Brief User Guide

Gulfstream G200 Program Information

For program installation help please see http://www.afmsolutions.com/installing.html

For getting started help please see http://www.afmsolutions.com/ipadiphone.html

General Software Information

AFM Solutions is a Texas based corporation founded in 2009 by Dejan Rajcic who is a pilot, physicist and software engineer. Dejan Rajcic has been writing scientific software since 1977 and aircraft performance software since 1981. The proprietary methods employed by AFM Solutions are those developed by Dejan as a result of many years of physics research and teaching in a university setting.
Our software always follows all the AFM (Aircraft Fight Manual) procedures in the most strict fashion, producing accurate and valid results. The algorithms used in the software follow the protocols and procedures dictated by the AFM, in this case the G200 AFM. This is true for all the data derived in the software for takeoff, landing and weight and balance. The aircraft AFM data is digitized and analyzed by AFM Solutions' proprietary methods and technology, after which, it is converted into computer algorithms and then into source code.
The software consistently produces accurate results based on the user input data, thus eliminating human error in the calculations. Our proprietary methods inherently contain error checking features and data proofing systems, however, we also run extensive quality control checks and test each program for accuracy and any possible errors.

There are two versions of this software available, one for aircraft certified for **MTOW of 35450** lb. and one for **MTOW of 35650** lb. The weight and balance form in the program is custom-configured for each aircraft, but it also allows the user to enter a separate user-defined configuration if necessary.

Takeoff Section Detailed Information

Performance values are calculated after a thorough weight limit analysis

- Structural Weight Limit
- Weight Limit due to Climb Requirements
- Weight Limit due to Brake Energy
- Weight Limit due to Runway Length
- Weight Limit due to Obstacles
- Weight Limit due to Required SID Gradient

Finally, the software uses the most restrictive of the weight limits found.

When calculating a takeoff weight limit due to **obstacle** the software will find the required average gradient.

Then, the optimum obstacle clearance weight is calculated by finding the best average available gradient.
The available gradient is calculated by finding the average of:
Climb gradient at airport pressure altitude and temperature, and climb gradient at level-off pressure altitude adjusted for ISA temperature deviations.

All corrections such as wind, runway slope, anti-ice, etc. are always applied.

Runway optimization is applied in obstacle clearance calculations.

Speeds, V1 and VR and Takeoff Thrust are computed at the airport pressure altitude and temperature.
Speeds, V2 and Vfto or Venr and Maximum Continuous Thrust are computed at level-off pressure altitude adjusted for ISA temperature deviations.

Note: Software displays the Final Segment Climb Gradient and Speed even if the final segment is not required.

Calculations can be performed for all runway conditions: Dry, Wet, Contaminated Runways.

Weight and Balance Section Detailed Information

The software uses the aircraft's Basic Operating Weight, arm and moment provided by the aircraft owner/operator. The user can input the weight of each passenger or crew member as required, as well as the cargo/baggage weight. Using the cg arms for each seat and baggage station, the software proceeds to calculate the aircraft weight, moment and C.G. for each phase of flight, Ramp, Takeoff and Landing by computing the fuel moment for each phase based on user input. The final results are displayed and checked against the aircraft's Center of Gravity and Moment Envelops. If a quantity is found to be outside the required C.G. or weight limits, the software alerts the user in each instance.

User Guide

When starting the app for the first time you'll have to accept the license agreement in order to continue.

When the app is started, it always shows the Main Menu page as illustrated below.
Here, you can tap the Weight & Balance button, Landing button or Takeoff button.

There are several options for the app's background color. Under different lighting conditions certain options may work better than others. The textured background works great in bright daylight, but a darker grey works better in low light situations.

Weight and Balance

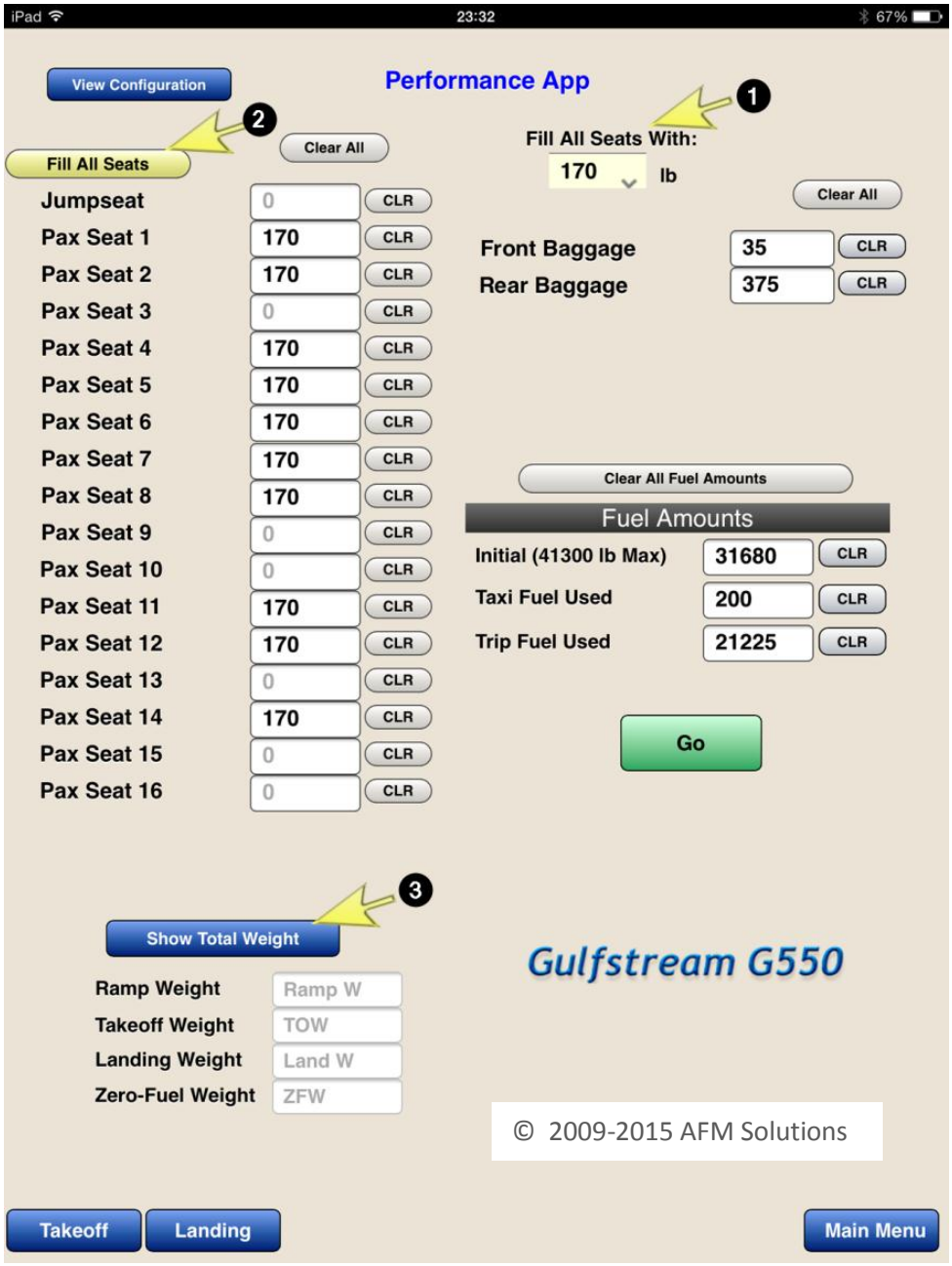
Tap the "**Weight & Balance**" button on the main menu to jump to the Weight and Balance form.
Then, you can either begin by typing the passengers' weight values or you can use the quick fill method.

To begin entering numbers tap on a white input box of your choice, for example Pax Seat 1:

A built-in keypad will appear so you can start typing. To move to the next box press the **"Next"** button:

The quick fill method:

1. Select the pre-determined passenger weight from 125 lb to 200 lb.
2. Tap the yellow " **Fill All Seats**" button. Then tap the "**CLR**" button next to any vacant seat.

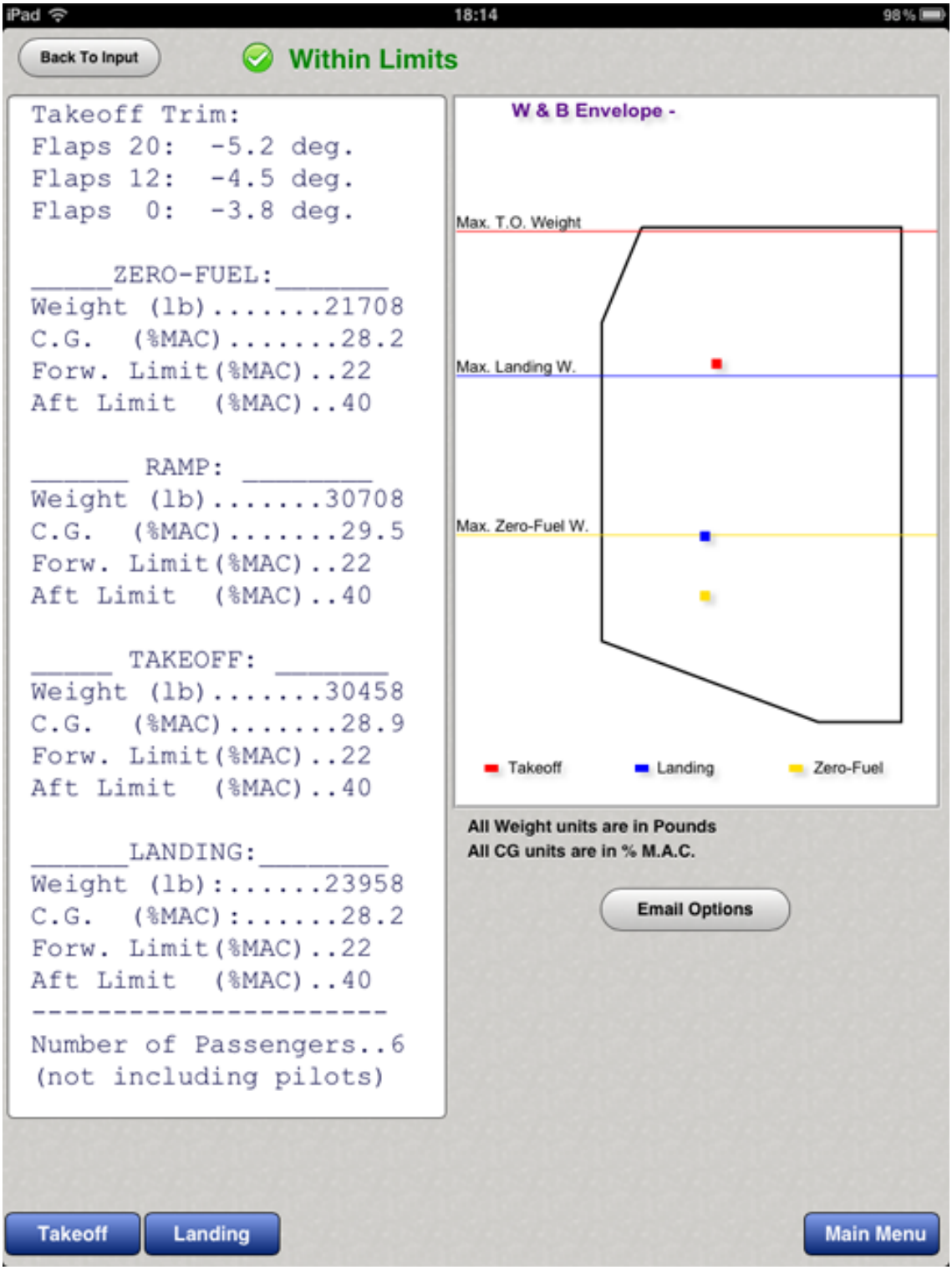


This page shows our G550 app.

However, all our apps have similar functions.

3. Press the "**Show Total Weight**" button at any time to the current Ramp Weight, Takeoff Weight, etc.

When finished typing, just press the green "**Go**" button to see the computed results.



The red square represents the Takeoff CG location, the blue square represents the Landing CG location and the yellow square represents the zero-fuel CG location.

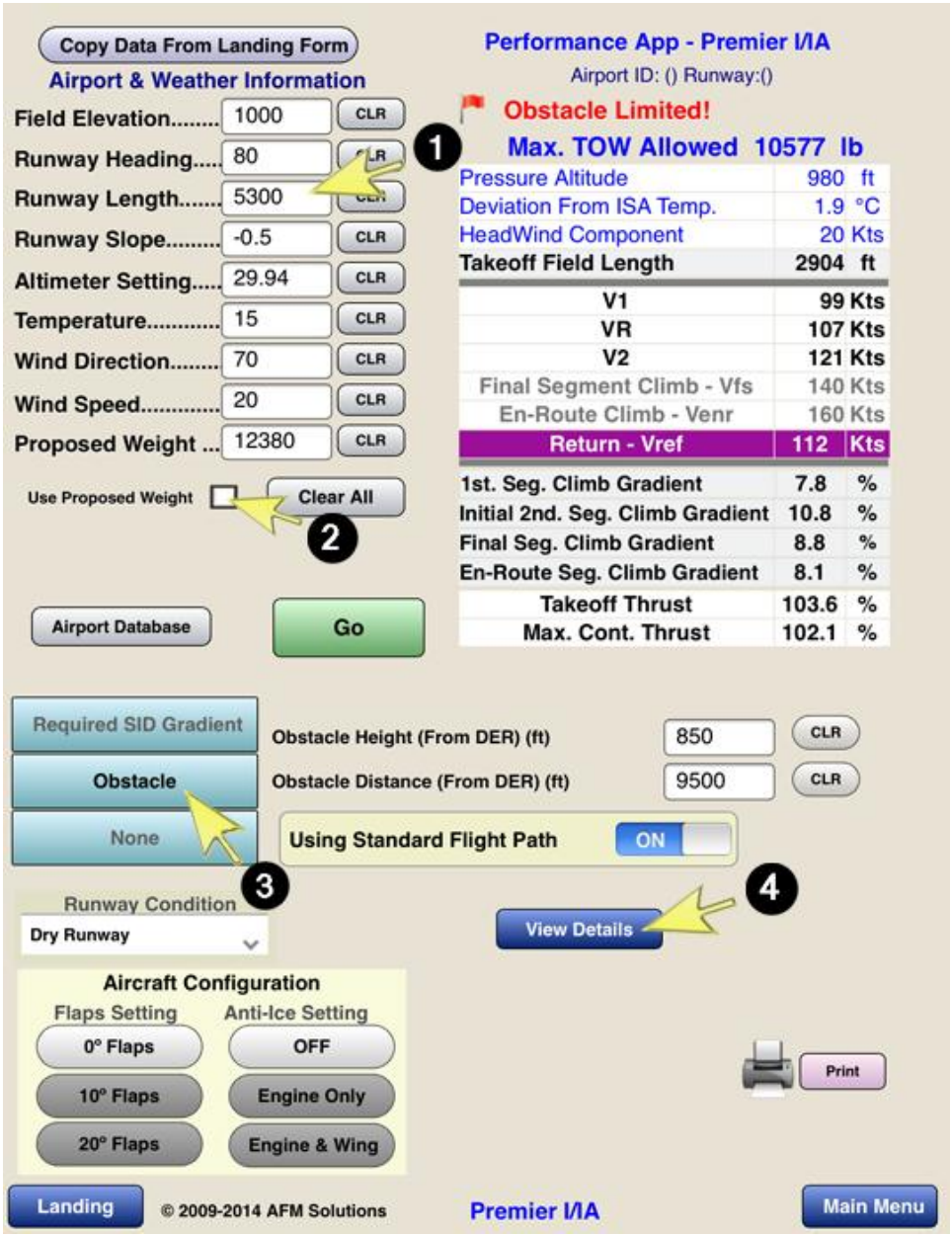
The **Ramp Weight**, moment and CG values are also computed, but they are not shown in the diagram. However, if the ramp weight, cg or moment is out of limits a warning message will appear on the screen.

Takeoff

Enter the required airport and weather information. The values will default to zero if left blank.

1. The runway length and the altimeter setting fields cannot be zero.

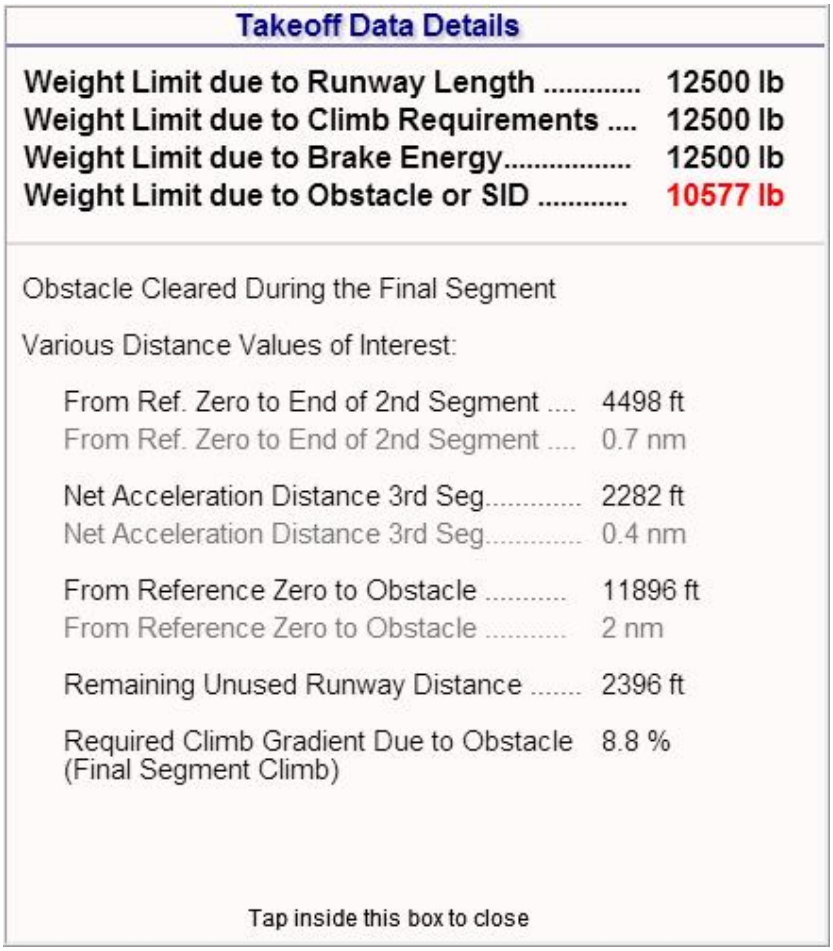
The altimeter setting can be entered in several ways for your convenience. For example for standard conditions you can type “29.92” or “2992” or you can use a metric value of “1013”



2. If the “**Use Proposed Weight**” box is checked, the program will use the weight found in the “Proposed Weight” box. If left unchecked, the program will find the maximum allowable takeoff weight for the given conditions.

3. If there are no obstacles to clear and no required SID gradient, press the “**None**” button.
If there is an obstacle, enter the obstacle height above the brake release point in feet. Then enter the obstacle’s distance from the end of the runway.

4. Press the "**View Details**" button to see the details of all the weight limitations encountered and the flight path details



If a computed weight limit value is less than the MTOW then it is shown in red. In this case the maximum takeoff weight limited by obstacle is 10577 lb.

When it is required to clear an obstacle, the program will always find the highest possible weight that will allow the **net flight path** to clear the obstacle by a **minimum of 35 feet**.

The second segment climb gradient is always computed.
The 4**00 ft level-off height and the 1500 ft level-off height are** adjusted for temperature deviations and converted to a **pressure altitude**. When it is necessary to go beyond the 2nd segment, the program calculates:

- the distance reached at the end of the 2nd segment
- the distance and height reached at the end of the final segment.
- It also calculates the horizontal distance travelled during each segment
- the horizontal acceleration distance required during the transition segments at 400 ft and at 1500 ft.

The main values are then displayed in the details box. To close this box, just tap anywhere inside the box.

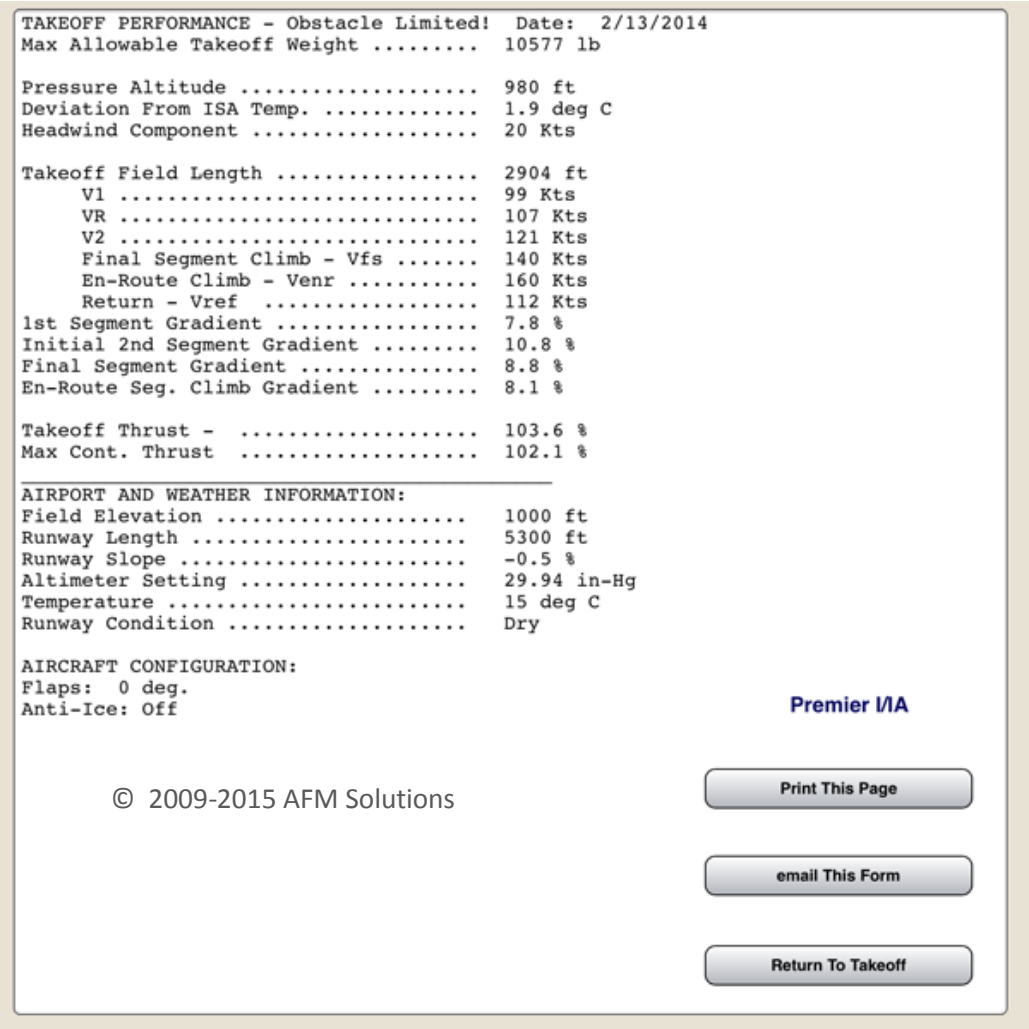
The **Reference Zero** point is a point 35 ft above the runway at the end of the takeoff field length.

Note that the maximum continuous thrust is always computed at the pressure altitude and temperature of the level-off height. The calculated value of the level-off pressure altitude is always adjusted for any deviation from ISA temperature.

When "**Using Standard Flight Path**" is on, the program will analyze obstacle clearance by finding the takeoff field length. Then from reference zero, it will calculate the 1st and 2nd segment gradients. If necessary, it will also calculate the 3rd segment horizontal acceleration distance, the final segment gradient, horizontal distance travelled during the final segment, the horizontal distance to accelerate from final segment to enroute segment, and finally the enroute segment climb gradient.
If "**Using Standard Flight Path**" is off, then the program will force the net flight path to clear the obstacle within the 5 minute engine limit before leveling off.

Printing Takeoff Results

Click on the “Print” button if you want to print or email the results of your takeoff calculations. The following form will appear

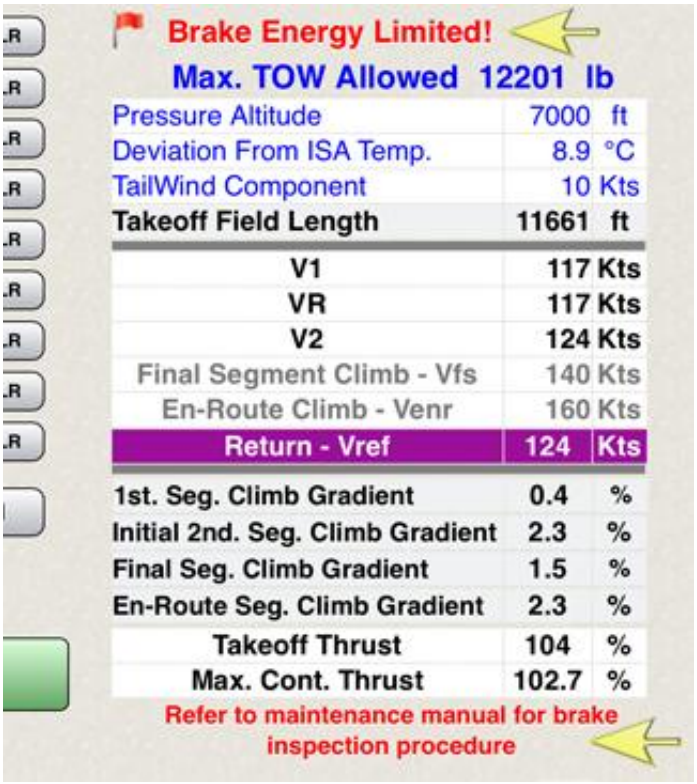


Press the “Print This Page” button and your AirPrint user dialog will appear. Air Print is now a standard feature on iPads running iOS 7. Just select your wireless printer and print.

Takeoff On Wet Or Contaminated Runways

Tap on the "Runway Condition" box to select a condition other than dry runway.

If you selected Wet Snow or Slush, then two new boxes will appear, contaminant depth in inches and specific gravity. If you enter a number that is out of range, the program will alert you and will show you the range of contaminant depth or specific gravity that can be used.
With other types of contaminant only the depth box will be shown.



The program always calculates the brake energy for each contaminant type.

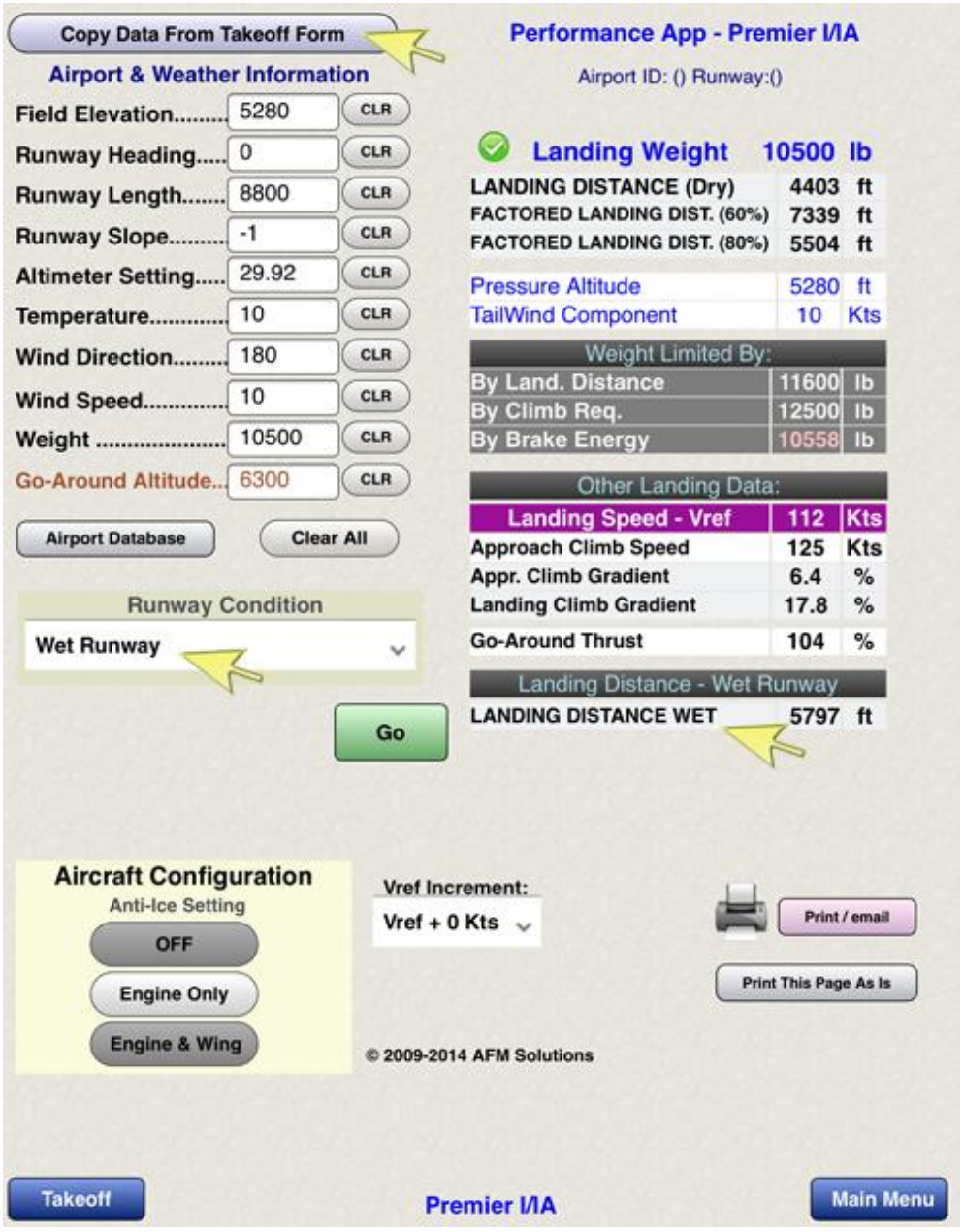
If the final brake energy value is in the shaded area of the graph then, as instructed by the AFM, the program shows a message just below the takeoff results reminding the user to refer to the maintenance manual for brake inspection procedure.

If the weight is also limited by the maximum brake energy allowed then there is massage above the takeoff results alerting the user to that effect.

As always, the program always applies all the necessary corrections to the field length and V1 speed.

Landing

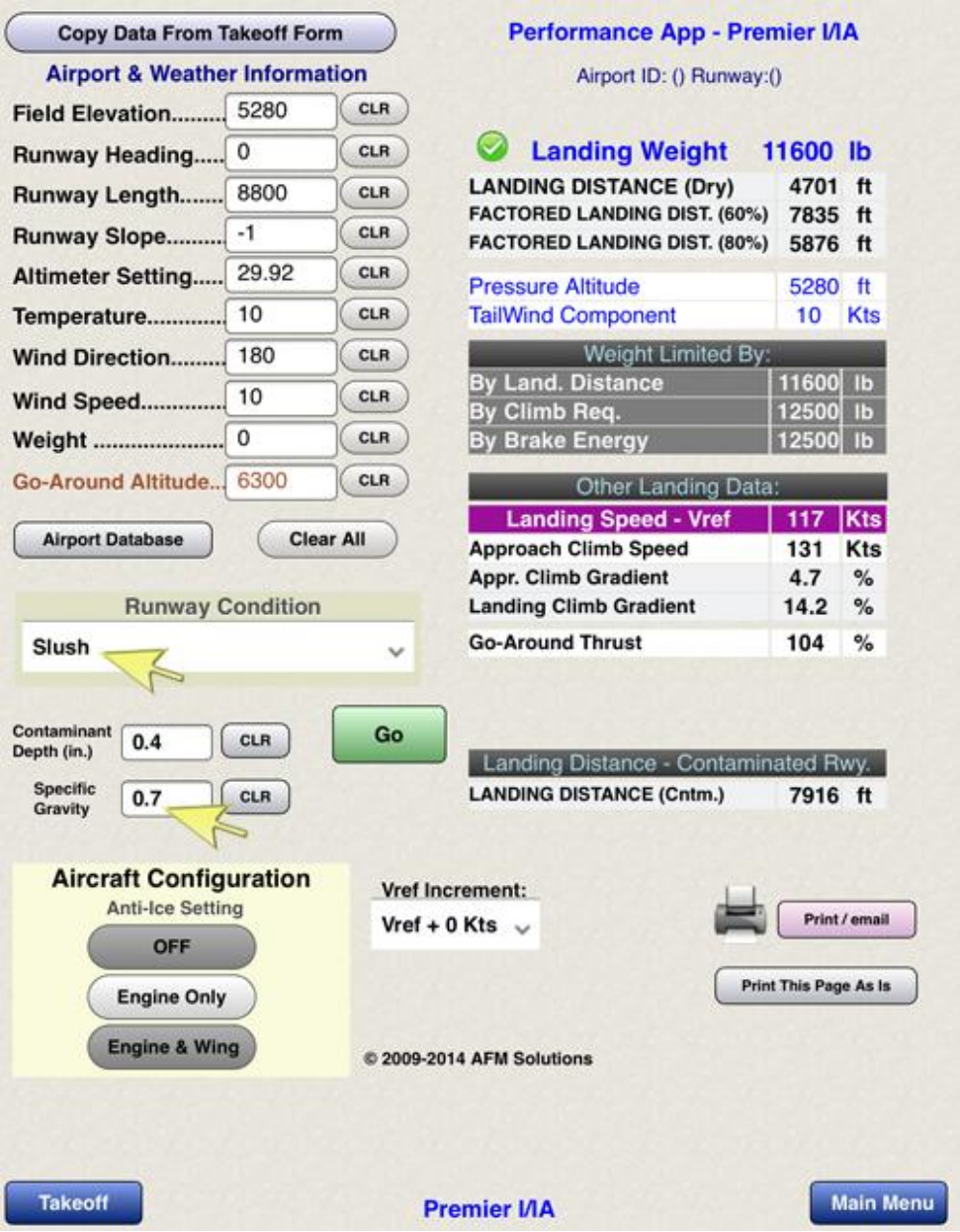
If the aircraft has to make an emergency landing immediately after takeoff, you can quickly transfer all the airport and weather information from the takeoff form into the landing form by pressing the "**Copy Data From Takeoff Form**" button near the top of the form.



If the "**Weight**" box is left blank, the program will use the structural maximum landing weight allowed.
If any of the Landing Distance results (dry, wet or contaminated) are out of range there will be a warning message shown in red. In the example above with wet runway, the landing distance of 5797 feet is less than the runway length of 8800 ft., so consequently we see a green checkmark next to the landing weight.

If the "**Go-Around Altitude**" box is left blank, then the program will automatically use the airport pressure altitude. The Go-Around Thrust, Approach Climb Gradient and Landing Climb Gradient are all calculated using the go-around altitude.

Landing on Contaminated Runways



In this example the user selected Slush with contaminant depth of 0.4 inches and specific gravity of 0.7

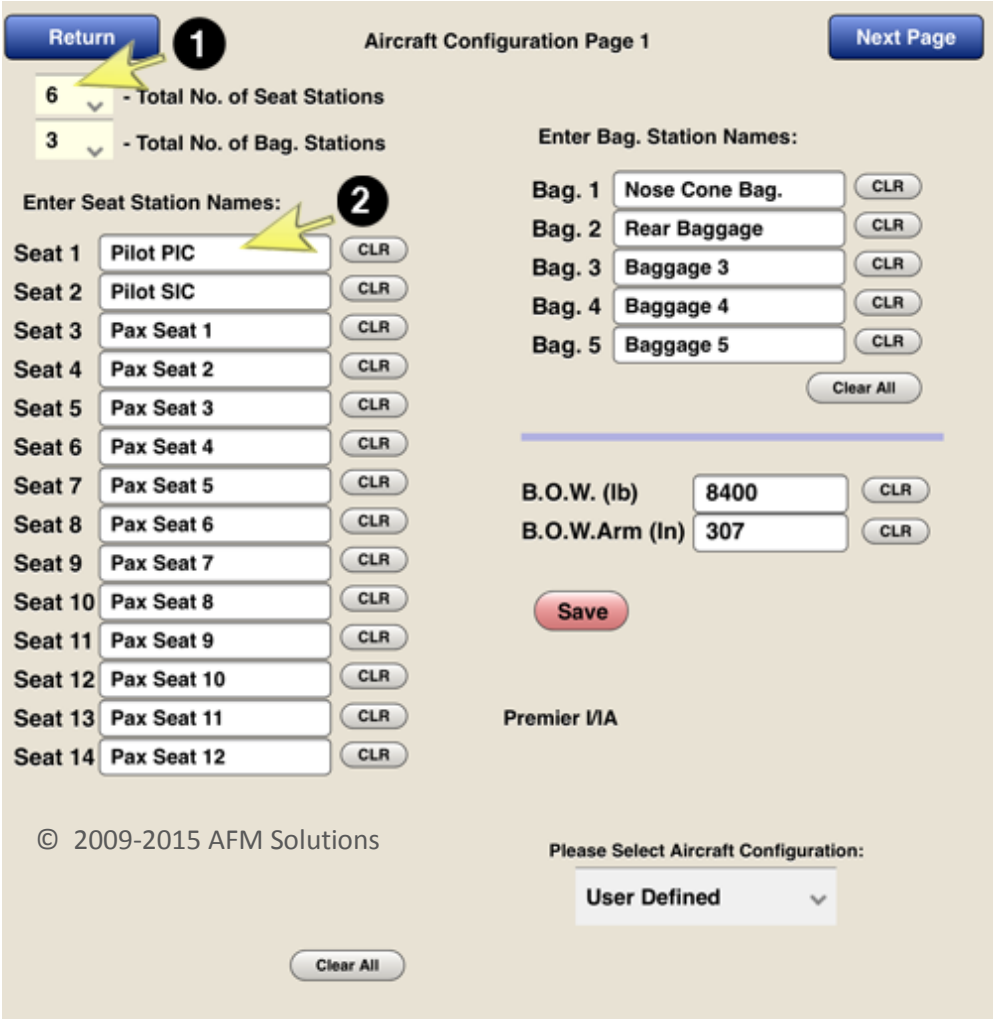
The program always calculates and displays the Dry-Runway landing distance for reference, even if the runway is not dry!

The landing distance for wet or contaminated runway is then shown below the Go-Around Thrust line.

The brake energy value is always calculated for each type of runway condition. If the landing weight is limited by the maximum brake energy value then the "**Weight Limited By**:" – "**By Brake Energy**" number will be shown in red.
There will always be a red warning sign if the weight or the landing distance exceeds the allowed limits.

Aircraft Configuration (Weight and Balance)

To view or modify the aircraft configuration, press the "**View Configuration**" button near the top of the weight and balance form. The W&B configuration form will show.



To return back to the weight & balance form, press the blue "**Return**" button. To move to the second page press the blue "**Next Page**" button.

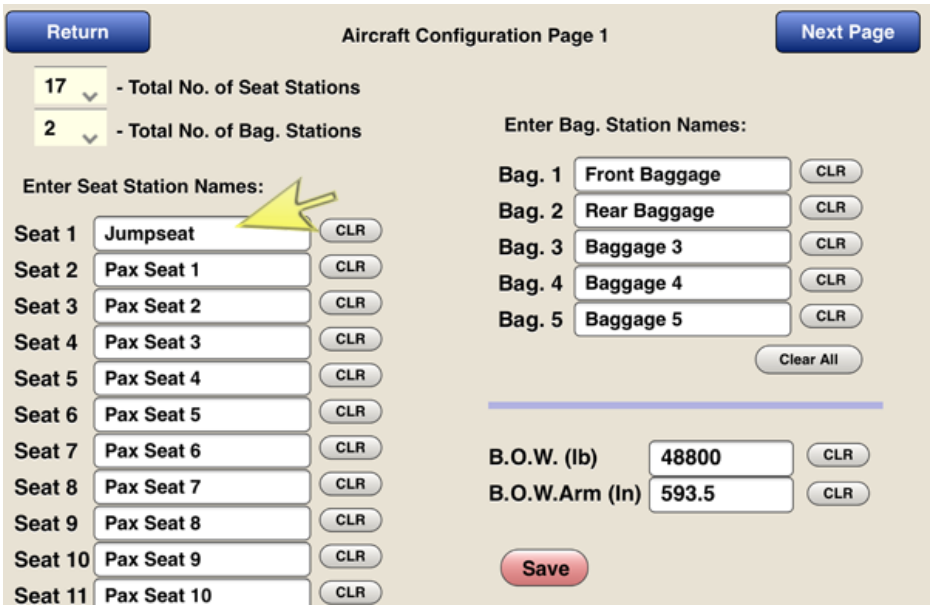
Here, you can change the number of seats present in your aircraft, the number of baggage areas present, B.O.W. weight etc.

1. This box lets you select how many passenger seats your aircraft uses.
2. You can rename the seats or baggage areas if needed.

For example if the first seat is a flight attendant seat, just tap the "Pilot PIC" box and change it to "Jump Seat" or "Flight Attendant". After you have made all the necessary changes, press the red "**Save**" button. Then return to the program.

You can select a configuration you want to use at any time. If you select "**Original Configuration**" the system will load the original data that was pre-programmed. This configuration cannot be modified. If you select "**User**

Defined" then the system will load the data you have entered and saved. The first time you use the app you'll have to erase or modify the generic data the user defined configuration contains.



To enter of change C.G. arms locations of the seats and baggage/cargo areas, go to the second page. Make any necessary changes and then press the "**Save**" button to save your new values or press the "Save & Exit" button to save the new values and return to the weight and balance input form.

If your aircraft has more than 14 seats please contact AFM Solutions so adjustments can be made to the program.