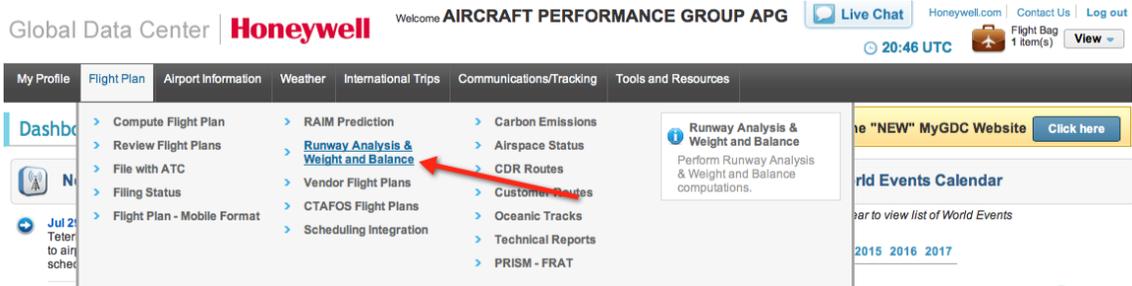
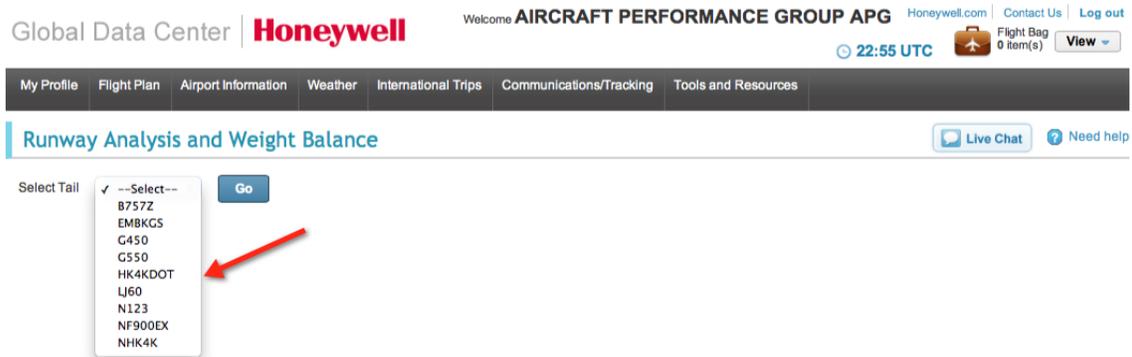


# Runway Analysis User Guide

The Runway Analysis & Weight and Balance functions are accessed by selecting 'Runway Analysis & Weight and Balance' from the Flight Plan drop down menu.

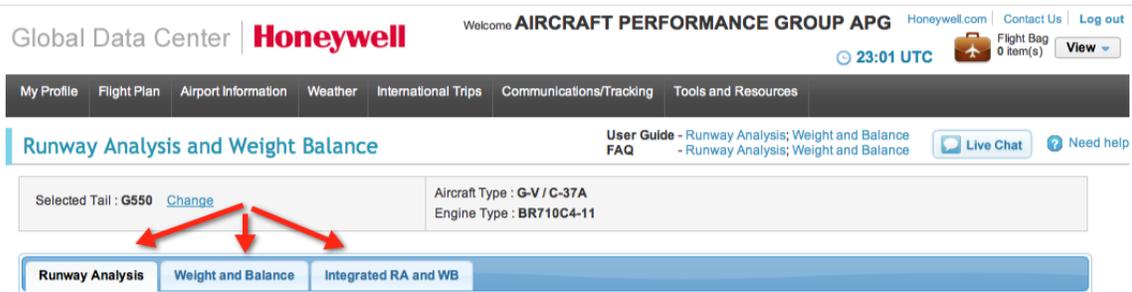


Select the tail to be used for the analysis from the Select Tail drop down menu.



The next page displays the three selections available for Runway Analysis (RA) and Weight and Balance (WB):

- Runway Analysis – for running RA alone.
- Weight and Balance – for running WB alone.
- Integrated RA and WB – for running RA and WB combined into an integrated solution.



# Runway Analysis

Selecting the Runway Analysis tab brings up the Departure and Destination screen, used for entering the required data for a standalone RA.

Runway Analysis
Weight and Balance
Integrated RA and WB

Calculate for  Departure  Destination  Dep Altn  Dest Altn1  Dest Altn2

DEPARTURE
ANALYSIS

ICAO\*  Airfield Info Weather Info  
[Airport Locator](#)

Runway\*

Runway Length  Actual Runway Length :

Shorten End

Wind (Dir/Speed)\*  Use METAR

Temp(C)\*  Note: Prefix +/- while entering the values

Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Takeoff Options

Estimated Weight  Structural Limit : 91000 lbs

Include emergency return settings in calculations

Limit TO	Estimated TO	Reduced Thrust
Limit:	Weight:	Weight:
Reason:		
V1:	V1:	V1:
VR:	VR:	VR:
V2:	V2:	V2:
PWR:	Vfto:	PWR:
Lvl Off MSL:	TO Dist:	A Temp(C)
	Trim:	

DESTINATION
ANALYSIS

ICAO\*  Airfield Info Weather Info  
[Airport Locator](#)

Runway\*

Runway Length  Actual Runway Length :

Shorten End

Wind (Dir/Speed)\*  Use METAR

Temp(C)\*  Note: Prefix +/- while entering the values

Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Landing Options

Estimated Weight  Structural Limit : 75300 lbs

Limit LD	Estimated LD
Limit:	LD Weight:
Reason:	LDA:
	LDG Dist:
	115% Dist:
	Vfto:
	Vapp:
	Vref:
	MAP Grad:

Compute
Generate Report

The Runway Analysis function is used to prepare a Takeoff (TO) analysis for the departure airport, and/or Landing (LD) analyses for the destination, departure alternate and destination alternate (2) airfields. In addition, a LD analysis can be prepared for Emergency Return (ER) to the departure airfield while preparing TO data.

For preparing TO data, complete the top portion of the page.

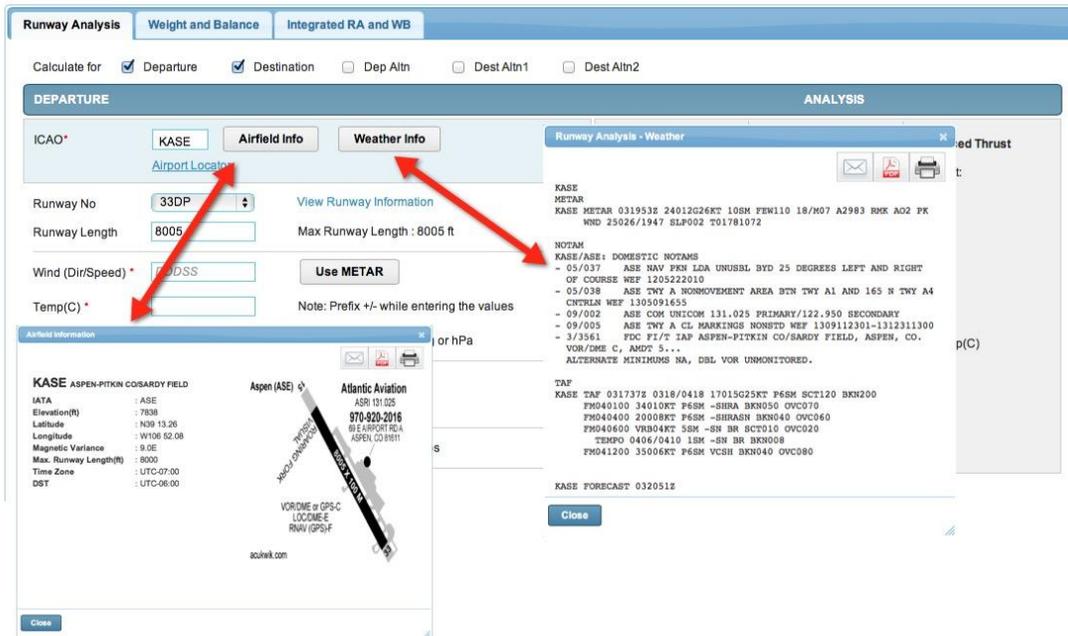
The screenshot shows the 'Runway Analysis' software interface. At the top, there are three tabs: 'Runway Analysis', 'Weight and Balance', and 'Integrated RA and WB'. Below the tabs, there are radio buttons for 'Calculate for' with options: 'Departure' (checked), 'Destination', 'Dep Altn', 'Dest Altn1', and 'Dest Altn2'. The main interface is divided into two sections: 'DEPARTURE' and 'ANALYSIS'. The 'DEPARTURE' section contains several input fields: 'ICAO\*' (empty), 'Runway\*' (dropdown menu with 'SELECT' selected), 'Runway Length' (empty), 'Shorten End' (dropdown menu with 'APPROACH' selected), 'Wind (Dir/Speed)\*' (text input 'DDDSS'), 'Temp(C)\*' (empty), 'Altimeter\*' (empty), 'Flap Setting\*' (dropdown menu with '10 DEG' selected), and 'Takeoff Options' (button 'ECS ON'). There are also buttons for 'Airfield Info', 'Weather Info', and 'Use METAR'. The 'ANALYSIS' section is a table with three columns: 'Limit TO', 'Estimated TO', and 'Reduced Thrust'. Each column has sub-headers: 'Limit', 'Reason', 'V1', 'VR', 'V2', 'PWR', 'Lvl Off MSL', 'Weight', 'V1', 'VR', 'V2', 'Vto', 'TO Dist', 'Trim', and 'A Temp(C)'. The 'Estimated Weight' field is empty, and the 'Structural Limit' is '91000 lbs'.

Enter the departure airport ICAO identifier and then select a runway.

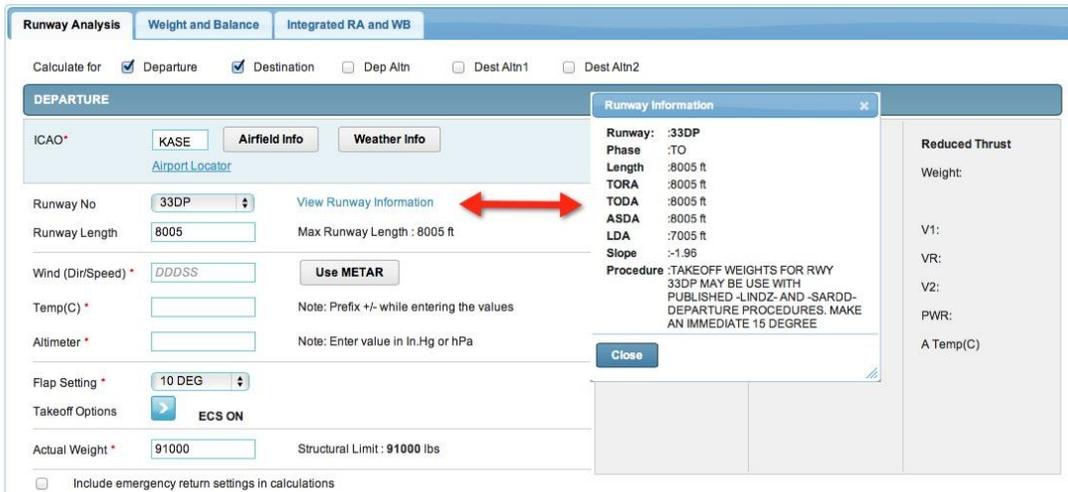
This screenshot is similar to the previous one, but with some fields filled in. The 'ICAO\*' field now contains 'KASE'. The 'Runway\*' dropdown menu now shows '33DP' selected. The 'Runway Length' field now contains '8005', and the 'Actual Runway Length' is displayed as '8005 ft'. A red arrow points from the 'KASE' text to the 'Airfield Info' button. Another red arrow points from the '33DP' text to the 'View Runway Information' link. The rest of the interface remains the same as in the previous screenshot.

Tools are provided to assist completing the departure information.

Airfield and Weather Information, including NOTAMS may be reviewed.



In addition, Runway Information, including Declared Distances and Engine Out Procedures, may be reviewed.



A runway shortening tool is also available for shortening a runway length to account for temporary conditions/NOTAMS.

To shorten a runway, first enter the 'shortened' runway length value in the Runway Length field. Then, from the drop down menu, select the end of the runway that has been altered/closed. In the example below, the Approach end of the runway has been shortened by 1000 feet and the runway length subsequently reduced from 8005 feet to 7005 feet.

The screenshot shows a software interface for runway analysis. At the top, there are three tabs: "Runway Analysis" (selected), "Weight and Balance", and "Integrated RA and WB". Below the tabs, there are checkboxes for "Calculate for": Departure (checked), Destination (checked), Dep Altn (unchecked), Dest Altn1 (unchecked), and Dest Altn2 (unchecked). The main interface is divided into two sections: "DEPARTURE" and "ANALYSIS".

In the "DEPARTURE" section, the "ICAO" field is set to "KASE". Below it, there are buttons for "Airfield Info" and "Weather Info", and a link for "Airport Locator". The "Runway" field is set to "33DP". The "Runway Length" field is set to "7005", with a note indicating "Actual Runway Length : 8005 ft". The "Shorten End" dropdown menu is open, showing "APPROACH" (checked) and "DEPARTURE". Other fields include "Wind (Dir/Speed)" set to "DDDSS", "Temp(C)", "Altimeter", "Flap Setting" set to "10 DEG", and "Takeoff Options" set to "ECS ON". The "Estimated Weight" field is empty, and the "Structural Limit" is "91000 lbs".

The "ANALYSIS" section is currently empty, with columns for "Limit TO", "Estimated TO", and "Reduced Thrust".

NOTE: it is important to select the correct end of the runway which is closed. Closing the Approach end has no effect on the distance from the departure end of the runway (DER) to the obstacle(s), whereas selecting the Departure end for shortening will 'increase the distance from the DER to the obstacle(s).

In this example, the takeoff performance will be calculated using the temporary runway length of 7005 feet and the original distances from the DER to the obstacles.

The environmental conditions may be entered individually by entering Wind (in 5-digit METAR format), Temperature (° C) and Altimeter (in Hg or millibars/hPa) in the appropriate fields. Alternatively, the Use METAR button may be selected for entering the last reported METAR values.

Runway Analysis | Weight and Balance | Integrated RA and WB

Calculate for  Departure  Destination  Dep Altn  Dest Altn1  Dest Altn2

**DEPARTURE** | **ANALYSIS**

ICAO\*     
[Airport Locator](#)

Runway\*    
 Runway Length  Actual Runway Length : 8005 ft  
 Shorten End

Wind (Dir/Speed)\*

Temp(C)\*  Note: Prefix +/- while entering the values  
 Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Takeoff Options

Estimated Weight  Structural Limit : 91000 lbs

Limit TO	Estimated TO	Reduced Thrust
Limit:	Weight:	Weight:
Reason:		
V1:	V1:	V1:
VR:	VR:	VR:
V2:	V2:	V2:
PWR:	Vfo:	PWR:
Lvl Off MSL:	TO Dist:	A Temp(C)
	Trim:	

Select the intended Flap Setting along with any Options that may be applicable for the takeoff.

Runway Analysis | Weight and Balance | Integrated RA and WB

Calculate for  Departure  Destination  Dep Altn  Dest Altn1  Dest Altn2

**DEPARTURE** | **ANALYSIS**

ICAO\*     
[Airport Locator](#)

Runway\*    
 Runway Length  Actual Runway Length : 8005 ft  
 Shorten End

Wind (Dir/Speed)\*

Temp(C)\*  Note: Prefix +/- while entering the values  
 Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Takeoff Options

Estimated Weight  Structural Limit : 91000 lbs

**Take Off Options**

SPOILERS INOP  
 ANTI SKID INOP  
 WET RWY  
 1/8 in SLUSH  
 1/4 in SLUSH  
 1/2 in SLUSH  
 1/2 in LOOSE SNOW  
 1 in LOOSE SNOW  
 1 1/2 in LOOSE SNOW  
 COMPACT SNOW  
 ICE  
 ECS ON  
 ECS OFF  
 COWL AI ON

Limit TO	Estimated TO	Reduced Thrust
	Weight:	Weight:
	V1:	V1:
	VR:	VR:
	V2:	V2:
	PWR:	PWR:
	A Temp(C)	A Temp(C)

NOTE: Options which are 'mutually exclusive', such as Anti Skid Inoperative and Wet Runway, are automatically prevented from being selected simultaneously.

Entering the Estimated TO Weight completes the required entries for TO data.

Runway Analysis | Weight and Balance | Integrated RA and WB

Calculate for  Departure  Destination  Dep Altn  Dest Altn1  Dest Altn2

**DEPARTURE** **ANALYSIS**

ICAO\*  Airfield Info Weather Info  
[Airport Locator](#)

Runway\*  [View Runway Information](#)

Runway Length  Actual Runway Length : 8005 ft

Shorten End

Wind (Dir/Speed)\*

Temp(C)\*  Note: Prefix +/- while entering the values

Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Takeoff Options

Estimated Weight  Structural Limit : 91000 lbs

Limit TO	Estimated TO	Reduced Thrust
Limit:	Weight:	Weight:
Reason:		
V1:	V1:	V1:
VR:	VR:	VR:
V2:	V2:	V2:
PWR:	Vfto:	PWR:
Lvl Off MSL:	TO Dist:	A Temp(C)
	Trim:	

Emergency Return may be selected, if desired. Select the landing runway and flap setting desired for the emergency return.

Runway Analysis | Weight and Balance | Integrated RA and WB

Calculate for  Departure  Destination  Dep Altn  Dest Altn1  Dest Altn2

**DEPARTURE** **ANALYSIS**

ICAO\*  Airfield Info Weather Info  
[Airport Locator](#)

Runway\*  [View Runway Information](#)

Runway Length  Actual Runway Length : 8005 ft

Shorten End

Wind (Dir/Speed)\*

Temp(C)\*  Note: Prefix +/- while entering the values

Altimeter\*  Note: Enter value in hPa or In.Hg

Flap Setting\*

Takeoff Options

Estimated Weight  Structural Limit : 91000 lbs

Include emergency return settings in calculations

Runway\*  15 33

Emg. Return Flap\*

Emg. Return Options

Limit TO	Estimated TO	Reduced Thrust
Limit:	Weight:	Weight:
Reason:		
V1:	V1:	V1:
VR:	VR:	VR:
V2:	V2:	V2:
PWR:	Vfto:	PWR:
Lvl Off MSL:	TO Dist:	A Temp(C)
	Trim:	

Limit TO	Estimated LD	
Limit:	LD Weight:	Vfto:
Reason:	LDA:	Vapp:
	LD Dist:	Vref:
	115% Dist:	MAP Grad:

From the Runway drop down menu select, the departure airport runway that is expected to be used for landing in the event of an emergency return immediately after takeoff. The LD data will be calculated using the actual takeoff weight previously entered.

Landing performance for the destination airfield requires similar entries as the departure data.

DESTINATION		ANALYSIS	
ICAO*	<input type="text"/> <a href="#">Airfield Info</a> <a href="#">Weather Info</a> <a href="#">Airport Locator</a>	Limit LD	Estimated LD
Runway*	SELECT	Limit:	LD Weight:
Runway Length	<input type="text"/> Actual Runway Length :	Reason:	LDA:
Shorten End	APPROACH		LDG Dist:
Wind (Dir/Speed) *	DDDSS <a href="#">Use METAR</a>		115% Dist:
Temp(C) *	<input type="text"/> Note: Prefix +/- while entering the values		Vfto:
Altimeter *	<input type="text"/> Note: Enter value in hPa or In.Hg		Vapp:
Flap Setting *	39 DEG		Vref:
Landing Options	<a href="#">▶</a> 60% LANDING FACTOR		MAP Grad:
Estimated Weight	<input type="text"/> Structural Limit : 75300 lbs		

DESTINATION		ANALYSIS	
ICAO*	KTEB <a href="#">Airfield Info</a> <a href="#">Weather Info</a> <a href="#">Airport Locator</a>	Limit LD	Estimated LD
Runway*	19 <a href="#">View Runway Informatic</a>		LD Weight:
Runway Length	6997 Actual Runway Length :		LDA:
Shorten End	APPROACH		LDG Dist:
Wind (Dir/Speed) *	14005 <a href="#">Use METAR</a>		115% Dist:
Temp(C) *	15 Note: Prefix +/- while en		Vfto:
Altimeter *	30.03 Note: Enter value in hPe		Vapp:
Flap Setting *	39 DEG		Vref:
Landing Options	<a href="#">▶</a> 60% LANDING FACTOR		MAP Grad:
Estimated Weight	66500 Structural Limit : 75300		

**Landing Options** ✕

WET RUN

1/8 in SLUSH

1/4 in SLUSH

1/2 in SLUSH

1/2 in LOOSE SNOW

1 in LOOSE SNOW

1 1/2 in LOOSE SNOW

COMPACT SNOW

ICE

COWL A/I ON

WING + COWL A/I ON

60% LANDING FACTOR

80% LANDING FACTOR

UNFACTORED LANDING DISTANCE

[Done](#) [Close](#)

NOTE: Landing Options include the ability to select landing factor values of 60%, 80% or Unfactored. The selected landing factor will be used to determine the Limit LD Weight. The selection will also be used to determine if the weight of the aircraft entered for the landing Estimated Weight, will be able to stop within:

- 60% of the Landing Distance Available (LDA), or
- 80% of the LDA, or
- Unfactored – using up to 100% of the LDA

Once all of the required entries have been made, select the Compute button to run the RA. The calculated data will be displayed on the right side of the screen.

DEPARTURE		ANALYSIS		
ICAO*	KASE <span>Airfield Info</span> <span>Weather Info</span> <a href="#">Airport Locator</a>	<b>Limit TO</b>	<b>Estimated TO</b>	<b>Reduced Thrust</b>
Runway*	33DP <span>View Runway Information</span>	Limit: <b>83221</b>	Weight: <b>71750</b>	Weight: <b>71750</b>
Runway Length	8005 Actual Runway Length : 8005 ft	Reason: <b>Runway</b>	V1: <b>126</b>	V1: <b>127</b>
Shorten End	APPROACH	V1: <b>141</b>	VR: <b>130</b>	VR: <b>130</b>
Wind (Dir/Speed) *	34008 <span>Use METAR</span>	V2: <b>151</b>	V2: <b>138</b>	V2: <b>138</b>
Temp(C) *	0 Note: Prefix +/- while entering the values	PWR: <b>1.65</b>	Vfto: <b>173</b>	PWR: <b>1.51</b>
Altimeter *	30.36 Note: Enter value in hPa or In.Hg	Lvl Off MSL: <b>9337</b>	TO Dist: <b>5871</b>	A Temp(C) <b>35</b>
Flap Setting *	10 DEG	Trim:		
Takeoff Options	<span>ECS ON</span>			
Estimated Weight	71750 Structural Limit : 91000 lbs			
<input checked="" type="checkbox"/> Include emergency return settings in calculations		<b>Limit TO</b>	<b>Estimated LD</b>	
Runway*	15	Limit: <b>91000</b>	LD Weight: <b>71750</b>	Vfto: <b>70</b>
Emg. Return Flap : *	39 DEG	Reason:	LDA: <b>7005</b>	Vapp: <b>115</b>
Emg. Return Options	<span>60% LANDING FACTOR</span>		LD Dist: <b>2724.03</b>	Vref: <b>110</b>
			115% Dist: <b>3132.64</b>	MAP Grad:

DESTINATION		ANALYSIS		
ICAO*	KTEB <span>Airfield Info</span> <span>Weather Info</span> <a href="#">Airport Locator</a>	<b>Limit LD</b>	<b>Estimated LD</b>	
Runway*	19 <span>View Runway Information</span>	Limit: <b>75300</b>	LD Weight: <b>66500</b>	
Runway Length	6997 Actual Runway Length : 6997 ft	Reason: <b>Structural</b>	LDA: <b>6234</b>	
Shorten End	APPROACH		LDG Dist: <b>2501.00</b>	
Wind (Dir/Speed) *	14005 <span>Use METAR</span>		115% Dist: <b>2876.00</b>	
Temp(C) *	15 Note: Prefix +/- while entering the values		Vfto: <b>159</b>	
Altimeter *	30.03 Note: Enter value in hPa or In.Hg		Vapp: <b>131</b>	
Flap Setting *	39 DEG		Vref: <b>126</b>	
Landing Options	<span>60% LANDING FACTOR</span>		MAP Grad: <b>10.15</b>	
Estimated Weight	66500 Structural Limit : 75300 lbs			

The output displays Limit TO/LD Weights, the Estimated TO/LD Weights and, for those aircraft capable of takeoff with reduced thrust, the Reduced Thrust performance information. In addition, if Emergency Return is selected, the ER data will also be displayed.

### **Limit TO**

The Limit TO field displays the takeoff performance Limit Weight, determined using the environmental conditions, flap and options selections for the departure airport. The limit Reason is also displayed denoting the factor determined to be the most limiting. Takeoff speeds  $V_1$ ,  $V_R$ ,  $V_2$ , and  $V_{FTO}$  are displayed for the Limit Weight. The power setting for the selected flap setting, environmental conditions and selected options (as required) are also displayed. The calculated Level Off Altitude (MSL) is displayed, defining the altitude to which the aircraft must climb to, level off, and accelerate in level flight to  $V_{FTO}$ .

### **Estimated TO**

Similarly, the Estimated TO field displays the takeoff performance data for takeoff at the Estimated Weight value. In addition, the TO Distance and Trim are displayed.

### **Reduced Thrust**

For those aircraft capable performing a takeoff at reduced thrust, performance data is provided. While similar to the Estimated TO data, the Reduced Thrust data also includes the reduced thrust power setting and the assumed temperature.

### **Limit LD**

The Limit LD field displays the landing performance Limit Weight, determined using the environmental conditions, flap and options selections for landing at the destination airport. The limit Reason is also displayed denoting the factor most limiting for landing.

NOTE: the limit weight is calculated using the selected Landing Factor option, i.e. when the limit Reason is Field Length, the aircraft can be stopped using all of the factored value of the LDA only when flown using the same technique as during the aircraft landing certification process (example: FAR 25.125).

### **Estimated LD**

The Estimates LD field displays the landing performance data for landing at the landing Estimated Weight value. In addition, the LDA, LD Distance (AFM actual landing distance – without factor), 115% of the LD Distance (for compliance with FAA Safety Alert for Operators – SAFO 06012, August 31 2006), V-speeds ( $V_{FTO}$ ,  $V_{APP}$  and  $V_{REF}$ ), and the Missed Approach Gradient (MAP Grad), are displayed.

NOTE: The missed approach gradient is the most limiting of the Approach Climb (FAR 25.121, one engine inoperative) and Landing Climb (FAR 25.119, all engines operating).

After computing the RA data, if a report is desired, select the Generate Report button.

DESTINATION		ANALYSIS	
ICAO*	<input type="text" value="KTEB"/> <a href="#">Airfield Info</a> <a href="#">Weather Info</a> <a href="#">Airport Locator</a>	<b>Limit LD</b>	<b>Estimated LD</b>
Runway*	<input type="text" value="19"/> <a href="#">View Runway Information</a>	Limit: <b>75300</b>	LD Weight: <b>66500</b>
Runway Length	<input type="text" value="6997"/> Actual Runway Length : 6997 ft	Reason: <b>Structural</b>	LDA: <b>6234</b>
Shorten End	<input type="text" value="APPROACH"/>		LDG Dist: <b>2501.00</b>
Wind (Dir/Speed) *	<input type="text" value="14005"/> <a href="#">Use METAR</a>		115% Dist: <b>2876.00</b>
Temp(C) *	<input type="text" value="15"/> Note: Prefix +/- while entering the values		Vto: <b>159</b>
Altimeter *	<input type="text" value="30.03"/> Note: Enter value in hPa or In.Hg		Vapp: <b>131</b>
Flap Setting *	<input type="text" value="39 DEG"/>		Vref: <b>126</b>
Landing Options	<input type="button" value="&gt;"/> <b>60% LANDING FACTOR</b>		MAP Grad: <b>10.15</b>
Estimated Weight	<input type="text" value="66500"/> Structural Limit : <b>75300</b> lbs		
<input type="button" value="Compute"/> <input type="button" value="Generate Report"/>			

Reports are generated containing all of the pertinent performance data and displayed in pdf format (only the top part of each RA is displayed in the following samples). All pages are watermarked with the aircraft's registration number and the date of report generation:

Takeoff

**Takeoff**  
**G550 G-550 BR710**  
**10 DEG**

**Actual TOW: 71750** ECS ON  
**Wind: 34008**  
**Altimeter: 30.36**

KASE	33DP	33DP5			Runway
TEMP C PWR	8005/8005/8005	8005/8005/8005			TORA/TODA/ASDA
-03 1.65	89579 / FL 125 / 130 / 138 / 173 5817 / 9337	89579 / FL 125 / 130 / 138 / 173 5817 / 10863			Limit Weight/Code Actual V1/VR/V2/VFTO TOFL/Accel (MSL)

Engine Out Procedures – as required

Departure Procedures
KASE 33DP
TAKEOFF WEIGHTS FOR RWY 33DP MAY BE USE WITH PUBLISHED -LINDZ- AND -SARDD- DEPARTURE PROCEDURES.
MAKE AN IMMEDIATE 15 DEGREE BANKED CLIMBING -RIGHT- TURN TO A HEADING OF 343 DEGREES.
AT 10.3 DME SOUTH OF DBL VOR (DBL R-165/D10.3 -OR- IASE LOC DME D3.75) MAKE A 15 DEGREE BANKED CLIMBING -LEFT- TURN TO HEADING 273 DEGREES.
INTERCEPT THE IPKN LDA NORTHWEST COURSE (OUTBOUND ON BACKCOURSE - IPKN 303/D15.0) DIRECT LINDZ INTXN (DBL VOR 244/12.6).
CLIMB IN HOLDING PATTERN AT LINDZ INTXN. (WEST, LEFT TURNS, 064 INBOUND).

Reduced Thrust – when applicable

**Reduced Thrust**  
**G550 G-550 BR710**  
**10 DEG**

**Actual TOW: 71750** ECS ON  
**Wind: 34008**  
**Altimeter: 30.36**

KASE	33DP	33DP5			Runway
TEMP C PWR	8005 / 8005 / 8005	8005 / 8005 / 8005			TORA/TODA/ASDA
-03 1.65	89579 / FL / 95 127 / 130 / 138 7639 / 9337	89579 / FL / 95 127 / 130 / 138 7639 / 10863			Limit/Code/Assum Temp Actual V1/VR/V2 TOFL/Accel (MSL)

## Emergency Return – when selected

### Emergency Return

G550 G-550 BR710

39 DEG

Actual LDW: 71750

Wind: 34008

Altimeter: 30.36

60% LANDING FACTOR

KASE	15	33			Runway
TEMP C	7005	7005			LDA
-03	91,000 / ST / 5.9 3510 / 4037 136 / 141 / 173	91,000 / ST / 5.9 3060 / 3520 136 / 141 / 173			Limit/Code/MAP Grad LD Dist/115% Dist VRef/VApp/VFTO

## Landing

### Landing

G550 G-550 BR710

39 DEG

Actual LDW: 66500

Wind: 14005

Altimeter: 30.03

60% LANDING FACTOR

KTEB	01	06	19	24	Runway
TEMP C	5319	6015	6234	6015	LDA
12	75300 / ST 2664 / 3063 126 / 131 / 159	75300 / ST 2531 / 2910 126 / 131 / 159	75300 / ST 2501 / 2876 126 / 131 / 159	75300 / ST 2575 / 2961 126 / 131 / 159	Limit/Code/MAP Grad LD Dist/115% Dist VRef/VApp/VFTO

