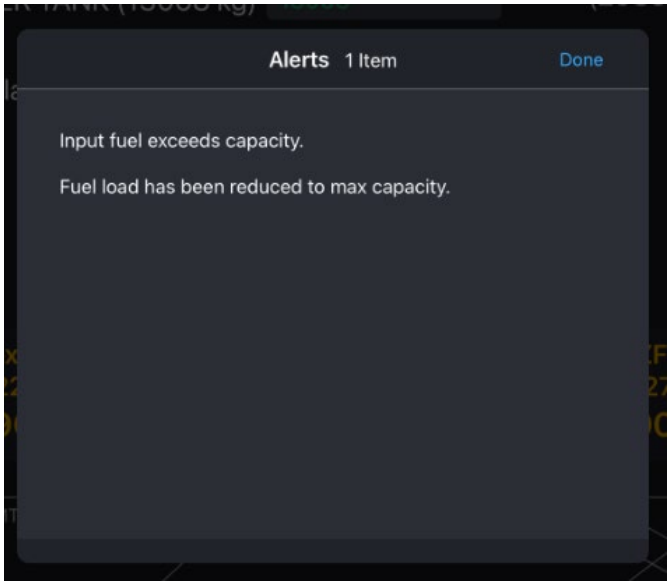
A typical FIXED input screen (sometimes also called OTHER or LMCs) might look like this:

This screen is used to account for various fixed-weight items that can be included. In this example, the allowances for an occupied Fwd Galley and Life Raft items have been included by selecting the appropriate check boxes. As shown on the top of the display, the total weight for these two adjustments is 113 kg. This screen also includes input boxes for general Last Minute Changes. For these, the user adds a description of the item, along with its weight and balance arm to account for the change.

A typical FUEL input screen might look like this:



In this case, the fuel load had been input using the **Total Load** input box. This input box is used to quickly input the total fuel and have the tanks fill via the standard fuel loading schedule. If the input fuel load exceeds the total tank capacity, then *OPT* will reduce the fuel load to match the tank capacity and alert the user that a change was made.

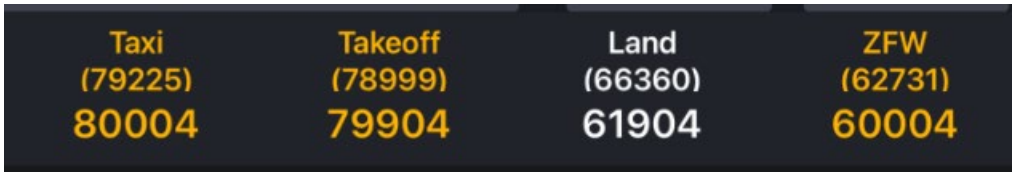


If the inputs are made by directly entering the data in the tanks entry boxes, the Main Tanks and Center tank labels turn amber if the determined distribution does not match the standard fuel loading schedule. If this is the case then the words Non-standard load appear below the Total Load input box.

Other inputs in the fuel sections are as follows:

- Taxi-out Fuel – used to compute the takeoff weight, given the current zero fuel weight and total fuel load.
- Planned Trip Fuel – used to compute the landing weight, given the current zero fuel weight, total fuel load, and taxi-out fuel.
- Fuel Density – used to check the input fuel weight against allowable capacity.

In the center of the screen, there is summary information displayed to constantly inform the user of the status of the various limit weights.



In each case, the number shown in parentheses is the structural limit weight and the number shown in the larger font is the current weight based on the inputs above. If, at any time the input weight exceeds the structural limit or the input weight's c.g. position is outside of the allowable grid shown at the bottom of the screen, the text for that weight will turn amber as shown above for the taxi, takeoff and zero fuel weight cases if using active curtailments. If using a curtailed CG envelope only the parameter outside of the CG envelope will turn amber. In this example, the planned Taxi and Takeoff weights exceed the structural limit. Note than until all of the text above is shown in white, the user is unable to leave the W&B screen.

OPT also plots the current W&B situation at the bottom of the screen to enable the user to get a quick assessment of the W&B. The four main weights are shown on this plot; OEW (Operating Empty Weight), ZFW (Zero Fuel Weight), LW (Landing Weight), and TOW (Takeoff Weight). The different weights are colored in coordination with their c.g. envelopes.

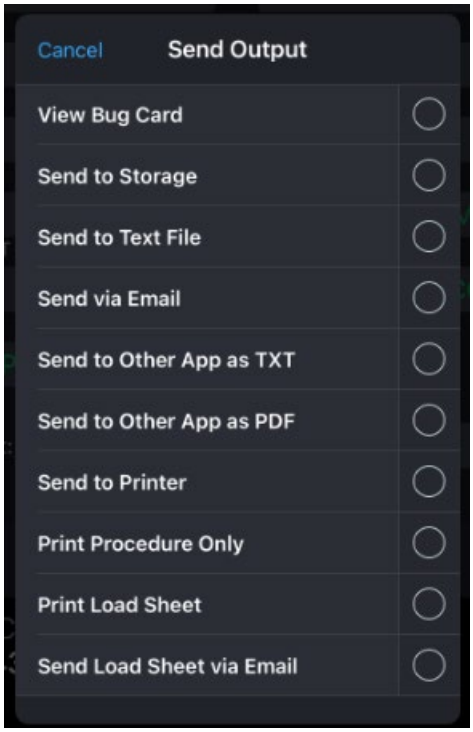
There are two buttons at the top of the screen that are also important. They are:

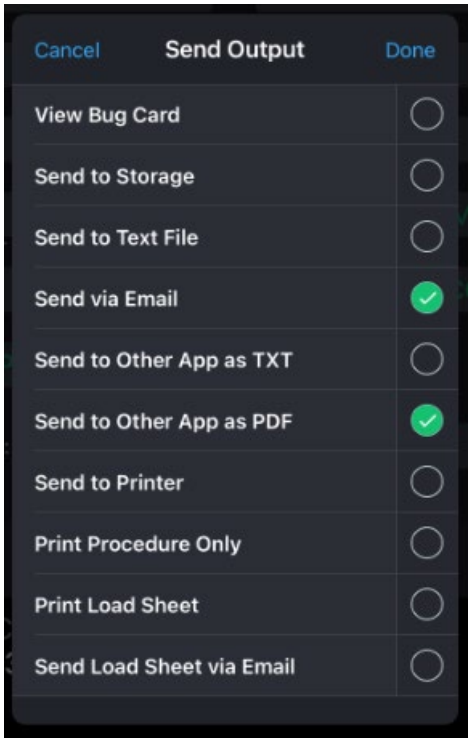
- **Cancel** – used to discard any changes that were made and return the user to the previous screen.
- **Reset WB** – used to reset all inputs to blank or off. Does not return the user to the previous screen.

When all of the desired changes/inputs have been made and all of the weights in the center of the screen have turned white, then you may return to the Takeoff or Landing screen of your choice and save the data by selecting the appropriate tab bar button.

Printing and Storing Results

The **Send Output** option on the tool bar, if available, allows the user to send the currently displayed output to different locations, such as a printer or a file storage location. This button becomes enabled only when there is output currently displayed. The actual format of the output that is printed is dependent on how your administrator has set it up. Selecting the **Send Output** will display the dialog box shown below with customized options (or similar).

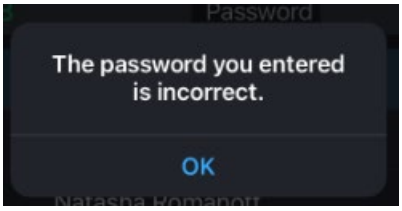




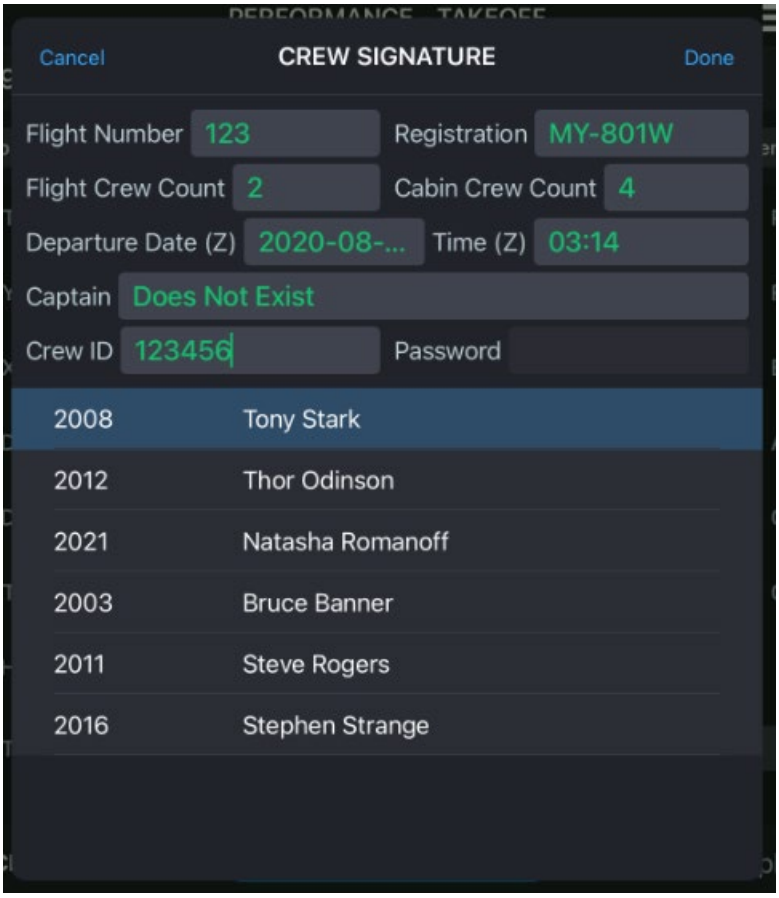
Making a selection from one of the available menu items will complete that action and return the user to the previous screen. As it can be seen above, multiple selections can be made to send the output.

If the Administrator selected the option for the crew to authenticate the output report using the Crew Signature, a popup screen prompting the user to input flight related parameters, selecting their Crew ID & Name and to input a password is shown as follows:

The above screen is shown for any of the following output options: "Send to Text File", "Send via Email", "Send to Printer" or "Print Load Sheet". If the crew selects a name from the list, the password field becomes enabled. The password entered by the flight crew must match the one in the crew data file and the **Done** button will activate and OPT will complete the action and return the user to the previous screen. If the password entered, does not match the password in the crew data file, an error message is shown.



If the crew does not remember their password, or a different user not listed wants to fill-in the information, they can enter a Captain Name & Crew ID and the password field will not become enabled. The user will be able to select **Done** and continue sending the report.



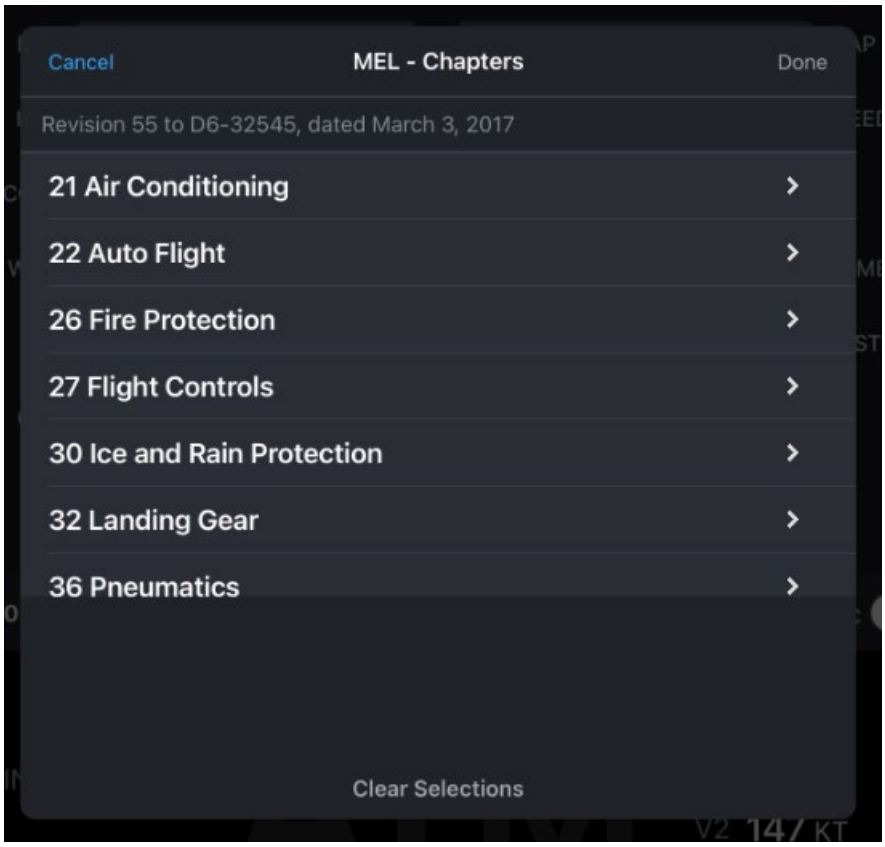
The report will show the words: "Signed by ***Does Not Exist*** (NOT AUTHENTICATED) ***123456*** at 03:14 on 2020-08-12". Where ***Does Not Exist*** was the name provided by the Captain and ***123456*** was the Crew ID specified.

If the Crew ID list is very long, the user can type their Captain Name and Crew ID and if an exact match is found the password field will become enabled. After the report is created the send action will be completed and return the user to the previous screen.

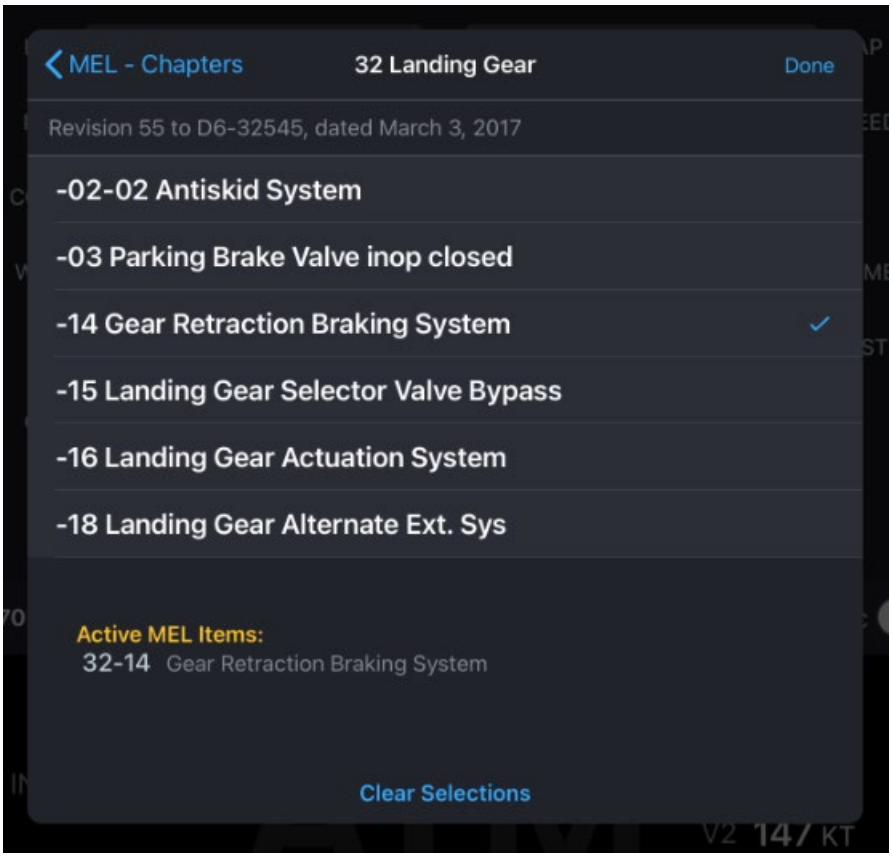
Making MEL and CDL Adjustments

OPT has the capability to make nearly all of the performance-related MEL and CDL adjustments. This capability is accessed using the **MEL** and **CDL** buttons on the tool bar. The functionality for both of these corrections is the same. The example discussed here will pertain to a sample MEL condition.

Selecting the **MEL** button will display the screen shown below which displays the chapter list for the MEL.



Selecting any of the chapters above will then display the list of available MEL items in that chapter, such as shown in this example:



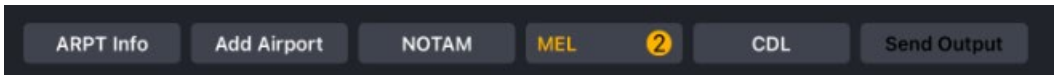
There are several features shown. Note that there is a check mark to the right of any currently selected item. There is also a list at the bottom of the screen to summarize all selected items. To return back to the chapter list, one would select **<MEL - Chapters**.

In addition, the remaining functions are as follows:

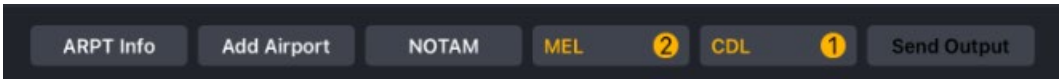
- **Done** – becomes active when changes have been made. Selecting **Done** will save the changes and return the user to the previous screen.
- **CANCEL** – will discard any changes made and return the user to the previous screen.
- **Clear Selections** – will clear all selected MEL items, but will not return the user to the previous screen.

If, when leaving the MEL screen, there are still active items, there will be an amber circled annunciation displayed in the **MEL** button with the MEL counts as shown below. This

amber annunciation is displayed any time there are active MEL items. An example is shown below.



Similarly, an annunciation is displayed any time there are active CDL items. An example is shown below with both MEL and CDL items.



Chapter Seven

How to Use the Onboard Performance Tool for Windows 10

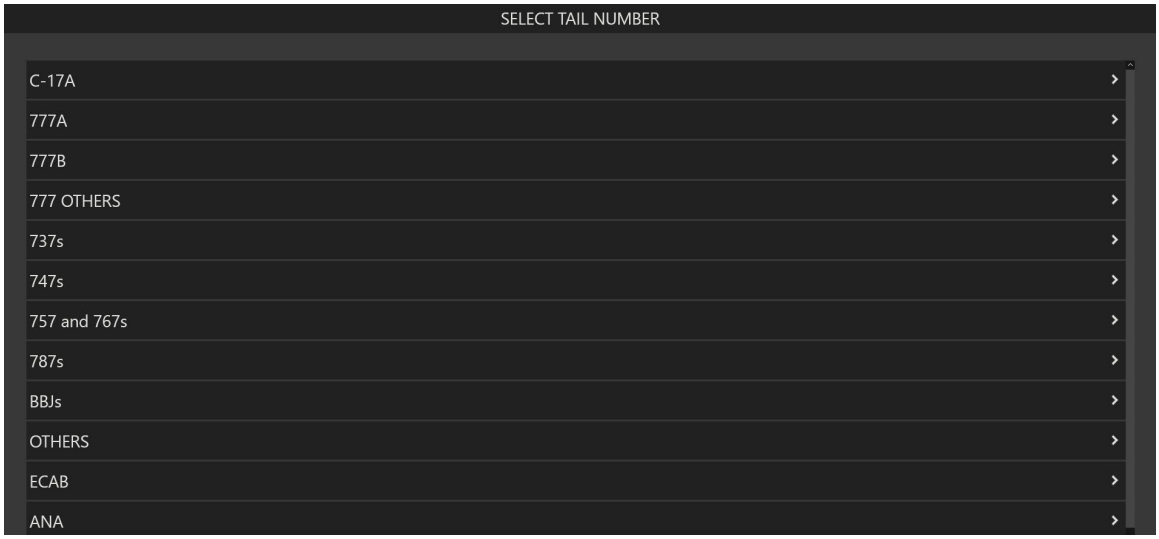
What it's for

The Onboard Performance Tool application is intended to be an easy-to-use interface that produces airplane performance related data for the flight crew. It is a Windows 10®-based application and makes use of an intuitive user interface. It is assumed that prior to using the Onboard Performance Tool, the administrator has set up and transmitted the airplane, airport, and DDG databases for the OPT user and the *OPT* users are sufficiently knowledgeable about the Windows 10® operating system and typical user interfaces to accomplish the tasks.

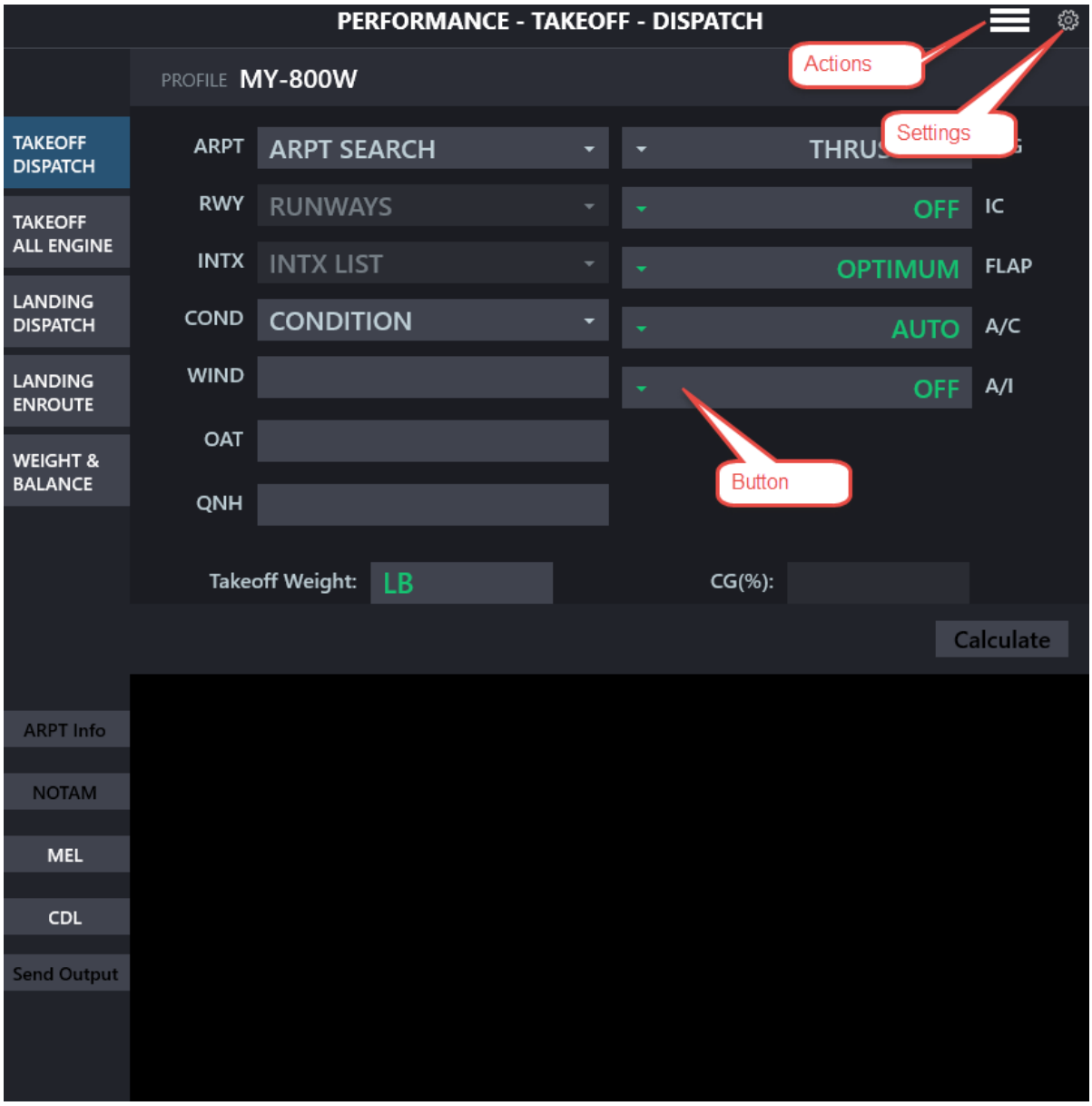
Because *OPT* is a very easily customizable application, your administrator may have created an appearance that differs in several ways from the examples shown in this chapter. Questions about these differences should be directed to your company administrator.

Using the Onboard Performance Tool for Takeoff – Windows 10

Depending on how your administrator has set up the application, *OPT* may or may not display an airplane selection menu when the application is launched. If your *OPT* installation has more than one airplane tail or type loaded, then you will be presented with a list of tails, or airplanes, to choose from. This list might look like that shown below.

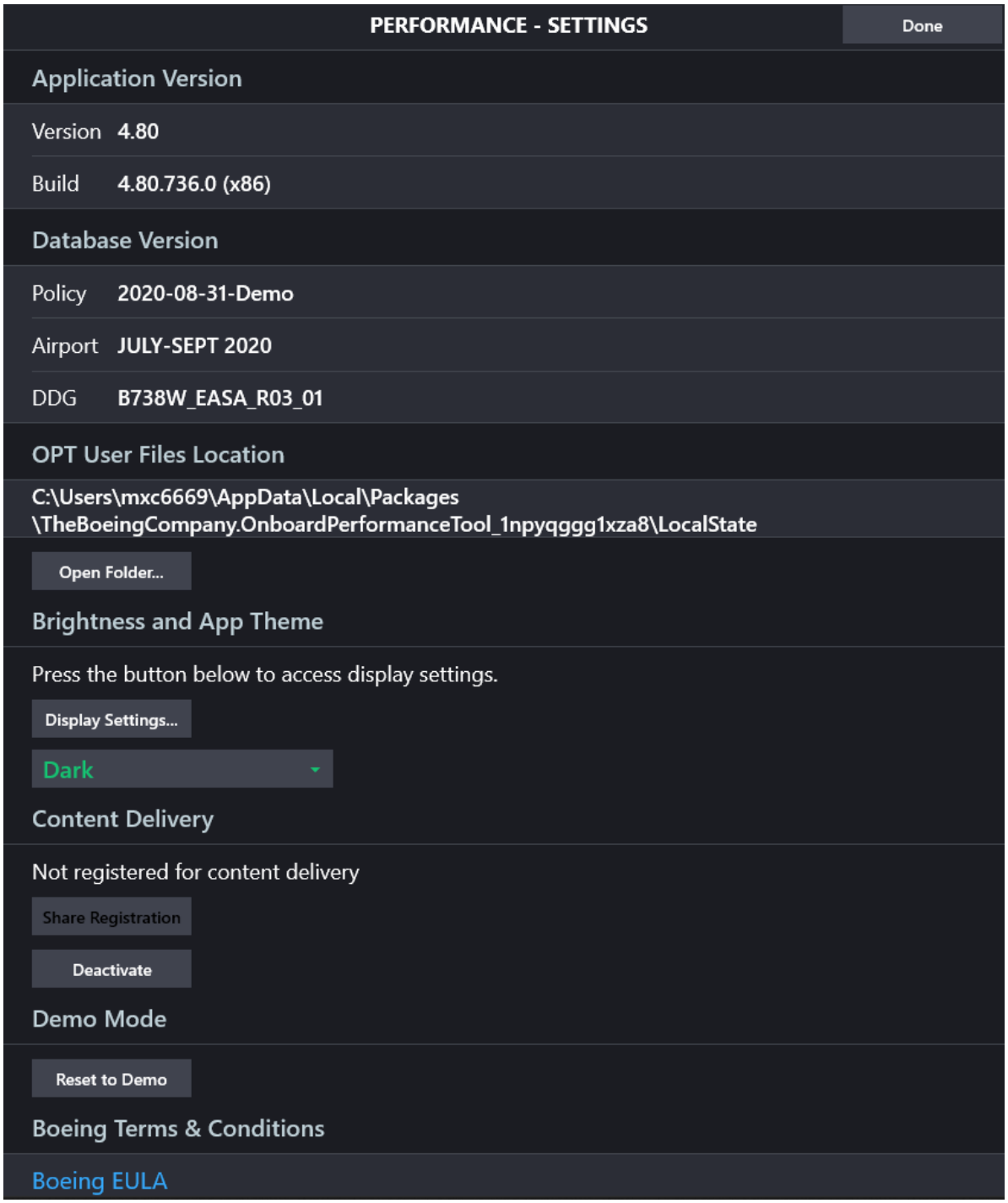


Selecting the appropriate tail number or airplane description will load the appropriate databases and start *OPT*. Once the loading process is complete, the main screen for takeoff appears, entitled at the top of the page PERFORMANCE - TAKEOFF.



This screen may be used to illustrate four different features; the Settings menu, the Actions menu, the buttons, and Menu Bar. In the screen above, the airport search button, **ARPT SEARCH**, is an example of a button.

When the Settings icon is selected, the following screen is displayed:

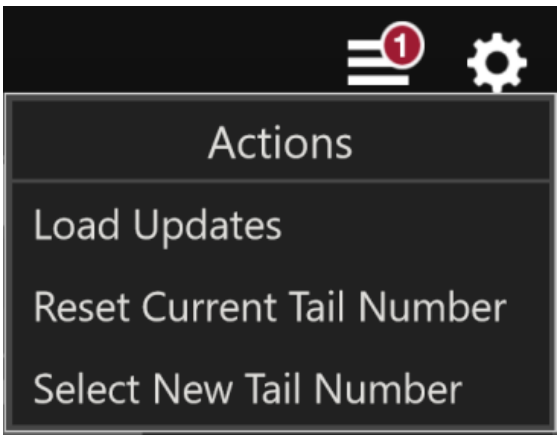


This menu allows the user to view the current software and database versions. There are also buttons to:

- Open the OPT User Files. This allows the user to update database files or retrieve output files from the OPT directory structure.

- Bring up the tablet's Display Settings screen to adjust the brightness level of the tablet. There is a Dark, Light or System Default theme to determine the color of the application. Light theme is used under bright conditions to be able to read the inputs/outputs.
- Deactivate or Share registration information for content delivery purposes
- Reset the application to Demo mode
- Display the End User License Agreement Terms and Conditions.

To the left of the Settings menu is the Action menu. This menu, shown below, allows the user to load updates that have been staged to the cloud by the administrator, reset the inputs for the currently selected tail number, or select a new tail number.



The Menu Bar at the left side of the Windows 10 screen is used to switch between the main *OPT* functions – Takeoff-Dispatch, Takeoff-All Engine (if applicable), Landing-Dispatch, Landing-Enroute, and Weight & Balance (if applicable). Selecting any of the functions shown on the Menu Bar will switch to the appropriate OPT screen and change the background color of that button to blue to denote the active screen.

Further down the Menu Bar, one finds the buttons used to display various context sensitive actions that are dependent upon which screen is currently being displayed. Selecting any of the items, when active, will display a new screen to make further selections or input. In this area, items which have a name that has been "grayed-out" are inactive and not available for selection.

Other buttons on the screen have a name to describe its function. When selected, the application will display a menu to make a selection from. For instance, the THRUST RTG button will display a menu similar to this when selected:

Simply selecting any of the items will enable that menu option, while touching somewhere off the menu will cause the menu to close with no change made to the current selection.

The main crew screen, for the most part, is set up in three basic functional areas. These areas are divided by group boxes. In portrait mode, the upper left portion is devoted mainly to crew input of airport and atmospheric information, the upper right portion is devoted to crew input of airplane configuration information, while the lower portion is devoted to output and results. Some buttons and/or input boxes may not be available on your screen, depending on the airplane model and other options controlled by the administrator.

Runway/Atmospheric Inputs

As noted above, the crew input is mainly divided up into airport/atmospheric inputs and airplane configuration inputs. The airport/atmospheric inputs would typically vary little between different *OPT* installations and consists of a minimum of the airport search button, the runway search button, and edit boxes for wind, OAT, and altimeter setting (QNH). In addition, there is an optional button to make selections for intersection calculations. Note that the tail number or configuration is also generally listed in the upper left corner of this area.

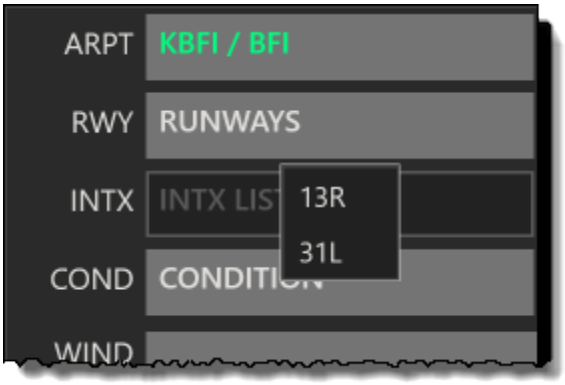
Airport Search

Selecting the ARPT popover button will display the airport search popover menu. This popover is enhanced to allow the user to either select the airport from the scrollable menu or to start typing in the airport code or name to narrow the selection down. If the user continues to type until *OPT* has made a unique match, it will automatically select that airport and close the menu.

Selecting a new airport for the takeoff screen will also affect data that is displayed on the takeoff screen by clearing the wind, OAT, QNH, and Weight & Balance information; the assumption being that calculations for a new flight are about to begin.

Selecting the Runway

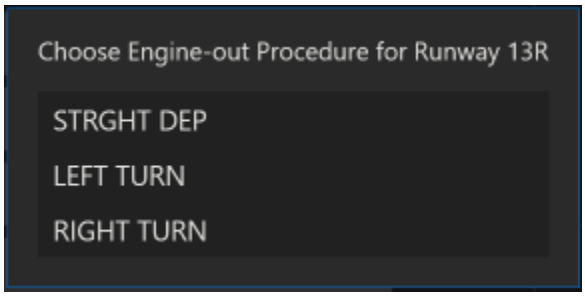
Once the airport has been selected, selecting the **RWY** button will display a dropdown button selection that might look like that shown below:



Selecting any of the available runways will load that runway for use, change the button name to the (green) runway ID, and check for existing departure and intersection information in the airport database.

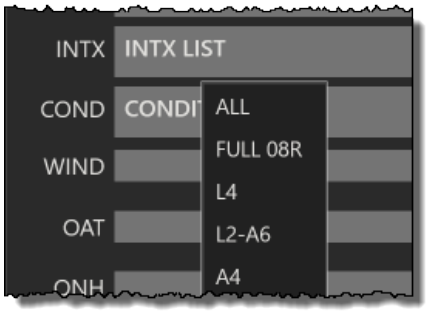
Selecting Departure Procedures (if available)

If your administrator has included different departure procedures for a specific runway, a new selection screen is displayed when there is a choice to be made. This screen looks like this:



Selecting Intersections (if available)

If your administrator has included intersection data in your airport database and, if there is intersection data available for the selected runway, the INTX button will become active. A typical selection is shown below.

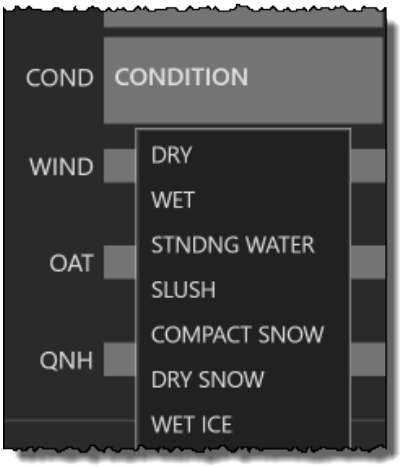


Selecting "ALL" by selecting the **ALL** button will calculate takeoff information for the full length runway (08R) and each of the available intersections. Selecting any single entry will limit the calculation to just that entry, such as intersection L4.

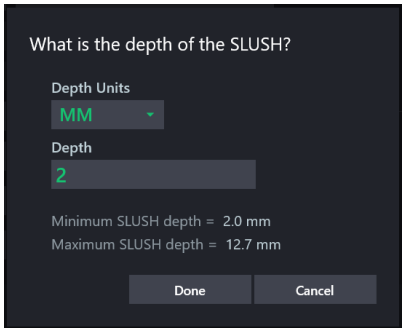
If your administrator has excluded the **ALL** selection, **ALL** will not be shown as an available selection and only individual calculations are available.

Selecting Runway Condition

Selecting the CONDITION button will display the list of runway conditions that your administrator has set up. A typical selection might look like this:



In this example, the possible choices are for dry, wet, and selected contaminated runway conditions. If the user selects STANDING WATER, *OPT* will then display a window to ask how deep the standing water is.



Entering Wind

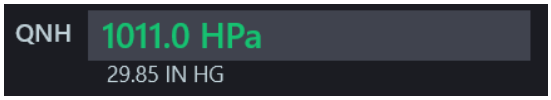
Wind inputs may be made in either wind component or direction and magnitude into the **WIND** edit box. Depending on how your installation of *OPT* is set up, you may also see the head/tail and crosswind components displayed under the wind input box as shown below. If the wind is input in wind component, headwinds are considered to be positive and tailwinds negative. The correct format for wind in the direction/magnitude format is just that, direction/magnitude, e.g. 040/20 would be a 20 knot wind coming from a magnetic heading of 40 degrees. The wind component is then resolved by comparing this information with the runway heading. After the cursor has left the input box, units are appended to the user's input to show how *OPT* has interpreted the input. If only inputting the headwind or tailwind magnitude, one may change the input units by adding, for instance, an "M" (for meters) to the input component, such as -5M. This would then be interpreted as a 5 m/s tailwind. An input of 5K would be interpreted as a 5 kt headwind. Additionally, a headwind or tailwind may be denoted in the entry by appending an "H" or a "T" to the wind magnitude, such as 5T for a 5 kt tailwind.

Entering OAT

OAT is entered into the **OAT** edit box. Again, depending on your installation, the alternate unit (C or F) may be shown under your input. If the user desires to input temperature in units not expected by *OPT*, simply place a 'C' or 'F' after the temperature (e.g. 59F) and *OPT* will make the correct conversion. Similar to the wind input, after the cursor leaves the edit box, the units that are assumed are displayed in the edit box as shown below and the alternate units are shown below the edit box.

Entering QNH

QNH, or pressure variation, may also be input in two different units, namely HPa (mb), or inches of Mercury (Hg). *OPT* will check the magnitude of this input and convert accordingly. Any inputs greater than 100 will be interpreted as HPa, while anything less will be interpreted as inches Hg. Depending on your installation, the converted values may displayed under your input.



Airplane Configuration Inputs

Once the airport, runway, and atmospheric inputs are made, the crew may specify the required airplane configuration items. When there are selectable derates available, the *OPT* user interface (UI) will include a rating dropdown button. If it is allowed by the administrator, this list may also include **Optimum** and **Windshear** selections. These selections will compute the best combination of fixed derate plus assumed temperature for maximum derate or special windshear guidance information respectively.

Other common airplane configuration and policy inputs are made through several other available dropdown buttons. Depending on your airplane type, these buttons might include:

- Flaps
- Air conditioning
- Anti-ice
- APU
- V1 policy
- Improved climb policy
- Reverse thrust availability
- Alternate forward c.g. limit

If selected by the administrator, the flap selection pull down menu may include an **Optimum** selection. If this option is chosen, the software will find the optimum takeoff flap position using only the flap positions shown in the allowable list set up by the administrator. If optimum is the only setting allowed, the Onboard Performance Tool will choose between all of the certified flap positions for that airplane. In some cases, when a departure procedure is selected that is valid for only a specific flap(s), the flap selection list will only contain that flap position(s).

If selected by the administrator, the flap selection pull down menu may include a **Preferred** selection. If this option is chosen, the software will attempt to use a single, preferred flap position specified by the administrator. If the performance available is not sufficient, OPT will revert to using Optimum flaps for its calculation.

Miscellaneous Inputs

Takeoff Weight and CG

In the **Takeoff Weight** edit box, the crew should enter the actual, or planned weight for the flight. The weight may be entered in either ones or thousands (102500 or 102.5). After this is done, and the **Calculate** button becomes active and is selected, *OPT* will then calculate both max thrust and assumed temperature information based on this weight. If the weight that is input exceeds the performance limited maximum takeoff weight, *OPT* will display an error message during the calculation process to alert the user and display the maximum weight. When returning from the Weight & Balance screen, this field will be automatically populated with the takeoff weight from that page.

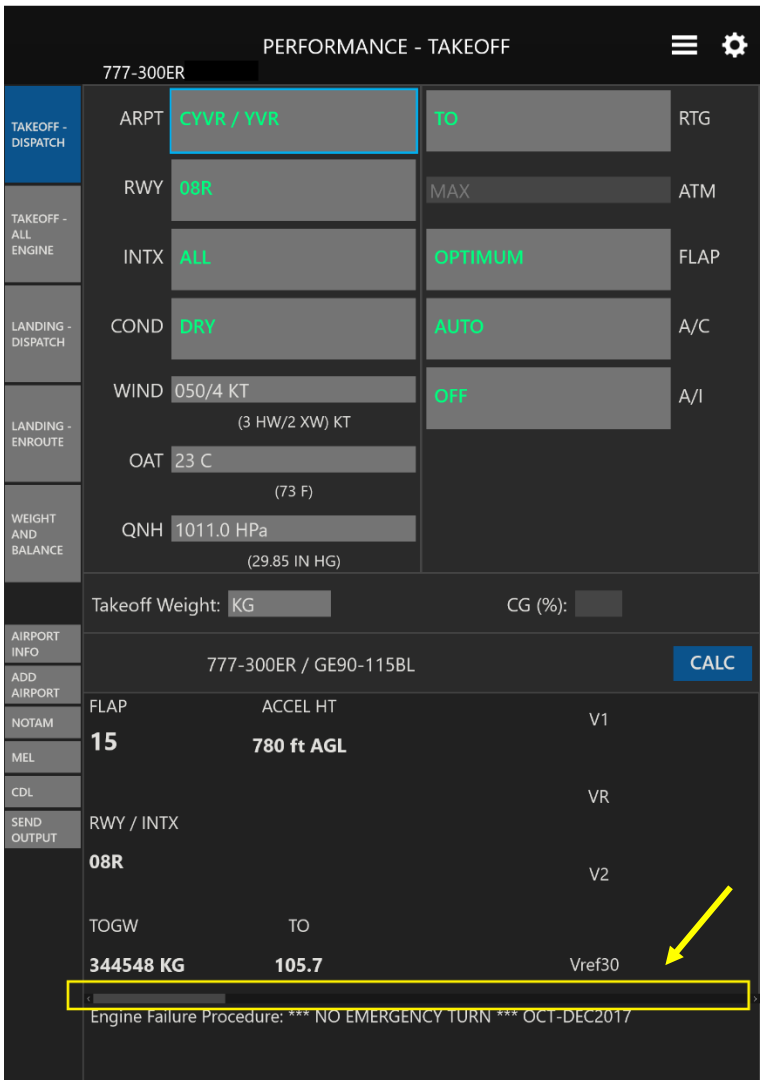
If available, once the takeoff weight has been input, the **CG** edit box becomes active and is available for input. This input is used only for the calculation of stab trim and does not affect takeoff performance. Like the Takeoff Weight input, this field will automatically be populated when returning from the Weight and Balance screen.

Assumed Temp

The **ATM** edit box also becomes active when a value is entered into the **Takeoff Weight** box. For this input, any number entered that is less than or equal to zero will be treated as a decrement from the maximum possible assumed temperature that the Onboard Performance Tool calculates. For a maximum assumed temperature calculation the user may input either a zero or "MAX". Any number greater than zero will be considered to be a user desired assumed temperature. If the user-input temperature is greater than the maximum allowable, an error message will be displayed to alert the user. The user should then either input a new assumed temperature or let the Onboard Performance Tool calculate the maximum assumed temperature as described above.

Calculating Takeoff - Dispatch Performance

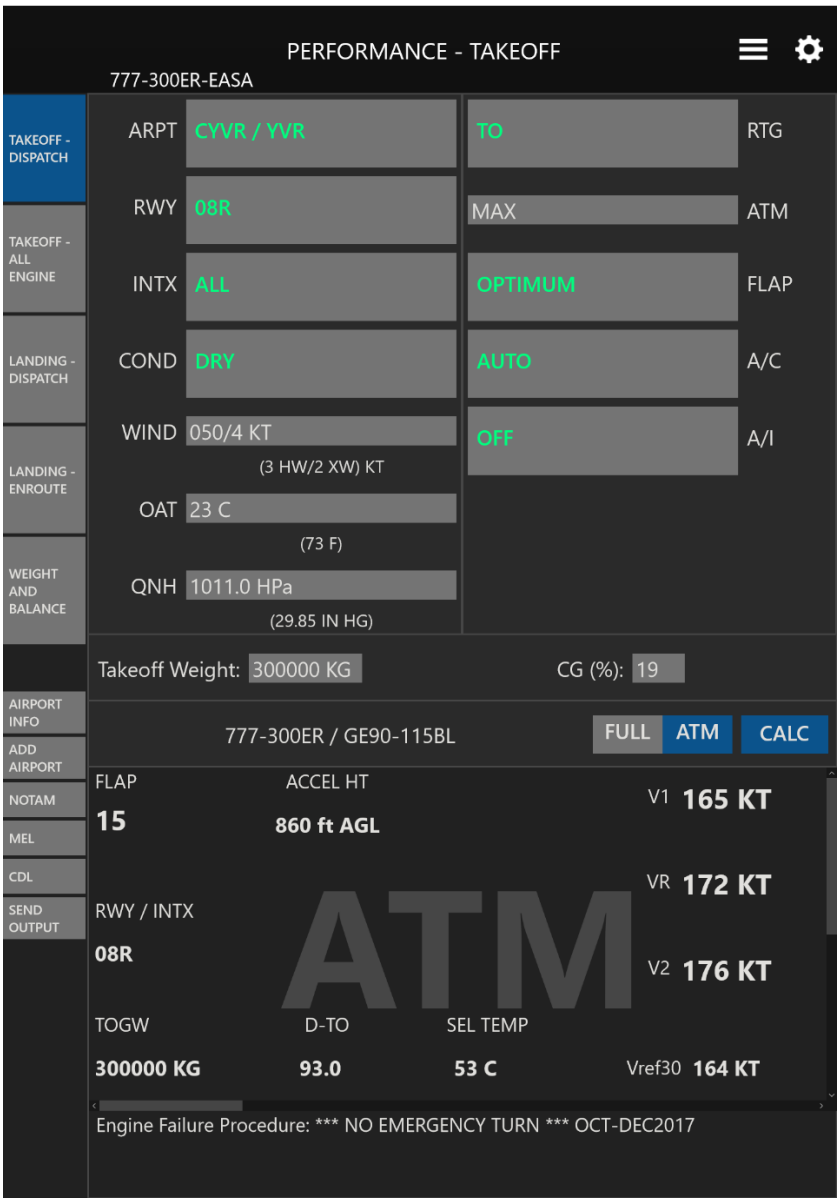
Once all of the required inputs are made and the **CALC** button becomes active (blue), the user may perform a calculation by selecting this button. If the takeoff weight has not been input, then *OPT* will calculate the maximum takeoff weight for each of the runways/intersections selected. In the example shown below, there are different sets of results returned. Those are denoted by the scroll bar below the output which is outlined in the example below. In the Windows 10 environment, this means that the user should "swipe" across the output area of the screen with their finger to scroll across and reveal more pages. The current runway/intersection being viewed is displayed on the left side of the output.



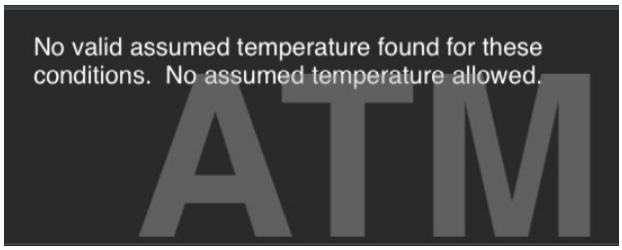
For this example, the results shown are for the full length runway 08R, the optimum flap position (for max weight) is flaps 15, and full rated (TO) thrust was used.

If the planned takeoff weight has been entered in the **Takeoff Weight** edit box, then *OPT* will calculate all required parameters for both the maximum takeoff thrust and best

assumed temperature cases. The example shown below includes several interesting features.

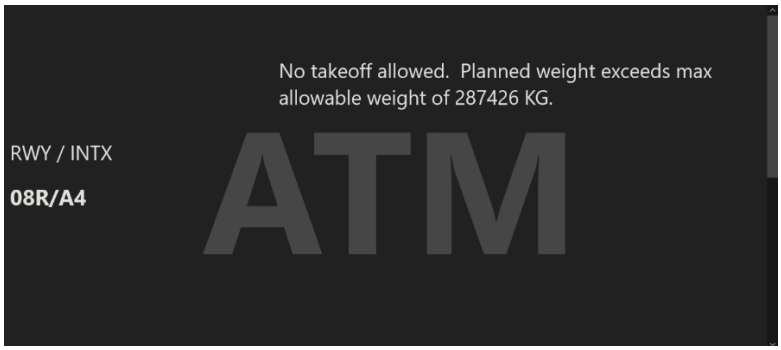


The first, most noticeable feature, is the "ATM" watermark behind the output. This enables the user to quickly recognize which mode is being viewed. To switch to the full thrust view, simply tap the FULL/ATM button just above the output section. In this example, a planned takeoff weight of 300000 KG has been entered. When the results became available after the calculation was done, they showed that an assumed temperature of 53 degrees C was available if using the full length of the runway. When viewing the results from the different intersections, however, if a point is reached where there is no more assumed temperature capability to use because the results for that intersection were too close to the performance limit of the airplane that is shown with the following message:



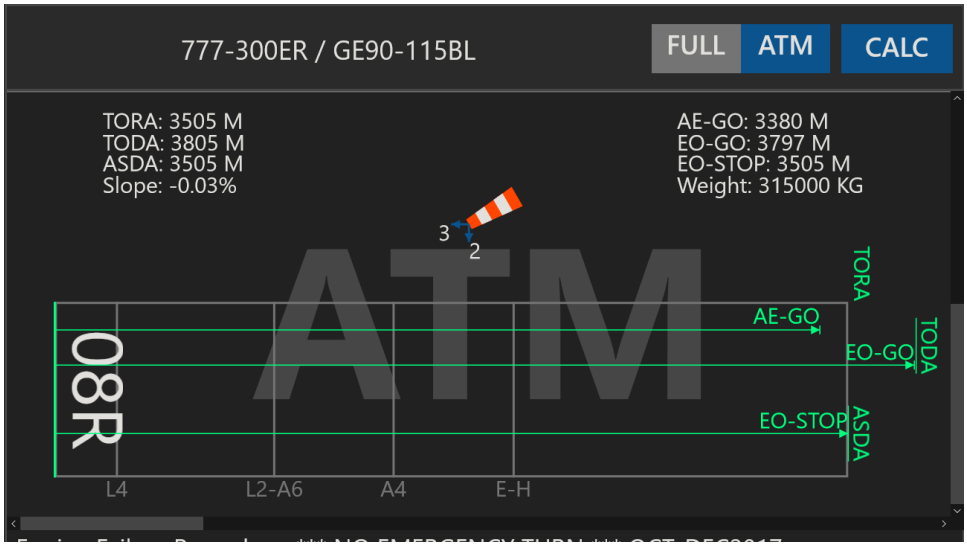
When results are initially displayed, *OPT* will display the ATM results for the first runway/intersection listed. In the example above, the ATM results for runway 08R are shown.

By swiping across the output area, one may display the results for the next runway, in either the ATM mode or the full thrust mode, as currently selected. In this example, because there are no valid results, *OPT* will return the appropriate error message to further describe why there is no ATM available or no takeoff allowed. For instance, if the 08R/A4 output is selected, the following error message is displayed:



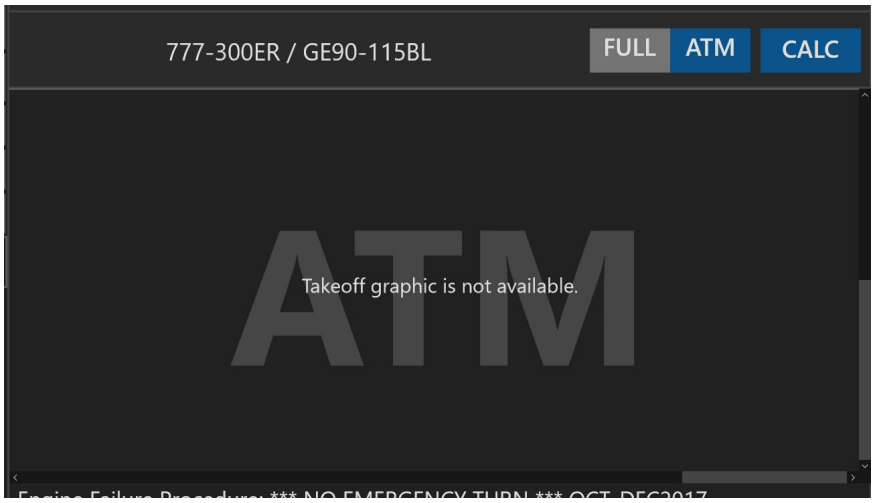
Note that this error message also displays the maximum weight which allowed to help with a quick assessment of the problem.

While in the takeoff results, if the user "swipes" up, a takeoff graph of the runway lengths required are displayed as shown below:

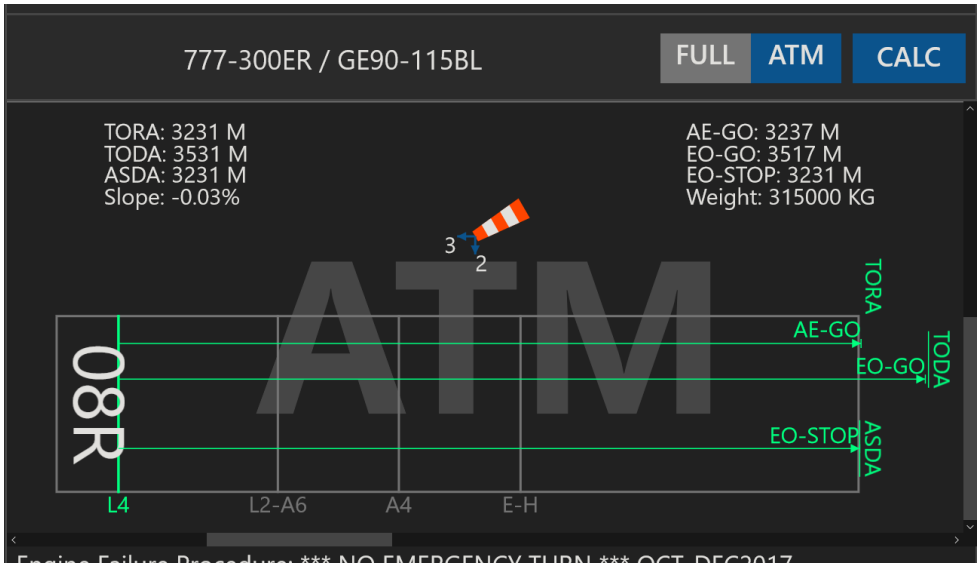


The "FULL/ATM" button when selected in blue lets the user know which results are being viewed. The starting point of the runway (08R) is shown in a vertical green line. The all-engine go, engine-out go and engine-out stop distances are shown in green. In the above results, the assumed temperature runway results are being displayed. The presence of the scroll bar below the output, indicates that the user should "swipe" across the screen with their finger to scroll and reveal more pages in the graphical view. The presence of the scroll bar to the right of the output, indicates that the user should "swipe" down the screen with their finger to scroll and reveal the output parameters. The windsock, shown in orange and white, display the direction and strength of the wind. In the above, we have a 3 knot headwind with a 2 knot crosswind.

When there are no valid results in either full or ATM in the graphical view, *OPT* will return the following error message:

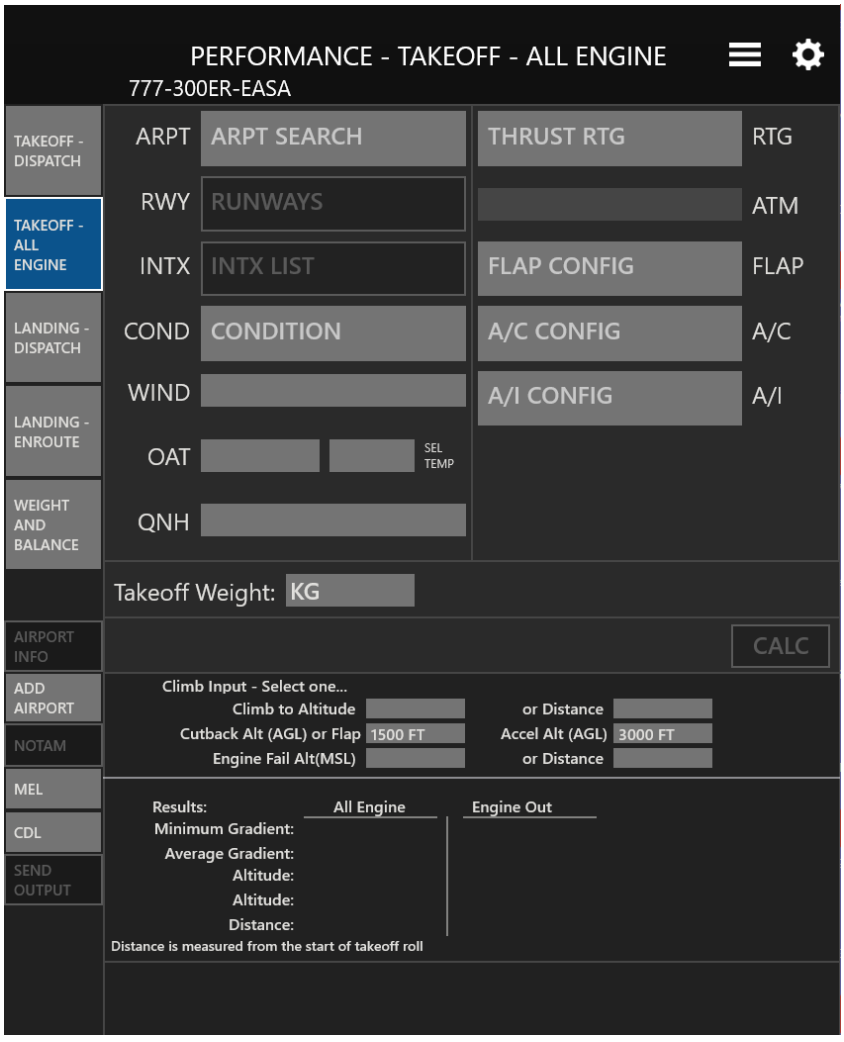


The example below shows the graphical view of an intersection takeoff, RWY 08R/L4. Again swiping down the screen will take the user to the numerical results.



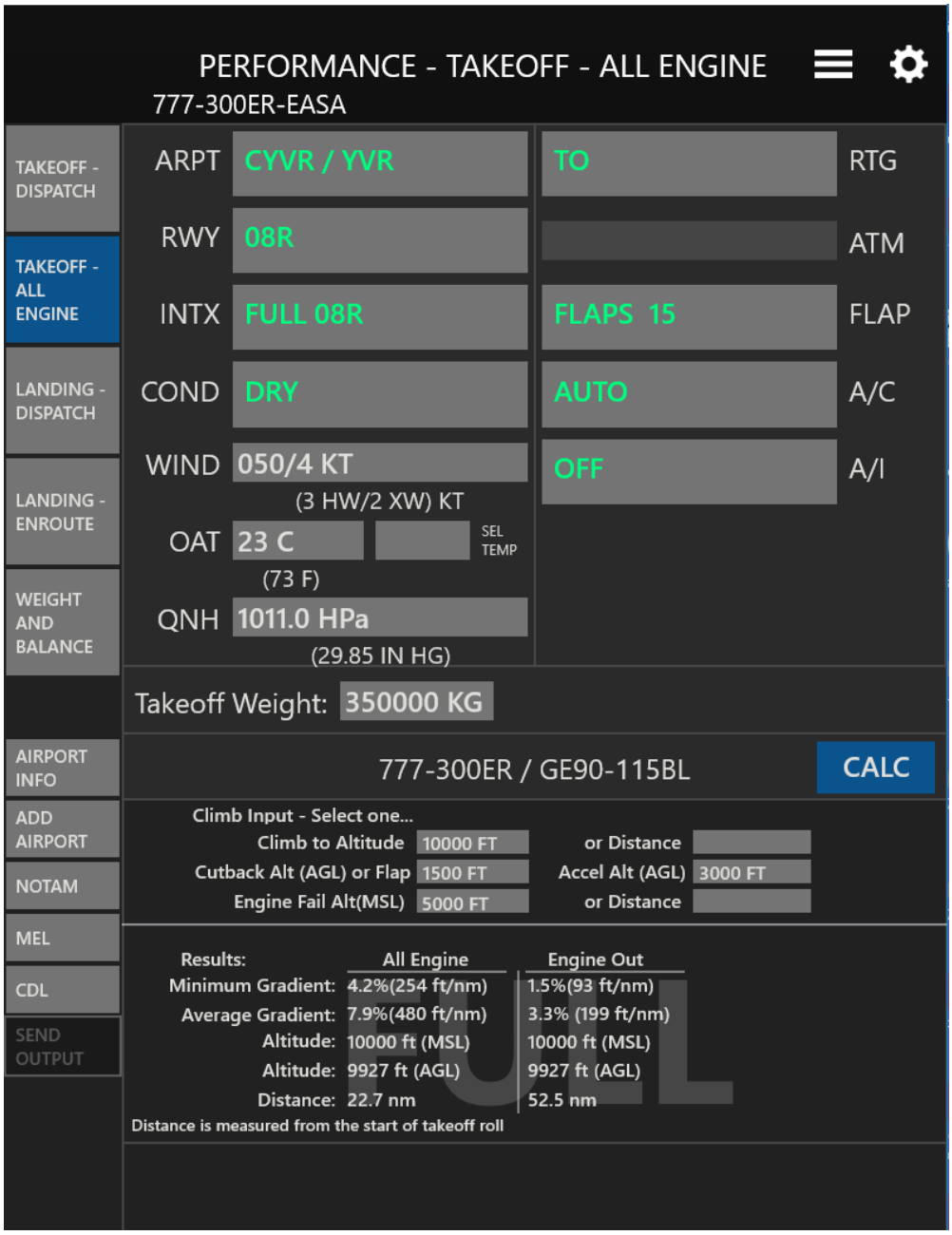
Using the Onboard Performance Tool *for* Takeoff - All Engine Gradient Checks

OPT will display two screens to calculate takeoff performance, Dispatch & All Engine. All Engine is only available if it has been activated by the Administrator. It is presented by using the **TAKEOFF – ALL ENGINE** button on the menu bar at the left. To display the **TAKEOFF-ALL ENGINE** page, which calculates all-engine climb capability following takeoff that includes distance-to-height or height-at-distance calculations the All Engine button is selected, and a screen similar to that shown below appears. The actual buttons and selections available are a subset of those defined for the Takeoff screen by your administrator. The Engine Fail Altitude or Distance inputs are a new option activated by your administrator.



If the user goes immediately to the all engine screen on startup no selections are chosen as shown in the figure above. The user can select/enter inputs to perform calculations.

However, we recommend that the user first performs a **TAKEOFF – DISPATCH** calculation and then visit the **TAKEOFF – ALL ENGINE** page, this way all values are automatically transferred from the takeoff calculation and the page might look something like that shown below.



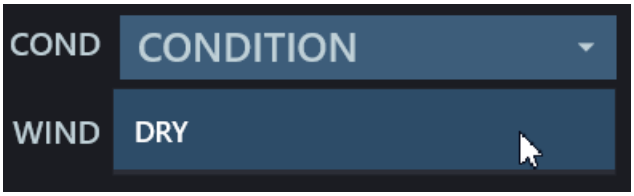
The All Engine gradient calculations also require additional inputs in the lower screen. For **Climb to Altitude (MSL) / or Distance**, the user can only enter one or the other and this specifies the end of the profile. The **Cutback Alt (AGL) or Flap** which is the thrust reduction altitude can be pre-populated by your Administrator or left blank for the crew to enter at runtime. The same applies to the **Accel Alt (AGL)** which is the All-Engine

Acceleration Altitude. The results show the watermark indicating if the calculation was an assumed temperature calculation (ATM) or a FULL thrust calculation. The Minimum Gradient is the minimum value encountered from the 35 foot point until the end of the profile. The average gradient is the delta height / delta distance from 35 foot point to the end of the profile. The Altitude Mean Sea Level (MSL) and the Altitude (AGL) which is the altitude above the airfield elevation are also reported. Lastly, the distance to the end of the profile in nautical miles is reported which is measured from the start of the takeoff roll.

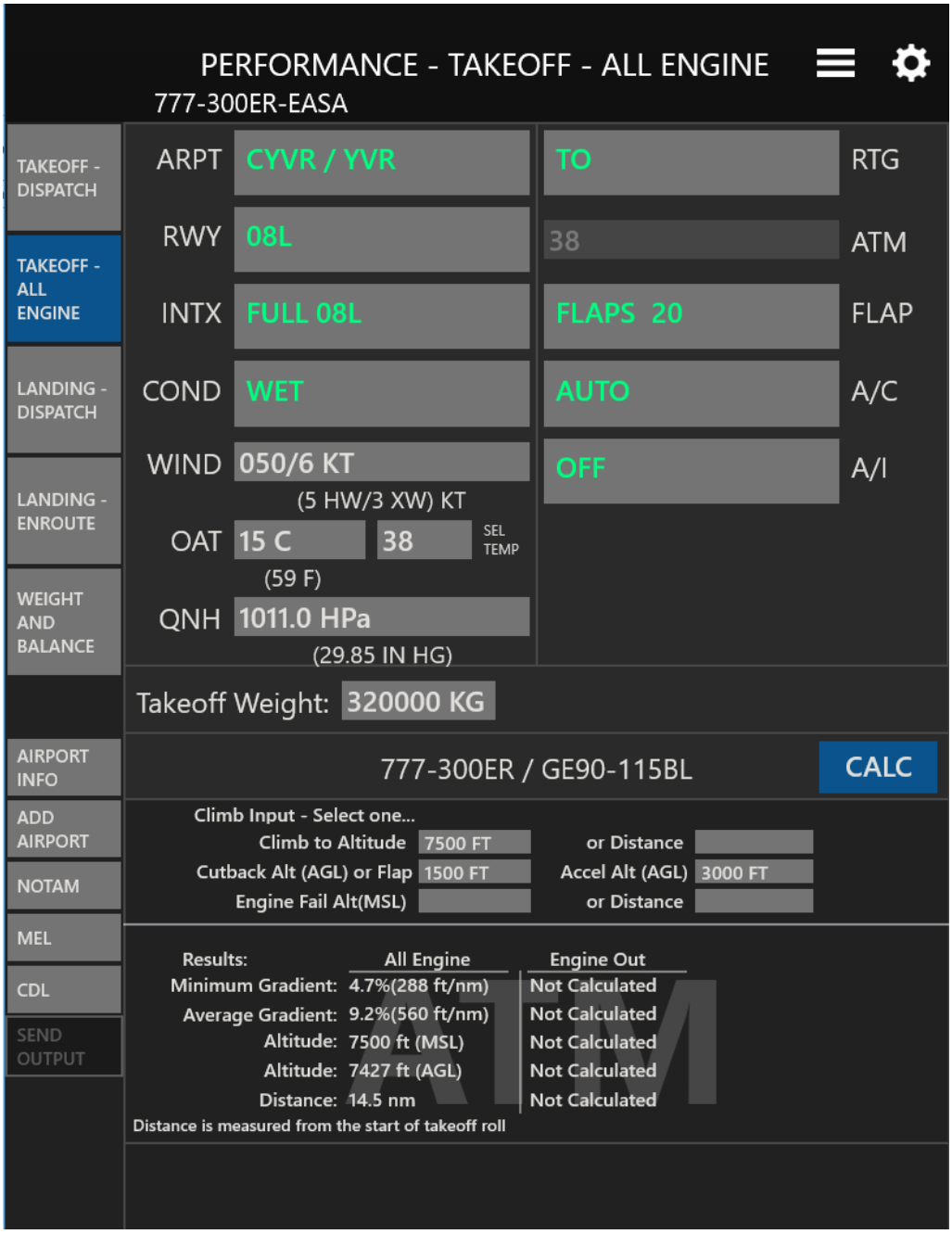
Additional information about the flight profiles. The calculations assume a straight-out departure with no accounting for the gradient loss in a turn. The profiles created to calculate the gradient requirements assume all engines operating, minimum thrust, the first takeoff segment is using an end condition of Gear Up Speed = V2 + X (i.e. 20) at whatever takeoff rating was selected, the next segment to the cutback altitude or flap is done at the same takeoff rating chosen, then accelerate to 250 knots and the final acceleration segment is at full climb thrust unless a different rating is selected via the **CLB** button (added via back office Administration). The acceleration is based on an assumption that 45% of any excess thrust is allocated to climbing the aircraft, and 55% is used to accelerate the aircraft (excess thrust is available thrust in excess of what is needed to maintain a constant altitude and constant speed). The value of X is taken from the default value that was specified in the Boeing Climbout Database (cnf file) which is typically the value specified in the Flight Crew Training Manual.

The ability to display **Engine Fail Alt (MSL) or Distance** is an optional input selected by your Administrator. Your OPT configuration might not have these inputs. If the user elects to calculate the gradient by using the input of Engine Fail Altitude or Distance, OPT starts the takeoff segment using the all engine profile and it continues the flight profile as described in the above paragraph until it encounters the engine failure altitude or distance, or finishes the thrust time limit, after this point the thrust is set to Maximum Continuous Thrust (MCT) until the end of the profile. FYI, OPT will not allow an engine failure prior to the gear up point. The main purpose of publishing the engine out gradient is to determine if the gradient requirements stipulated for the planned Standard Instrument Departure (SID) can still be met even if an engine failure occurs. This calculation is not intended to ensure obstacle clearance capabilities; the intention is to provide a simple check on meeting the SID minimum gradient requirements based on an assumed flight path. The **TAKEOFF – Dispatch** calculation ensures that one engine inoperative takeoff flight path and obstacle clearances calculations as per the regulatory requirements are met.

The ability to calculate for runway conditions other than **DRY** was added to the Takeoff All-Engine in OPT version 4.40. However, if the user starts with the **TAKEOFF – ALL ENGINE** screen, the only selectable runway condition will be **DRY** as shown below.

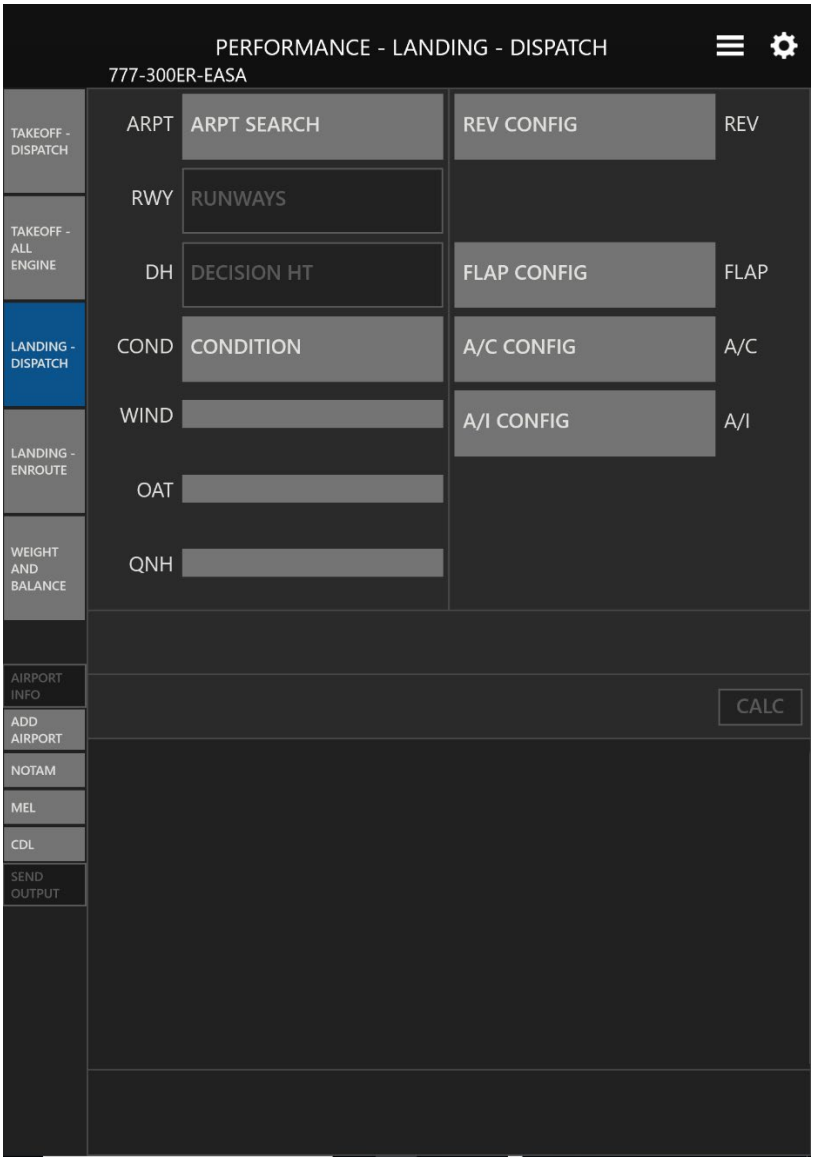


In order to be able to conduct an analysis for other runway conditions, i.e. **WET**, the user must first perform a **TAKEOFF – DISPATCH** calculation and then after the calculation is completed, select **TAKEOFF – ALL ENGINE**, this will automatically transfer all the values and the required distances to be able to compute the all engine gradients for the runway condition from the takeoff calculation. An all engine gradient calculation at a runway condition of WET is illustrated below. The engine fail altitude or distance inputs were left blank and that is why the results show "Not Calculated" for Engine Out.



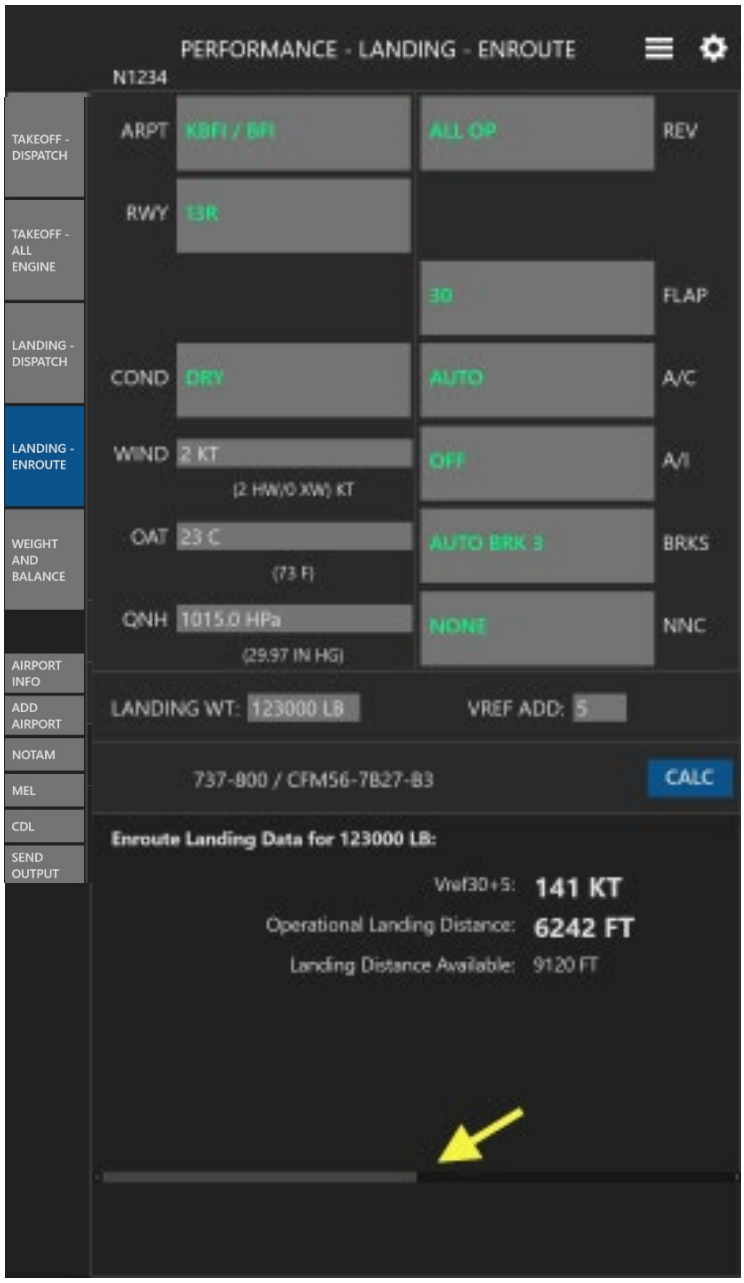
Using the Onboard Performance Tool for Landing

OPT will display two screens to calculate landing performance. This information is only available if it has been activated by the Administrator and is presented for LANDING – DISPATCH and LANDING – ENROUTE. These two very similar pages are displayed by using the **LANDING – DISPATCH** and **LANDING - ENROUTE** buttons on the menu bar at the left. When the **LANDING – DISPATCH** button is selected, a screen similar to that shown below appears. As with takeoff, the actual buttons available in the configuration section are defined by your administrator.



To display the LANDING – ENROUTE page, which would typically be used for landing distance assessment at the time of arrival, the **LANDING - ENROUTE** button is selected.

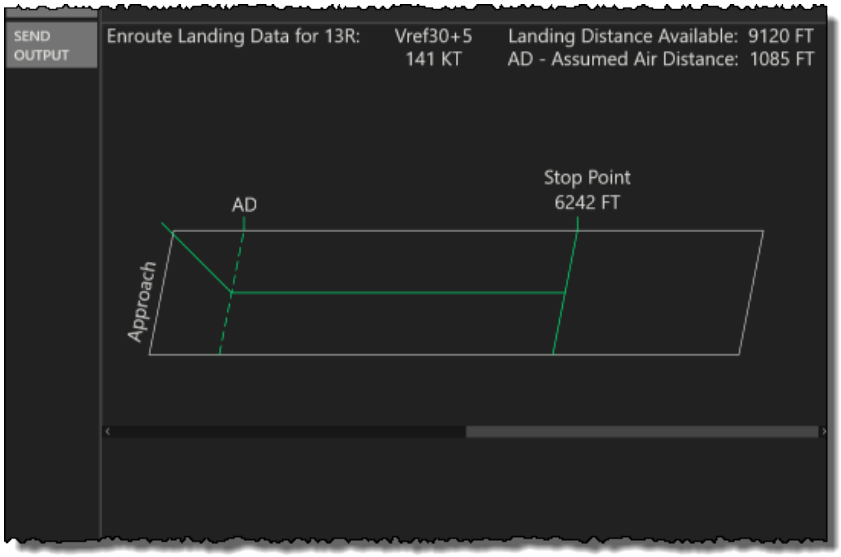
This will display two or three additional buttons to select from – the **BRAKES** and **NON-NORM** buttons. These two buttons are used to select the braking configuration for landing and any non-normal configurations that might be applicable. The third button, Thrust Reversers, can be enabled for landing enroute only if configured by your company Administrator. After making all of the inputs, the LANDING - ENROUTE information might look something like that shown below.



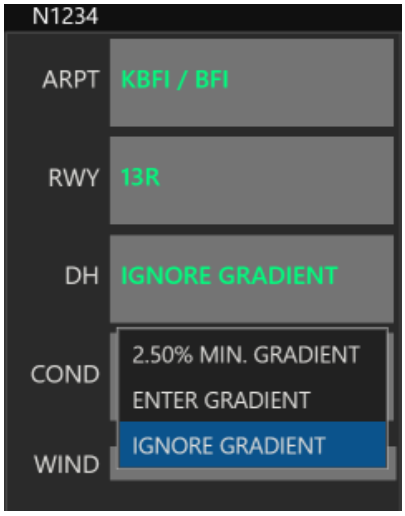
The enroute section contains the approach speed, the required landing field length and available landing field length for the input landing weight. These distances are, in general, based on the information shown in the Boeing QRH and may or may not be factored by

company policy. They may, or may not, include the effect of reverse thrust. Ensure that you know what your company's *OPT* installation is based on. In addition, some models will have brake cooling information available.

As with the takeoff output, the scroll bar shown above indicates that there is more information available by swiping one's finger across the output area. When that is done, you'll see a rendering of the landing distance indicated on a runway as shown below that can be used for situational awareness purposes.



In some cases, your company Administrator may activate an option to also calculate limit conditions for required go-around gradients. If that is the case, a button appears typically under the runway selection. This button will typically have a minimum gradient, one or more decision heights which have been equated to other gradient requirements in the back office, a selection to input a custom gradient requirement, and a selection to ignore this missed approach gradient calculation but still consider the approach and landing climb regulatory requirements. A typical screen is shown below:



When used in the Landing – Dispatch mode, the choice on this button will be included in the limit weight calculation and can, therefore, limit the landing weight. In the Landing – Enroute mode, this button will cause the go-around calculation to take place and *OPT* will alert the crew if the input weight is too high to achieve the requested go-around performance.

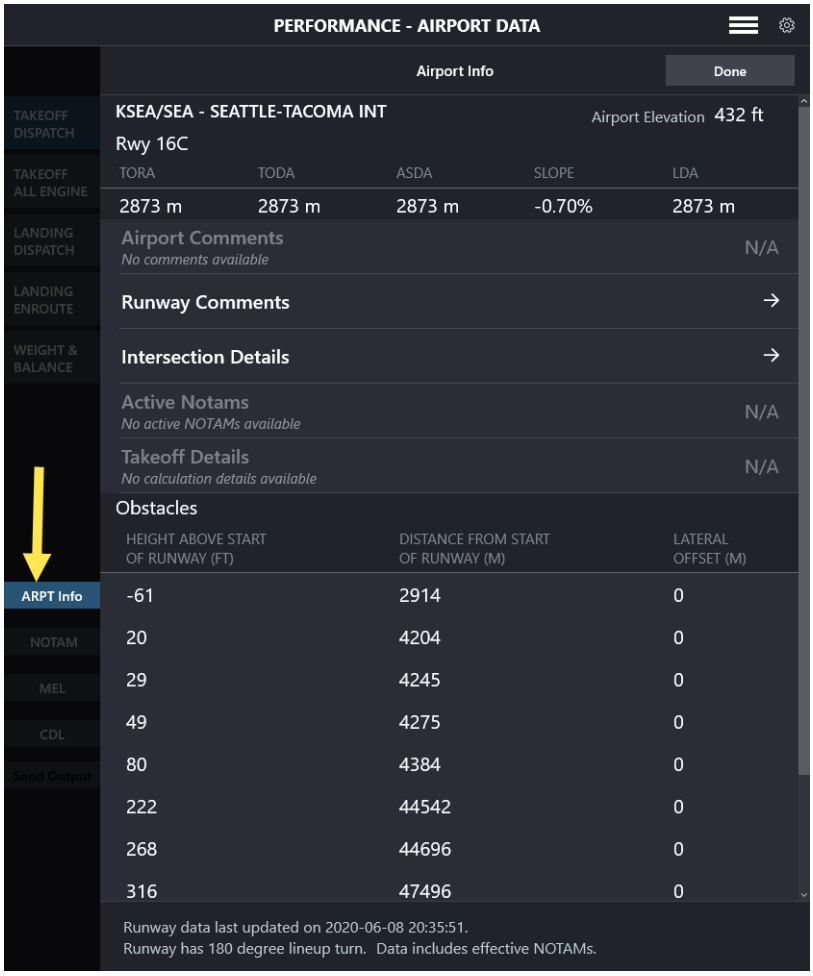
☞ **Note:** **Enroute distances displayed by *OPT* may or may not contain factors and may or may not include the effect of reverse thrust. Make sure that you know what your company's data is based on.**

Other Available Functions

From the takeoff screen, there are several other functions available to the user. These functions are accessed from the lower menu bar to the left of the screen and are described below.

Viewing Airport Information

The **AIRPORT INFO** button displays a screen which summarizes the airport data for the selected airport and runway and calculation type. This button is only active if both an airport and runway have been selected. The runway length and other parameters can be cross-checked with the available airport information of your latest Airport Chart. A typical airport information screen for takeoff is shown below.



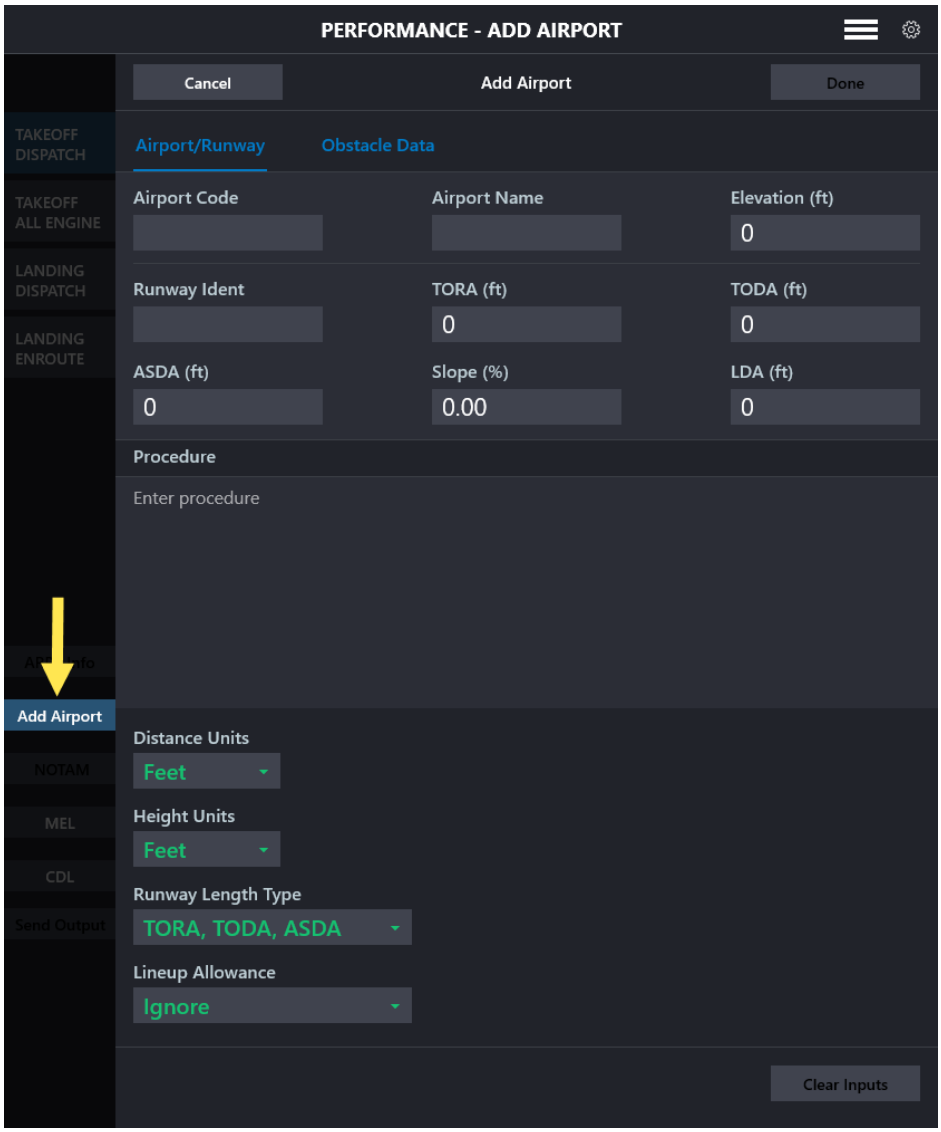
The available buttons and their function are:

- **Done** – returns the user to the previous screen.

- **Airport Comments** – if airport comments are available, this button displays a screen with those comments.
- **Runway Comments** – if runway comments are available, this button displays a screen with those comments.
- **Intersection Details** – if there is intersection data associated with the selected airport and runway, this button will display those intersections.
- **Active NOTAMS** – if there are currently active NOTAMs being applied to the calculations, this button will become active and will list those NOTAMs. Active NOTAMs may be disabled or re-enabled from that screen, if that option was selected in *Administrator*.
- **Takeoff Details** – if this option was selected in *Administrator,* it will display a summary screen of secondary information pertinent to the takeoff data currently displayed.

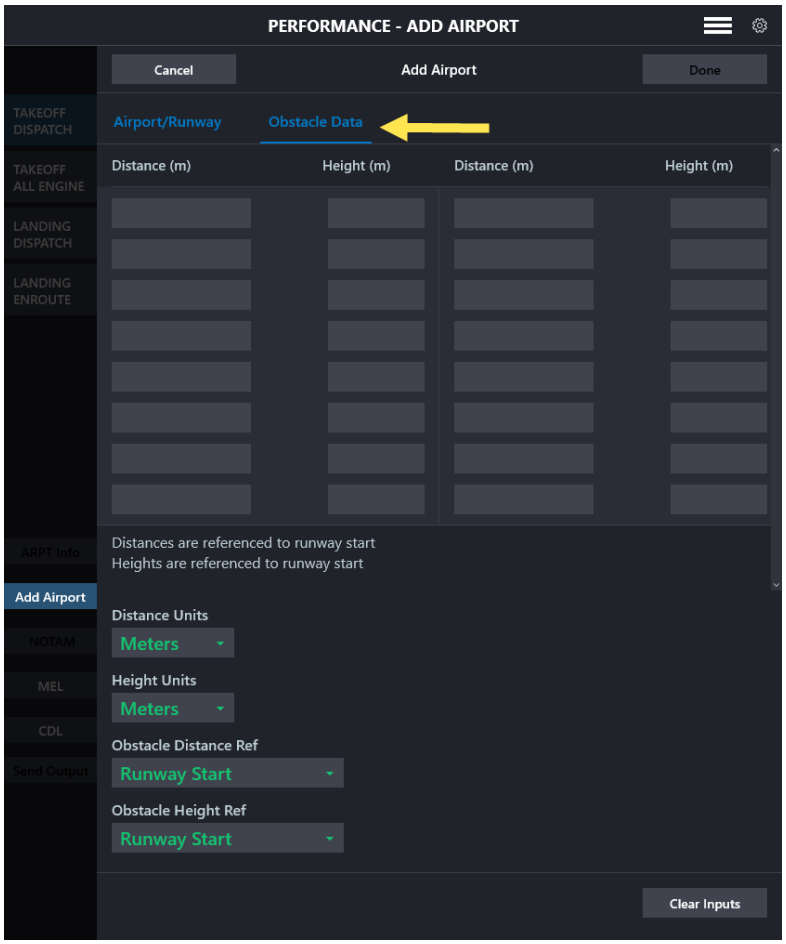
Adding a Temporary Airport

The **Add Airport** button, if available, will display an entry screen to allow the user to enter airport information for an airport that is not currently in the airport database supplied by your administrator. This information is retained only on a temporary basis and will be deleted when the *OPT* application is closed. If the information is required for takeoff performance ensure that you are under TAKEOFF-DISPATCH when adding the temporary airport. Similarly, if the information is required for landing, ensure that you are under LANDING Dispatch or Enroute when adding the runway information. When the **Add Airport** button is selected, *OPT* displays the following screen.



The top portion of the inputs consist of several edit boxes into which one enters the necessary information to describe the airport. The lower half of the screen contains several drop-down buttons that are used to select the appropriate units and obstacle reference points for the input information.

In addition to the information required in the screen above, the user should also add any available obstacle information. This is done by selecting the **Obstacle Data** selection, which changes the top portion of the screen to display the following:



The user may enter any obstacle height and distance information as desired. The obstacle distance and height information that is entered should be referenced to the choices designated in the lower half of the screen, should be relative to the flight path of the departure route and, ideally, corrected for any gradient loss during a turn. Further information about the specifics for this should be obtained from your airline's *OPT* administrator. Selecting **Airport/Runway** will return the user to the original add airport screen.

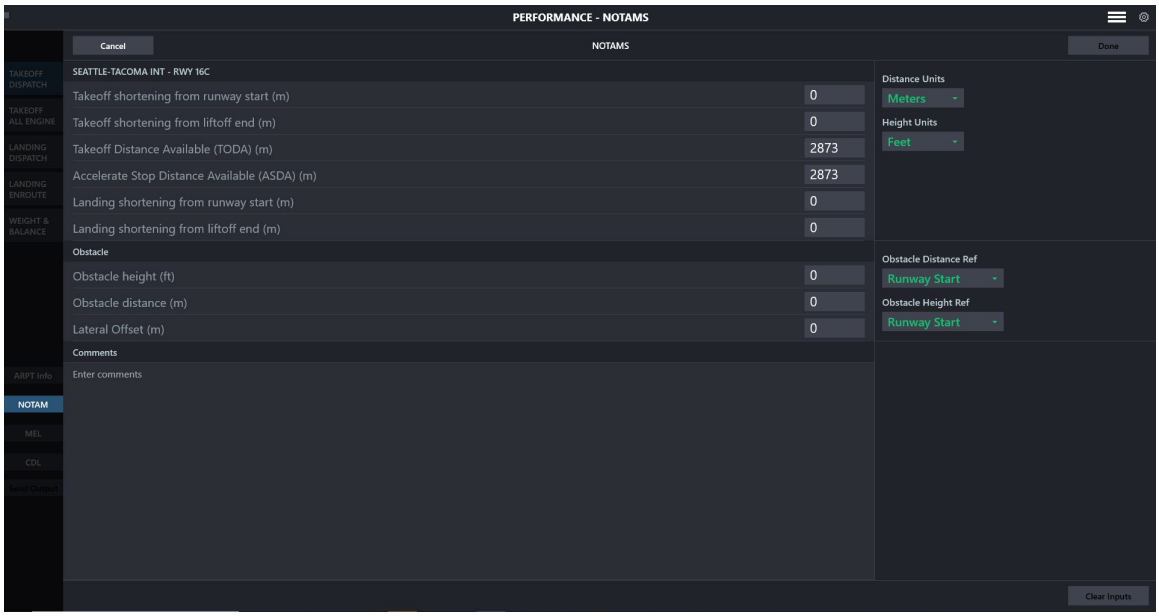
The remaining button functions are as follows:

- **DONE** (appears after data has been entered) – once enough required information has been entered, the **DONE** button becomes active. It will save the information, return the user to the previous screen, and select the temporary airport for use.

- **CANCEL** – this button will discard any changes that have been made and return the user to the previous screen without making any changes to the selected airport.
- **CLEAR INPUTS** – this button will clear all edit box inputs that have been made on this screen.

Adding a Temporary NOTAM

The **NOTAMS** button, if available, will display an entry screen to allow the user to input temporary NOTAM information that affects takeoff or landing performance. This capability exists in addition to the time-effective NOTAM capability the administrator uses to input NOTAMs. The temporary NOTAM information that is input is retained by *OPT* until cleared by the user; it is not deleted in a manner similar to the temporary runways. When the NOTAMS button is selected, the following screen is displayed:



Note that the above screen does not display any information for an ACTIVE NOTAM that was pre-defined in your OPT airport database by your company Administrator. The Active NOTAM information is found under ARPT Info >> Active NOTAMs. The above screen is to define the NOTAM information by using this interface directly. The airport and runway to which this NOTAM will apply is displayed as the title to the uppermost group box. This enables the user to verify that the correct runway is being affected. As with the temporary airport input, there are popover buttons at the bottom of the screen (if in portrait) or to the side (if in landscape) to specify the input units and obstacle reference points. The inputs are used for the actual calculations. The TODA and ASDA are automatically adjusted based on the takeoff shortening from runway start adjustment. The user can also elect to apply a NOTAM to the TODA and ASDA only. If the shortening is from the liftoff end, a clearway or stopway greater than zero are not allowed.

A summary of the inputs for the current functionality is as follows. These values are based on the distance units selected by the user:

Takeoff shortening from runway start:

The distance that the runway is to be shortened from the start of the takeoff roll. When a value is entered in this field it is subtracted from the original runway length, subtracted from the original TODA or clearway and subtracted from the original ASDA or Stopway. The user is not allowed to increase the TODA or ASDA values.

Takeoff shortening from liftoff end:

The distance that is to be taken from the liftoff end of the runway. When a value is entered in this field it is subtracted from the original runway length, the TODA is set to the runway length or no clearway is available and the ASDA also set to the runway length or no Stopway is available. The user is not allowed to increase the TODA or ASDA values and these are now set to the runway length.

Takeoff distance available (TODA):

The length of the runway plus any clearway if it exists. It will be automatically adjusted if a takeoff shortening from the runway start or liftoff end of the runway is entered. The user can select to decrease only the TODA up to the runway length. The user is not allowed to enter a TODA less than TORA.

Accelerate stop distance available (ASDA):

The runway's declared Accelerate Stop Distance Available (ASDA). It will be automatically adjusted if a takeoff shortening from the runway start or liftoff end of the runway is entered. The user can enter an ASDA value that is less than the TORA. The user cannot increase the available stopway from the original available stopway.

Landing shortening from runway start:

The distance that is to be subtracted from the start of the available landing distance

Landing shortening from liftoff end:

The distance that is to be subtracted from the end of the available landing distance

The reason for having the differentiation between liftoff end and runway start for the landing shortening is to help the display of the landing distance when the results are sent to FD Pro or for use with future graphing functionality.

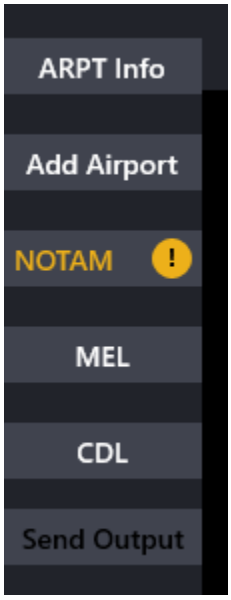
In the Obstacle section only one (1) obstacle can be added to simplify crew workload. If more than one obstacle is required, your airline may consider utilizing the OPT Administrator time-effective NOTAM function which allows the back office Administrator to manually set up multiple obstacle data and follow the

normal process for building the airport database and the associated part for loading the new airport.sdb into OPT. The crew in this case can run OPT without having to enter the NOTAM as it will be prepopulated in OPT when the Runway is selected. The other possible option is still consulting your back office and ask them to filter obstacles that are outside the approved splay, eliminate obstacles that will clearly not be limiting and run your back office performance tool to determine which obstacle is limiting and pass this information to the flight crew.

The Comments input is used only to allow a note to be written to remind others what the NOTAM is based on. The **DONE** and **CANCEL** buttons function as on the temporary runways screen. The remaining buttons function as follows:

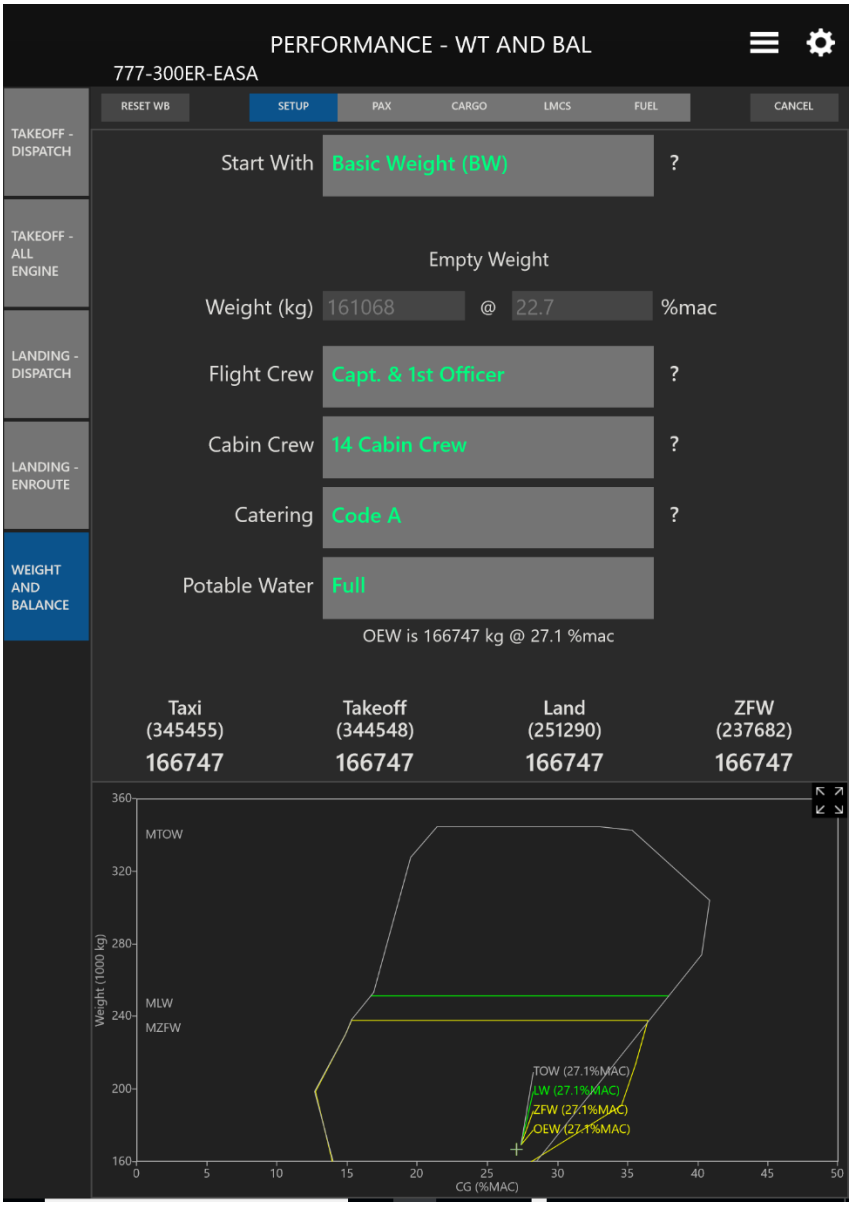
- **CLEAR INPUTS** – resets all of the current inputs to blank with the exception of TODA and ASDA.

After inputs have been made and the user returns to the main takeoff or landing screen, there will be a circled amber exclamation symbol displayed in the NOTAM button. This amber circle (shown below) is used to alert the user that there is currently an active NOTAM on the selected runway. This amber circle (also appears automatically if a time-effective NOTAM is in effect.



Weight and Balance

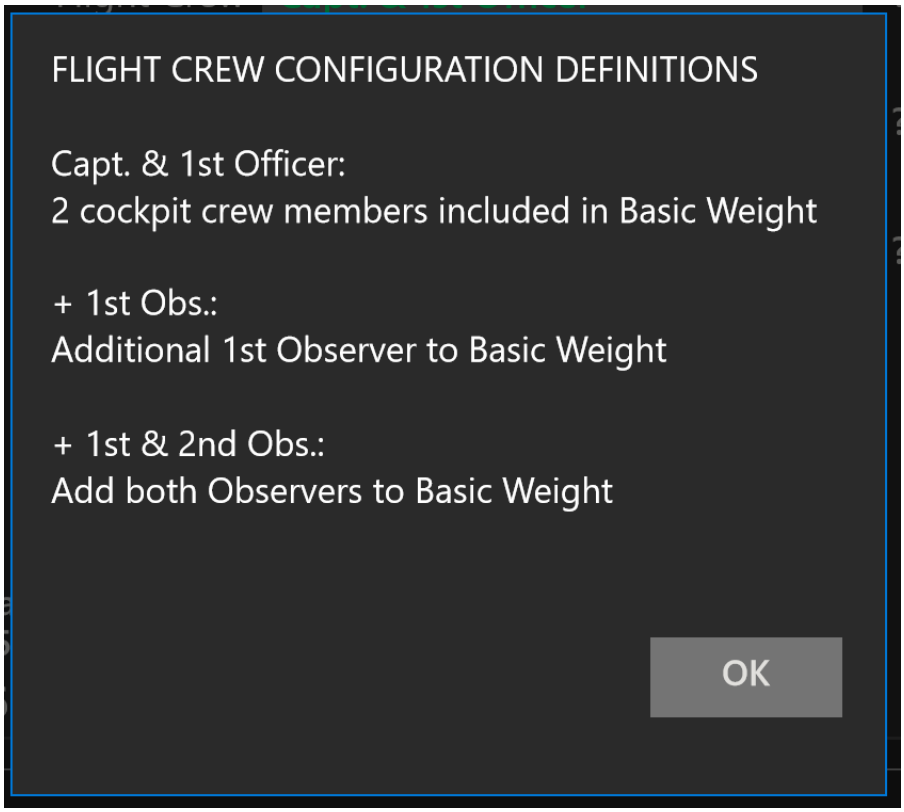
The **WT AND BALANCE** button, if available, will display an entry screen to allow the user to input and calculate W&B information. A typical W&B entry screen is shown below, with many inputs having already been made to illustrate different aspects of the display. The SETUP tab is available starting with OPT version 4.30 and has to be activated by your Administrator. The choices available depend on your specific configuration and are determined by your administrator.



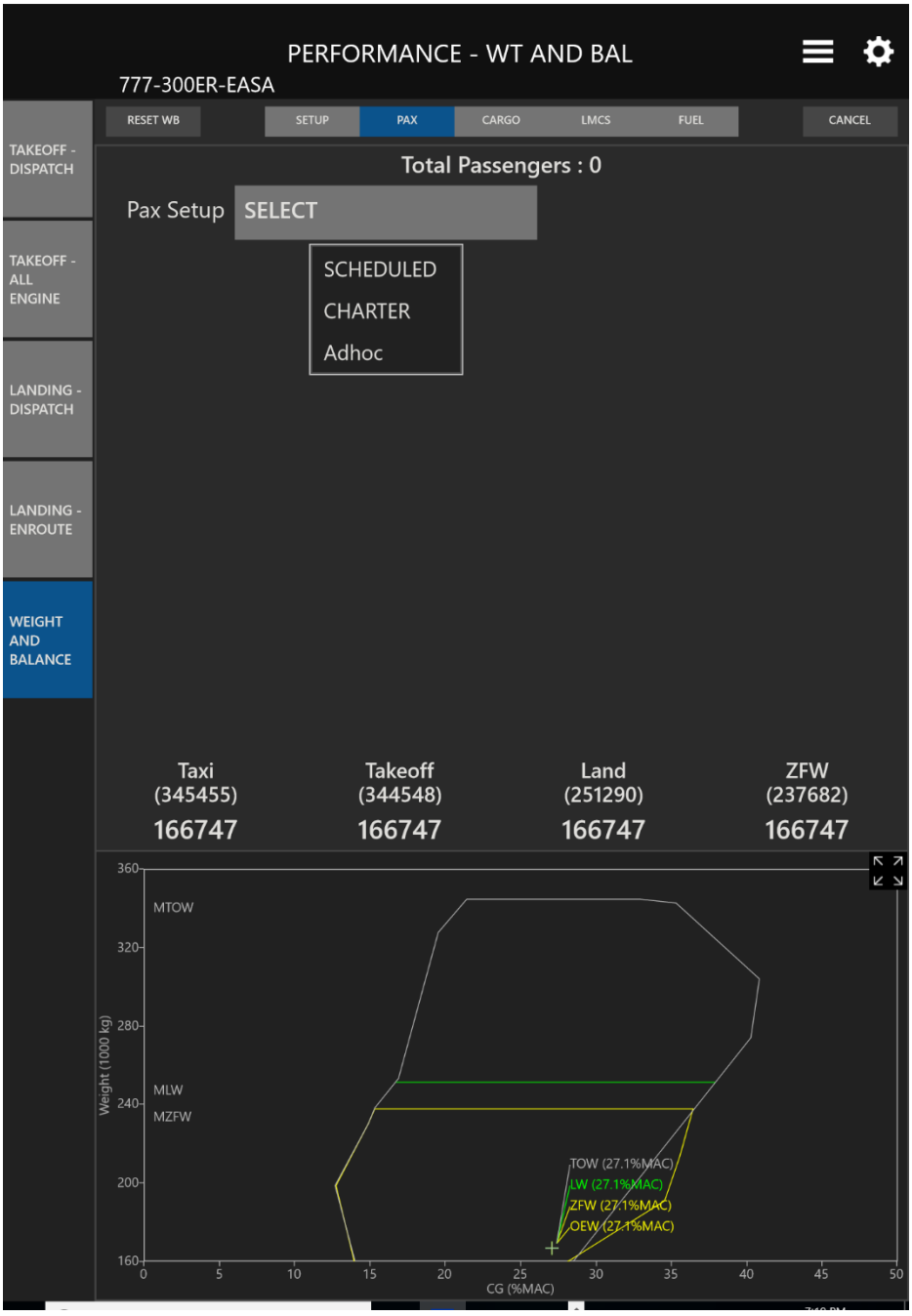
The **SETUP, PAX**, **CARGO**, **FIXED**, and **FUEL** buttons shown in the tool bar area are used to switch between the different weight inputs available. The button that is highlighted blue is the currently active input area. In this example, the SETUP button is blue and all fields have values selected.

The Start With selection is customizable by the Administrator. If Enter ZFW Directly is selected, the remainder of the popups on this page will be disabled and so will the PAX, CARGO, LMCS tabs. The Enter Empty Weight Directly allows the user to define a new Weight that is not on the list.

If defined by the Administrator the ? can be useful in providing help information. To obtain the help information simply click on the ?. The example shown below shows the help information defined for Flight Crew.

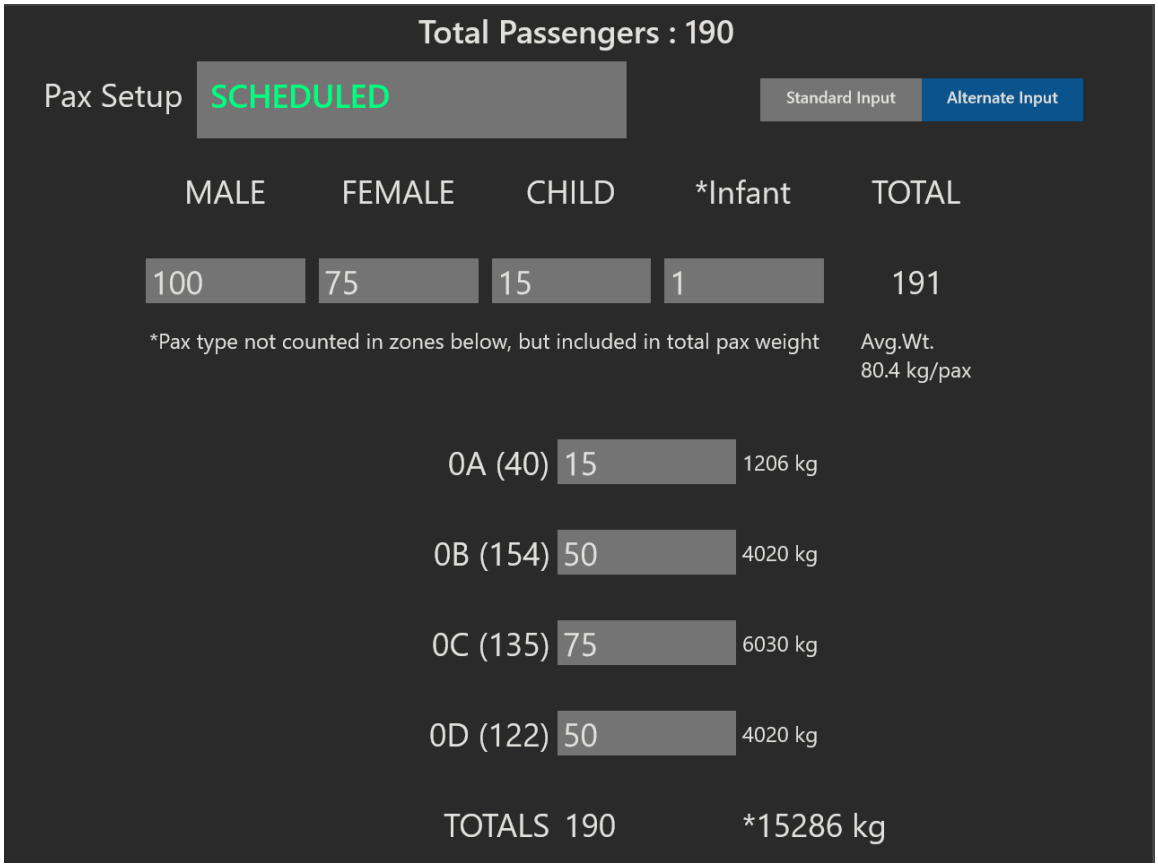


The Administrator can choose to define multiple passenger setups. If this is the case with your company's OPT the PAX entry screen will look as follows:

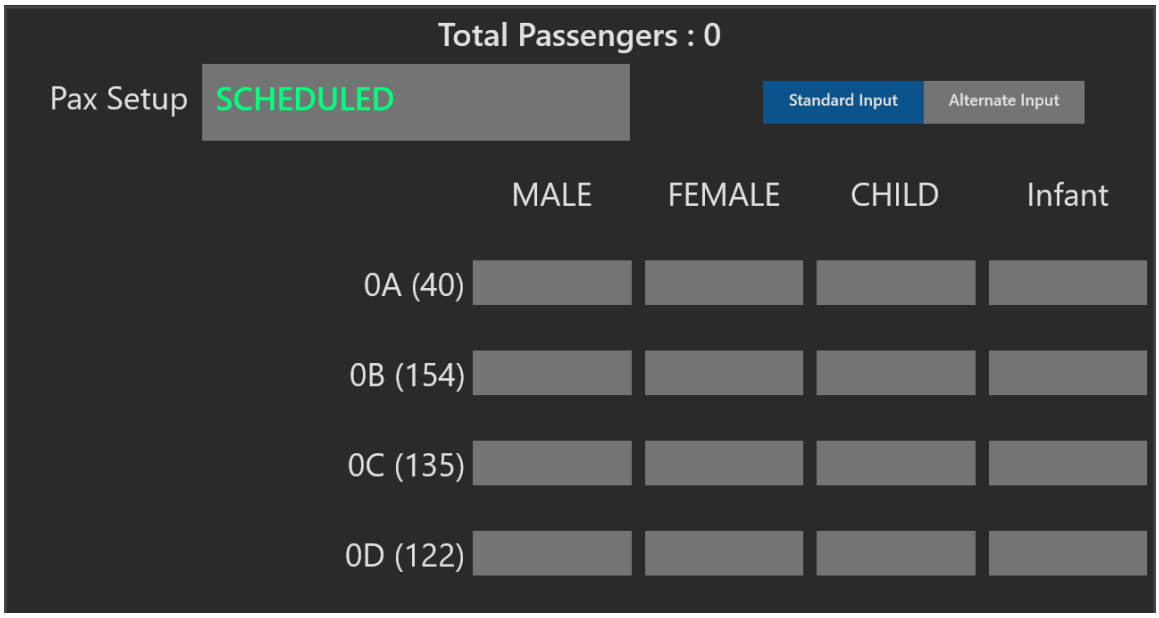


Selecting one of the setups will display the different passenger zones. The number of zones and passenger types and names (if applicable) are determined by your administrator. In addition, the weight for each passenger type and whether they count in the total zone count are also determined by the administrator.

In the example below, the Alternate Input for passengers is shown which is an available option also determined by your Administrator:

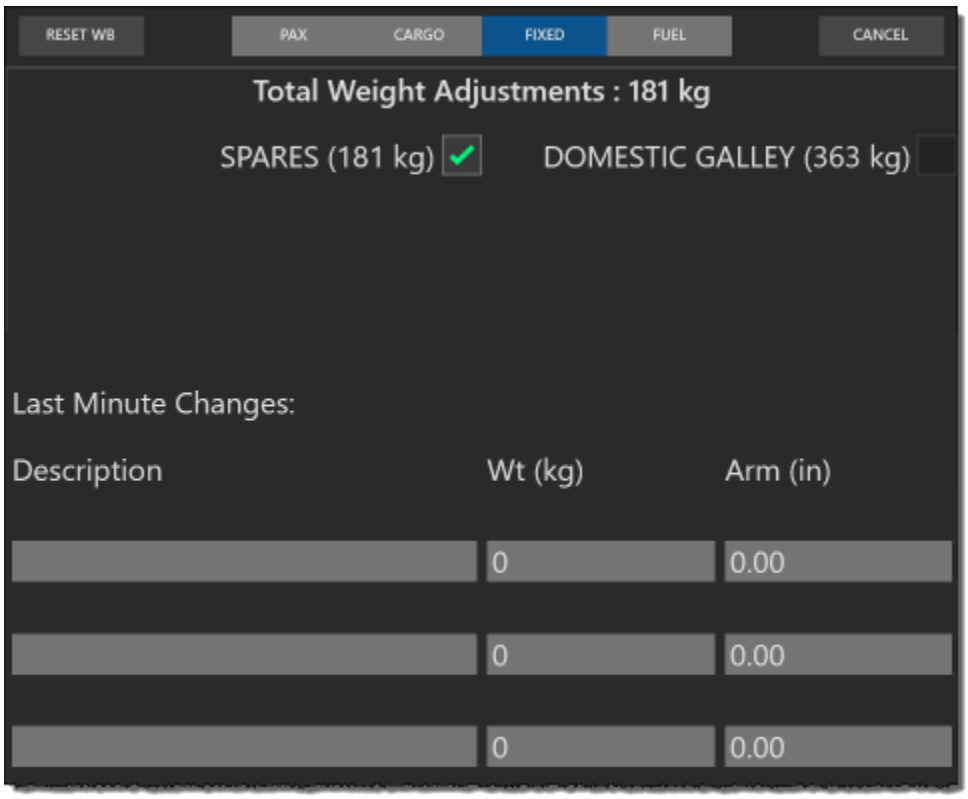


The Standard Input is shown below.



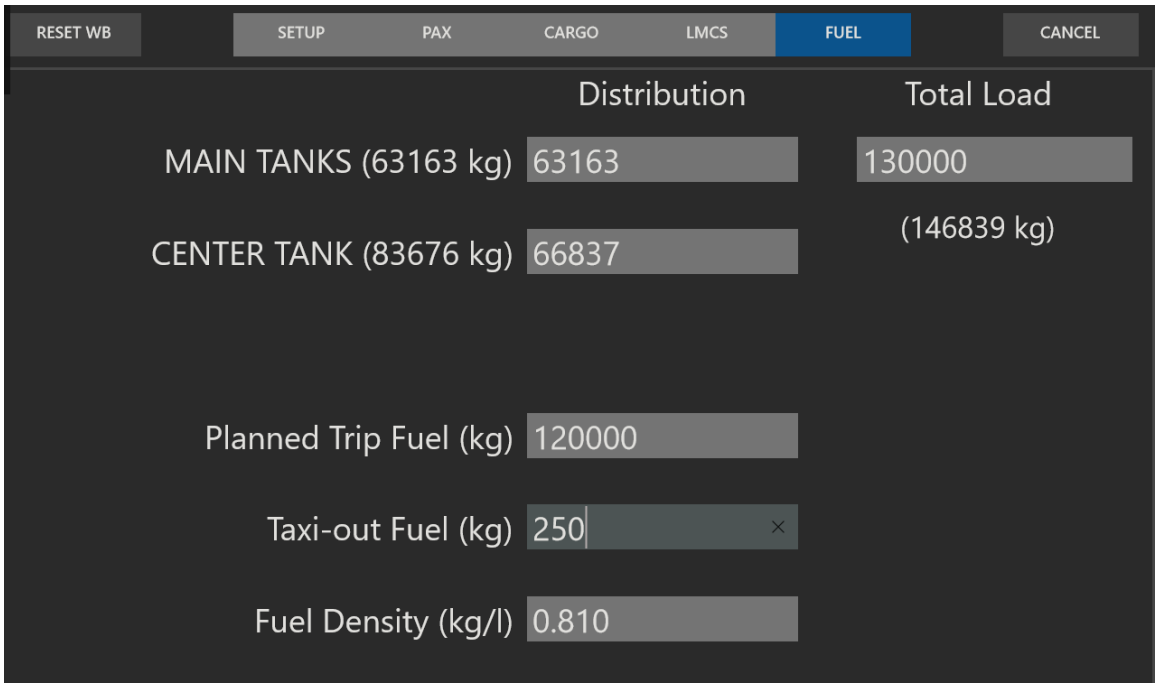
Cargo may be input either by zone or position, depending on how the administrator has set up your application. A typical cargo input screen based on loading by position might look like this the picture below. Selecting any of the buttons will display another input screen for each position in that zone.

A typical FIXED input screen (sometimes also called OTHER) might look like this:



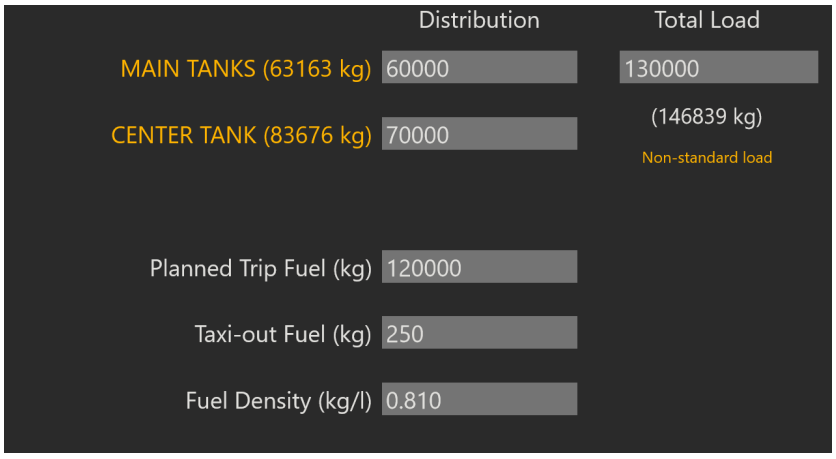
This screen is used to account for various fixed-weight items that can be included. In this example, the allowances for a Spares Kit has been included by selecting the appropriate check box. As shown on the top of the display, the total weight for this adjustment is 181 kg. This screen also includes input boxes for general Last Minute Changes. For these, the user adds a description of the item, along with its weight and balance arm to account for the change.

A typical FUEL input screen might look like this:



In this case, the fuel load had been input using the **Total Load** input box. This input box is used to quickly input the total fuel and have the tanks fill via the standard fuel loading schedule. If the input fuel load exceeds the total tank capacity, then *OPT* will reduce the fuel load to match the tank capacity and alert the user that a change was made.

If the inputs are made by directly entering the data in the tanks entry boxes, the Main Tanks and Center tank labels turn amber if the determined distribution does not match the standard fuel loading schedule. If this is the case then the words Non-standard load appear below the Total Load input box.

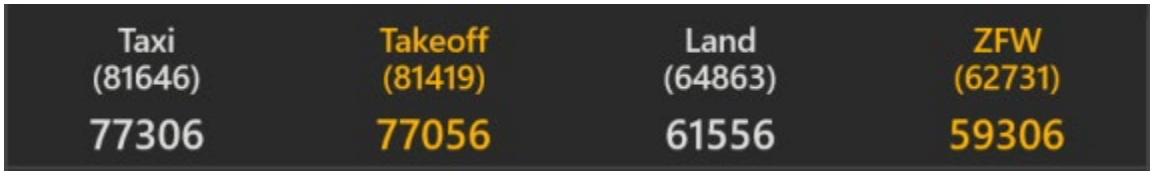


Other inputs in the fuel sections are as follows:

- Taxi-out Fuel – used to compute the takeoff weight, given the current zero fuel weight and total fuel load.

- Planned Trip Fuel – used to compute the landing weight, given the current zero fuel weight, total fuel load, and taxi-out fuel.
- Fuel Density – used to check the input fuel weight against allowable capacity.

In the center of the screen, there is summary information displayed to constantly inform the user of the status of the various limit weights.



In each case, the number shown in parentheses is the structural limit weight and the number shown in the larger font is the current weight based on the inputs above. If, at any time the input weight exceeds the structural limit or the input weight's c.g. position is outside of the allowable grid shown at the bottom of the screen, the text for that weight will turn amber as shown above for the takeoff and zero fuel weight cases. Note that until all of the text above is shown in white, if the user attempts to leave the W&B screen an Out of Balance message will be displayed requiring user action.

OPT also plots the current W&B situation at the bottom of the screen to enable the user to get a quick assessment of the W&B situation. The four main weights are shown on this plot; OEW (Operating Empty Weight), ZFW (Zero Fuel Weight), LW (Landing Weight), and TOW (Takeoff Weight). The different weights are colored in coordination with their c.g. envelopes.

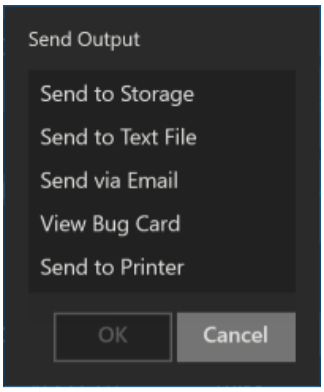
There are two buttons at the top of the screen that are also important. They are:

- **CANCEL** – used to discard any changes that were made and return the user to the previous screen.
- **RESET WB** – used to reset all inputs to blank or off. Does not return the user to the previous screen.

When all of the desired changes/inputs have been made and all of the weights in the center of the screen have turned white, then you may return to the Takeoff or Landing screen of your choice and save the data by selecting the appropriate menu bar button.

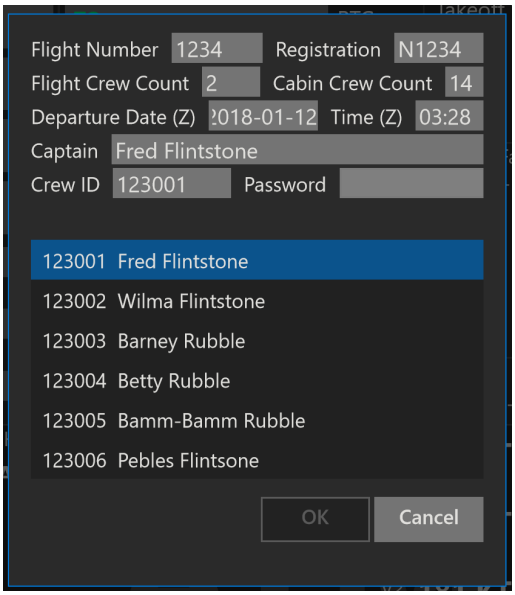
Printing and Storing Results

The **Send Output** button on the lower menu bar, if available, allows the user to send the currently displayed output to different locations, such as a printer or a file storage location. This button becomes active only when there is output currently displayed. The actual format of the output that is printed is dependent on how your administrator has set it up. Selecting the **Send Output** button will display the dialog box shown below (or similar).



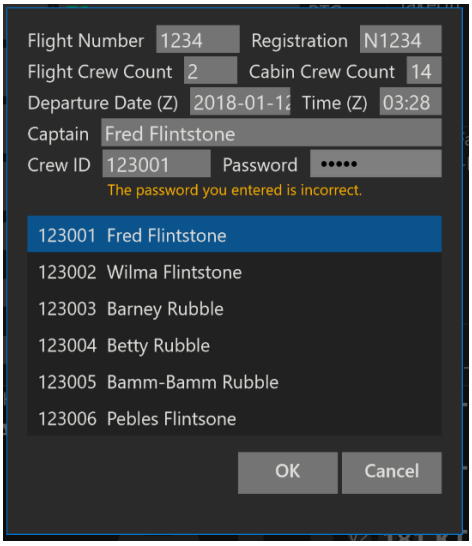
Making a selection from one of the available menu items will complete that action and return the user to the previous screen.

If the Administrator selected the option for the crew to authenticate the output report using the Crew Signature, a popup screen prompting the user to input flight related parameters, selecting their crew id & name and to input a password is shown as follows:

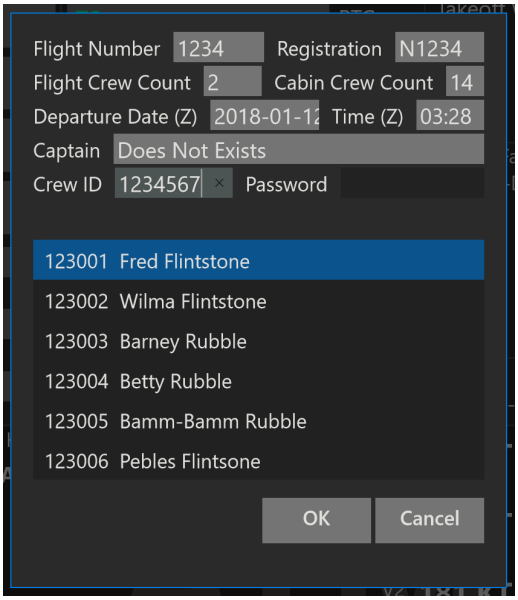


The above screen is shown for any of the following output options: "Send to Text File", "Send via Email", "Send to Printer" or "Print Load Sheet". If the crew selects a name from the list and the password entered matches the one in the crew data file, the **OK** button will activate and OPT will complete the action and return the user to the previous screen. If the

password entered does not match the password in the crew data file, an error message is shown.



If the crew does not remember their password, they can enter a Captain Name & Crew ID not listed and the password field will not become enabled and the action will be able to be completed by selecting **OK**.



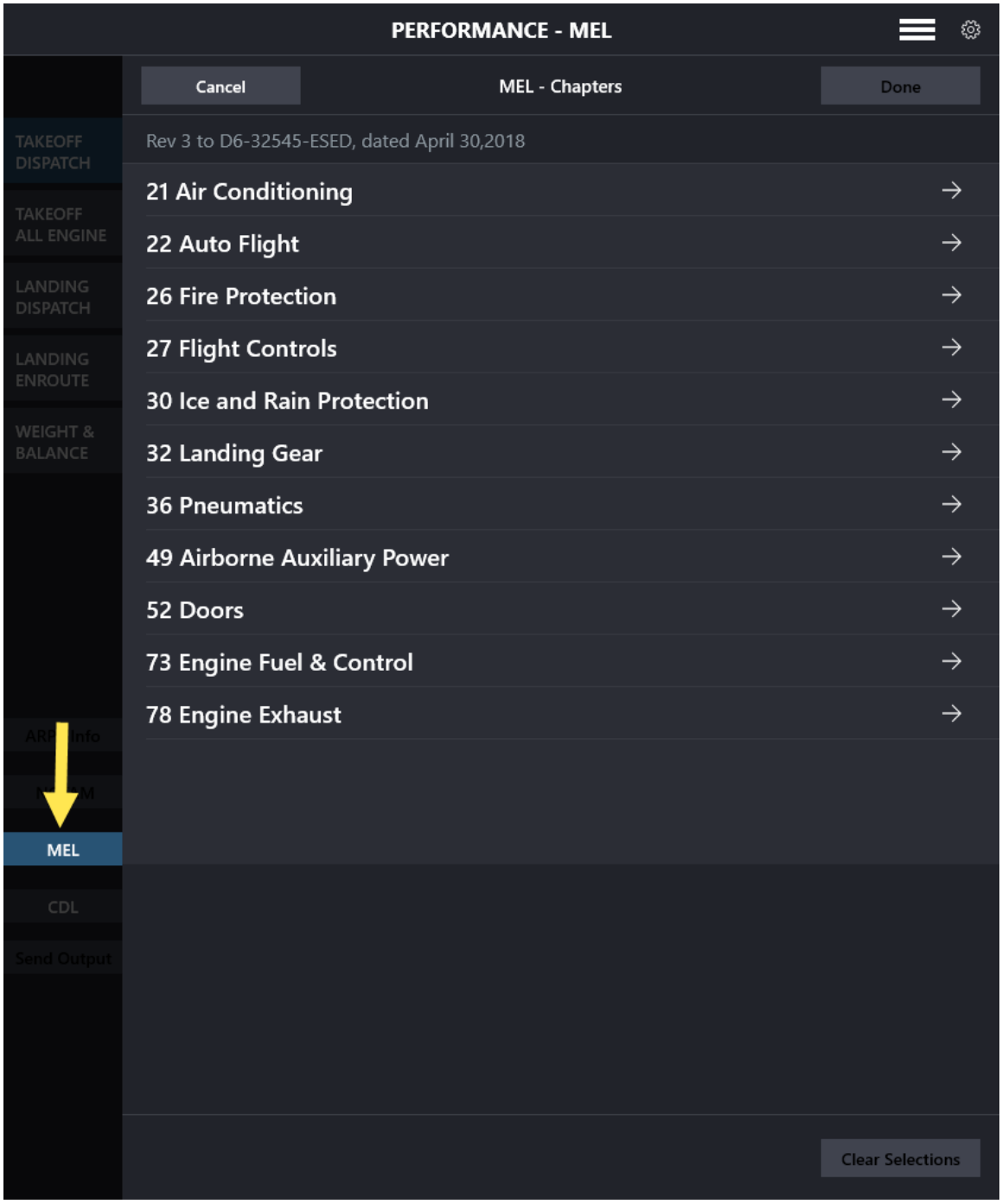
The report will show the words: "Signed by ***Does Not Exists*** (NOT AUTHENTICATED) ***1234567*** at 03:28 on 2018-01-12". Where ***Does Not Exists*** was the name provided by the captain and ***1234567*** was the Crew ID specified.

If the Crew ID list is very long, the user can type their Captain Name and Crew ID and if an exact match the password field will become enabled. After the report is created the send action will be completed and return the user to the previous screen.

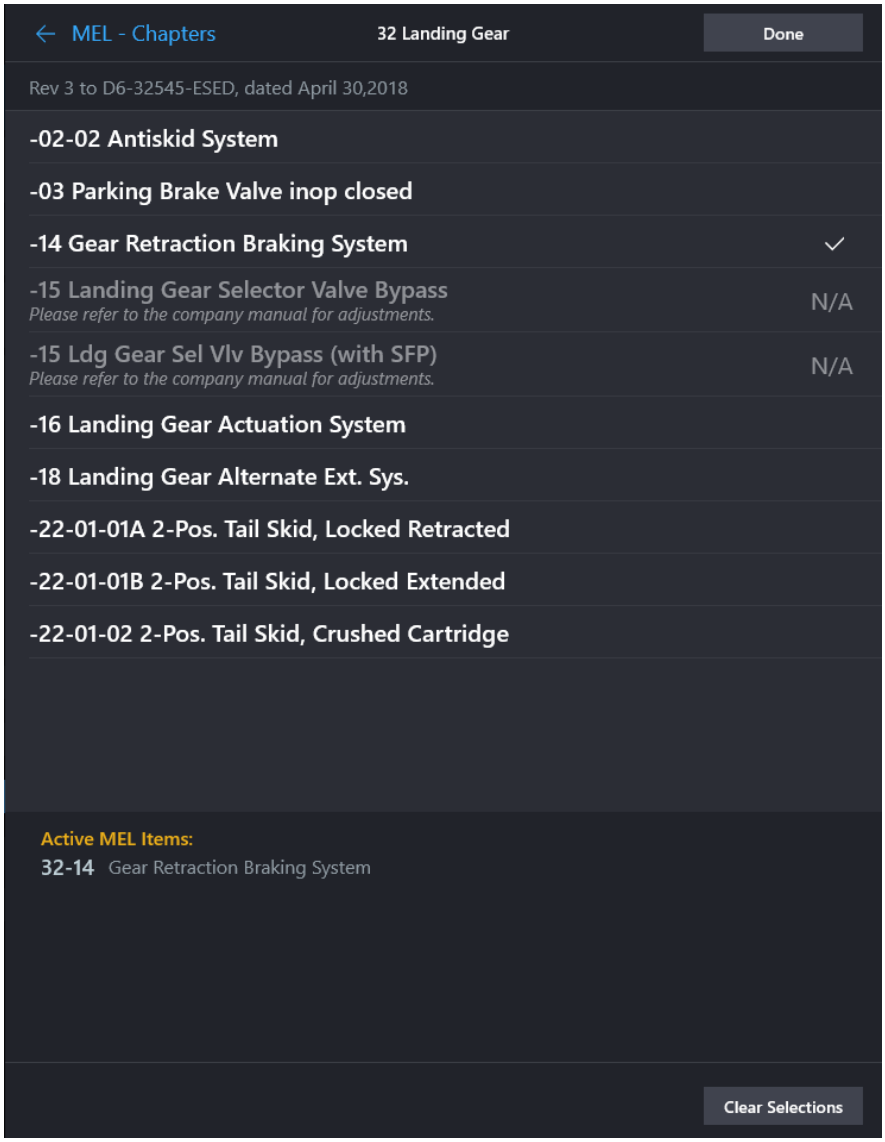
Making MEL and CDL Adjustments

OPT has the capability to make nearly all of the performance-related MEL and CDL adjustments. This capability is accessed using the **MEL** and **CDL** buttons on the lower menu bar. The functionality for both of these corrections are the same. The example discussed here will pertain to a sample MEL condition.

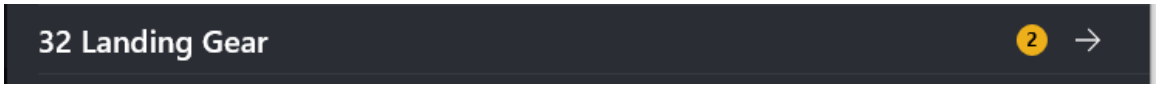
Selecting the **MEL** button will display the screen shown below.



When arriving at this page, it displays the chapter list for the MEL. Selecting any of the chapters will then display the list of available MEL items in that chapter, such as shown in this example:



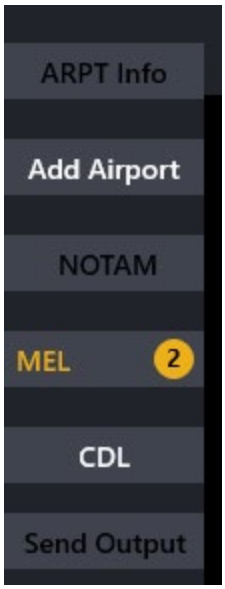
There are several feature shown on this picture worth mentioning. Note that within the Chapters view, there is a check mark to the right of any currently selected item. There is also a list at the bottom of the screen to summarize all selected items. If an adjustment is not available a N/A is to the right of the item and a note referencing to consult your company manual for adjustments is shown. To return back to the chapter list, one would select **MEL - Chapters**. An Amber numbered in a circle is shown next to each chapter to indicate the number of active items as shown below.

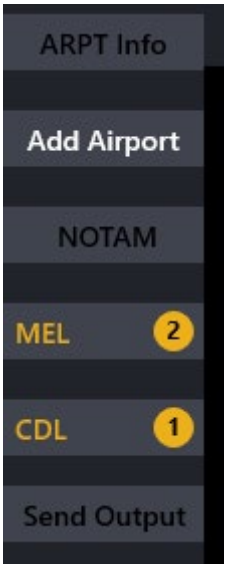


In addition, the remaining buttons function as follows:

- **Done** – becomes active when changes have been made. Selecting the **Done** button will save the changes and return the user to the previous screen.
- **Clear Selections** – will clear all selected MEL items, but will not return the user to the previous screen.
- **Cancel** – available at the Chapters menu, will discard any changes made and return the user to the previous screen.

If, when leaving the MEL screen, there are still active items, there will be an amber circle displayed next to the **MEL** words in a manner similar to the NOTAMS. This amber numbered circle is displayed any time there are active MEL or CDL items. Examples are shown below depicting both active MEL and CDL items.





Chapter Eight

The Rest

Other References

There are many features of *OPT* which may be customized beyond the scope of what is presented in this document. To assist in this effort, the following EFB design documents are also provided in the standard application installation:

- Airport Database Design Description
- Policy Database Design Description
- DDG Database Design Description
- Initialization and Configuration File Design Description

Getting additional help

If you encounter a problem or you just want to find out how to use a particular function in *Administrator* or the Onboard Performance Tool, please contact us at CIS Customer Support.

Our email address is:

CISCustomerSupport@boeing.com

If you prefer, you may mail us your question. To help us address your question, please include as much information as you can concerning the particular problem or question that you have.

Our mailing address is:

The Boeing Company
Digital Aviation – Flight Optimization
OPT Group
P.O. Box 3707, MC 13-86
Seattle, Washington 98124-2207 USA

Glossary

A

AFM-DPI—Airplane Flight Manual-Digital Performance Information; the designation given the electronic flight manual first developed for the Boeing 777.

Airplane Configuration—The combination of airplane and engine parameters that define the baseline for performance calculations.

Airport/Runway Database—The internal Laptop Tool database that allows the user to create and maintain a definition of airports and runways for use with the *OPT* program.

B

***BTM* (Boeing Takeoff Module)—**The acronym given to the software which does the actual calculation of takeoff performance.

C

CDL—Configuration Deviation List. An AFM appendix detailing allowable airplane configuration items that are allowed to be missing at dispatch.

D

Database—A repository of frequently accessed data. Refers to either one of the internal Laptop Tool user-maintained databases (Airplane, Airport/Runway, etc.) or an airplane performance database.

DDG—Dispatch Deviations Guide. Boeing document which details allowable systems/configuration items which may be inoperative at dispatch.

Dialog Box—A window in the Onboard Performance Tool that lets the user make inputs and respond to prompts.

Directory—A location in the file hierarchy where files are stored.

E

Execution—Starting one of the software programs (*Administrator* or *OPT*) and calculating airplane performance data.

F

File—A named source of data that is read from or saved to on the computer external to the Onboard Performance Tool. Files are created by the Onboard Performance Tool and are used to supply data to the Onboard Performance Tool.

File Extension—The three character string after the "." in a filename. Used to identify the type of data contained in the file and to associate certain types of data with a specific program or application.

G

GUI (Graphical User Interface)—A type of program interface that employs visual controls (dialog boxes, buttons, lists, menus, etc.) to allow the user to access and run programs interactively. The Onboard Performance Tool is a GUI.

H

I

Import—Bringing data into *Administrator* for use during performance program input definition. *Administrator* allows importing of airplane takeoff definition data for takeoff, airport and runway data, and for line-up allowance definition.

Interface—The facilities of a program that give the user access to its capabilities.

J

K

L

List—A box on a dialog box containing a list of items that are available for use in the Onboard Performance Tool. For example, the list of airports shown on the airport/runway maintenance dialog box.

M

MEL—Minimum Equipment List. FAA document detailing allowable inoperative airplane systems.

N

O

Output—Refers to data produced by the software programs.

P

Pages—The subsections of many *Administrator* or the Onboard Performance Tool dialog boxes that are accessed by selecting a tab. The pages on a dialog box contain functions that are used to manage the type of data that the dialog box controls (e.g., Runway input data). The pages reduce clutter and help group related functions.

Path—The specific location of a file in the computer's file hierarchy, usually given from the reference point of the drive that the file is on (e.g., **C:\Program Files\OPT** is the path to the file ., **C:\Program Files\OPT\OPT.EXE**).

Preferences—Settings for the Onboard Performance Tool and for the performance programs that are usually not changed often and can be treated as a default item. Preferences are pre-set when the Onboard Performance Tool is installed and if you change them their values are used for any subsequent inputs created. For example, gross weight and altitude units, height and distance units, and output file paths are all preference settings.

Q

R

Radio Button—A type of button used on many dialog boxes that lets the user choose from only one of a set of possible options—called radio button (or option buttons) due to their similar appearance to buttons used to select stations on a car radio.

Run—Means the same as execute—to start a program.

RNP—Required Navigation Performance. A highly accurate method of flying a prescribed course.

S

SCAP (Standard Computerized Airplane Performance)—The industry standard adopted by IATA to provide a common interface between any manufacturer's performance software and an operator's customized output formatting program.

SCAP Database—A SCAP-compliant takeoff database. Either a unified model table series or an AFM-DPI database. Used by the Onboard Performance Tool for takeoff analysis.

Select List—The list of items that are currently selected for performance program execution.

SCAP Import File (.SIF)—A text file that describes the takeoff analysis parameters available in either a unified model table database or an AFM-DPI SCAP database. Also contains information to allow import of database information into the Onboard Performance Tool.

T

Tabs—The extensions on the right side or top of the pages on *Administrator* and *OPT* input dialog boxes Tabs can be "clicked" with the mouse button to navigate between the various pages on a dialog box.

U

User—Refers to the person using the software being described.

V

W

Windows®—Refers to Microsoft Windows—the operating system that the Onboard Performance Tool is used in. Windows® is PC-based and allows applications (e.g., *OPT*) to interact with the user via windows, dialog boxes, lists, menus, mouse commands, buttons, etc.