
THIS MANUAL CONTAINS INSTRUCTIONS FOR:

Operation of DynaFlight Aerial Application Systems

DynaFlight-AirAg and Forestry Airborne Aerial Application
Guidance and Management system



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Overview of the simulator:

What good is it to me?

This simulator will give you a really good idea of how the DynaFlight navigation system actually works. It will also allow you to do some basic training in the comfort of your office, and save you expensive flying hours.

What is the simulator?

The AirAg Simulator uses the actual software used on the Airborne Guidance system coupled with separate moving map to show relative position. When you have become comfortable with the method of operation of this simulator, you will easily become familiar with the actual operation in the aircraft.

How do I control it?

For the simulator on your PC Computer, you will use the Logitech Extreme 3D Pro (available at most electronic stores). In your Aircraft it is very easy, the 5-way top-hat switch along with one other button switch on the pilots control grip runs the total system operation. Also, spray on and off is sensed using pressure switches and/or a switch on the spray control lever.

Software Installation Instructions:

The following are the instructions for the installation of the DynaNav DynaFlight-AirAg Simulator and AirAg Office Software.

The “DynamavAgCompleteFullInstall.exe” install program will install AirAg Office, AirAg Simulator, Aircard Tuneup, PC Card Utilities, Synchronize Air Card and all the manuals. *Note: After installation run the **AirAg Office** software and the **Synchronze Air Card** in simulator mode first before running the AirAg Simulator - ‘Start – Programs – DynaNav Ag – -----’*

Cautions:

You have to be running Windows 95, 98, 2000, XP, Vista, Windows7 or NT for this simulator to work. For Vista, the properties on the Shortcuts for all of the programs have to be changed for “Administration” privileges. Please contact our office for instructions on how to do this if you are unable to make it work.

Download “DynamavAgCompleteFullInstall.exe” from www.dynamav.com – Support - Software – Downloads – Simulators AirAg Complete Install:

- Go to the folder that you stored the “Ag DynamavAgCompleteFullInstall.exe” with your browser (Windows Explorer) and Run this program (double click on this image).
- Step through the install wizard, normally accepting the defaults are OK, you may require to enter your name and company name.
- After this is installed, make sure your computer is connected to the Internet and go to ‘Start – Programs – Dynamav Ag – Check for Updates on the Web’. This will check for the

latest updates and ask you to Run an update wizard if there are any revisions to be downloaded. Once completed, you will have the latest software for all programs.

Install Logitech Joystick Software

Install the Software as supplied on the CD for the Logitech.

For Logitech Extreme 3D Pro Joystick

1. Install supplied Logitech software as per their instructions from the CD.
2. Open up "Game Controllers" Start – Control Panel – Game Controllers
3. Select Logitech Extreme 3D Pro Controller and select "Properties". Test Throttle, etc. for operation.
4. Select the "About" tab and mouse click on "Logitech Profiler"
5. Under the "Profile" pull down menu select "Import" then browse and select "DynaFlight Air.wgp" which will be found under C:\ Drive – Program Files – DynaNav – Ag Complete. Once "DynaFlight Air.wgp" is selected click on "Open".
6. A window "Profile Properties" now will give a profile name of "DynaFlight Air" and you will need to Browse to the Game file. Hit the "Browse" button and a window with "Look in:" should show up. Browse to "C:\Program Files\Dyanav\ Ag Complete", now scroll to "myprog32", select it and "Open".
7. After this, under the "Profile" pull down menu "Select Profile" and click on "DynaFlight Air".
8. Under the "Options" pull down, select "Global Profiler Settings" and check the selection for "Apply persistent profile and select "DynaFlight Air" as the persistent profile.
9. Also select "Start Profiler at system startup"
10. Select OK to the "Global Profile Settings" box, and then close the Logitech Profiler.
11. After this, run the Air Ag Simulator Start – Programs – DynaNav Ag – Air Ag Simulator. NOTE: If the buttons do not seem to work, make sure there is no a second "Flight Control by Joystick" program running. If there is, close the second one or close the Dynanav Air Ag Simulator and re-start the simulator.
 - After this is finished, the program will be installed as a normal windows application and will be available run by using 'Start – Programs –Dyanav AG - Air Ag Simulator' and 'Start – Programs – Dynanav Ag – Ag Ground'.
 - Note: After installation run the AirAg Office and Synchronize Air Card software first before running the AirAg Simulator - 'Start – Programs – Dynanav Ag – AirAg Office'.

Instructions for the use of the DynaFlight and Simulator

Note :- Before Starting the AirAg Simulator Program – Run the “Air Ag Office” in simulator mode and “Synchronize Air Card” on the “C” drive first See Manual below.

If you are running the program you should use the “Quit” button(Twice) to Exit the Simulator. If this does not work, you can TERMINATE THE SIMULATOR PROGRAM at any time, just hold the ALT key down and hit F4 (usually designated ALT-F4 by regular computer users).

The Joystick on the PC Computer for simulator

The tophat, trigger, and the switch below the tophat button, is used to for the complete selection and operation of the system. The flying is controlled by; the throttle for speed and for turning, the left and right of the joystick is used. (In older simulators, the “Num Lock” must ON for this to work properly. If the buttons aren’t working, try changing the “Num Lock” (on the number pad or other ways on a laptop).



Figure 1 Logitech Extreme 3D Pro

Selecting from a list

What is a list?

Under certain circumstances you will be presented with a screen filled with a list of items to choose from (customers, swath widths, fields, nav points, etc). Until you make a choice from the list you will not be permitted to do anything else.

Navigating the list:

For BOTH the simulator on your PC computer and the Aircraft system, use the Tophat switch. Down is down the list one at a time, and up is up the list one at a time. Left is back up the list in larger jumps farther and farther each time you hit it (for long lists). Right is down the list farther and farther each time you hit it. Select the chosen item from a list by pulling the trigger (enter).

Selecting a button on the button pad

What is a button pad?

It is a tic-tac-toe pattern (a 3 by 3 set of squares which look somewhat like the set of buttons on the number pad of your keyboard). Each button has a small message or title on it.

The corner Buttons are information fields such as selected Customer and Job name.

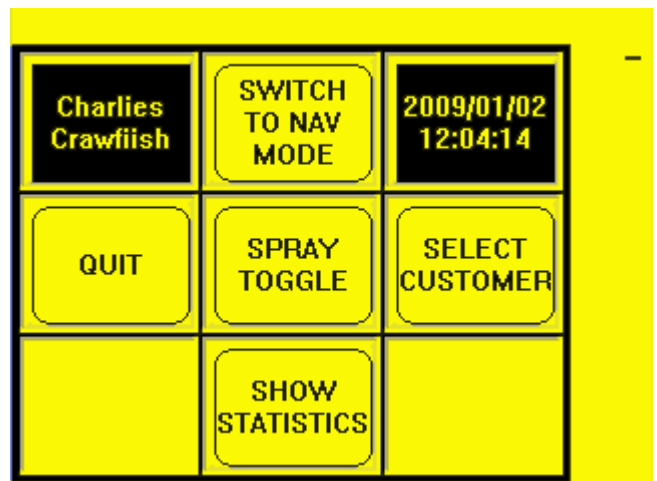
What is it for?

Each 'button' on the button pad that is visible can be 'pushed' or activated through the tophat switch on the aircraft or Joystick control grip. When a button is pushed something happens. The text on the button pad hints at what will happen when the button is pushed and held for a second.



Selecting a button

When you are looking at a button pad, the individual buttons correspond to the layout of the same direction on the tophat switch on the aircraft. Pushing and holding the Tophat in the direction of the button will accept. NOTE: If the Tuneup Kit has selection "Using Fire Button on Hold" turned off, then the 'Trigger' must be pulled to accept the selection.



Rotating through the visible windows

What are 'visible windows'?

So far we have described above a list and a button pad. These are individual 'windows' that can be made visible, one only at a time.

What does it mean to ‘rotate through’ them?

Since only one window can be visible at a time, and we might want to be able to select another window to look at or use, we will have to have a way to change to the ‘next’ window. If you think of the windows as a set of playing cards stacked up, you will get to the next one in the stack by putting the top window (card) onto the bottom of the stack. Each time we do this, we call this rotating through the windows, or ‘windowing’.

How do I rotate through the visible windows?

We rotate through the windows once each time we hit the left ‘Window’ switch (**Button 3 on simulator joystick**) below the tophat. (*In the actual aircraft, we would push down the top hat button on the ErgoGrip or special button set-aside for this purpose called the ‘window’ button.*)

While in the **Roadway Live** window, pushing the ‘Window’ button **once** brings up the next window. By waiting a couple of seconds before pushing the Window button, it will return to the Roadway Live window.

While in the **Roadway Live** window, pushing the ‘Window’ button **twice** brings up the third window. By waiting a couple of seconds before pushing the ‘Window’ button, it will return to the Roadway Live window.

While in the **Roadway Live** window, pushing the ‘Window’ button **three times** brings up the **Buttons** window. By continuing to push the ‘Window’ button, you will continue to rotate through the different windows until you come back to the **Roadway Live** window.

What windows are available to rotate through?

This depends on what is currently going on. When you first start up, there is only ONE window available, and that is the customer list, from which you must select the customer name you are going to work for (or alternatively you could select ‘new customer’, but that is ahead of us a bit). Once you have selected a customer, you will ONLY have the two button pads to work with until you select something to do. If you select the ‘SELECT JOB’ button, then chose a field (already in progress or pre-defined), you will now have to choose a Nav Point to navigate to, this will be explained later. You will now have 2 default windows to look through. Try this and see.

Spray On/Spray Off

In both the simulator and in the real aircraft, by pulling the **trigger (enter)** switch will toggle the spray recording on and off. In the real aircraft the spray on/off is sensed from the boom pressure switch and/or a switch on the spray lever to automatically record the spray on/off. NOTE: one of AirAg Tune-up settings is the minimum speed at which spray recording will take place, the default being more than 15 knots. If you want to spray at less than this speed, you will have to change this parameter using the AirAg Tune-up (see DynaFlight Tune-up below)

Speeding up/down and Turning on the simulator

Joystick Throttle

Use the throttle to set your speed, which is displayed on both the moving map as well as on the navigation window. The speed is variable between 0 and approximately 195 knots.

Turning left and right

The joystick uses only the left and right flight control for turning. The rate of turn is proportional to the how far you push the stick left or right.

Selecting a Customer

- When the system first Starts up, it will ask you to select the aircraft name (Tail number or other name given in the AirAg Office Software settings)
- After this you select the customer from the list and pull the Enter (trigger).
- If the customer is not in this list you may select “**Add New Customer**” at the top of the list. This will add a new customer using the exact date and time e.g. 2010/04/29 17:45:23. This can be edited later on in the AirAg Office software to the actual customers name.
- Also, you can select the ‘Select Customer’ Button at anytime to change to a different customer.

Setting a new job

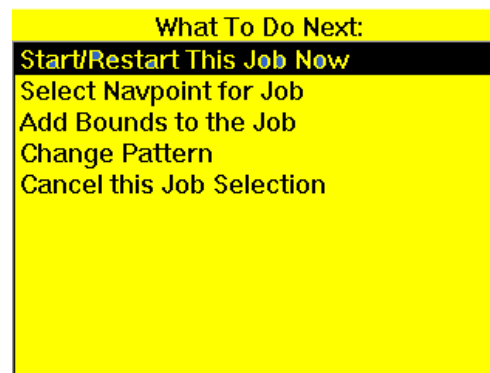
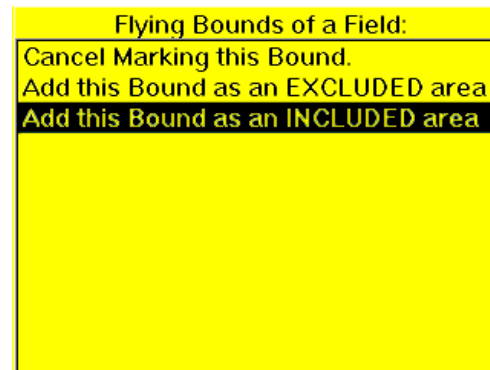
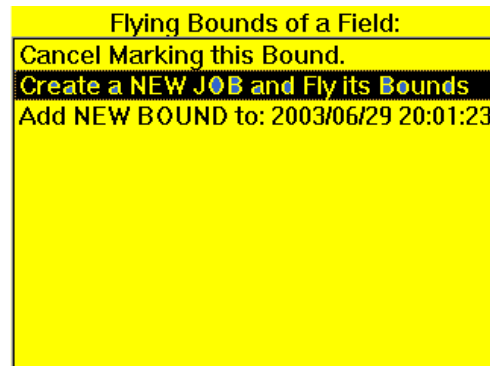
- Select the **NEW JOB** button.
- You will now have all the parameters in a list using the parameters that you last used. This includes Customer, Swath Width and Pattern. You can change any of these parameters by scrolling to them and pulling the “Enter” Switch (Trigger) and then scroll to change and then “Enter”.
- You will have the new Job Name as the exact Date and Time of this entry, which you can also change to a Job number by selecting and entering.
- The Pattern can be changed to any the standard 3 patterns as well as Free Form. Free Form gives all of the lines all of the time, the other types will automatically be set up upon how you fly the pattern during setup (explained in FlexGuide below).
- The swath width (in Feet or Meters) can be changed. Scroll up and down the list with the up and down buttons on the Tophat, then, pull the Enter (trigger) switch.
- The top of this list is “Start Job with Settings Below”. When ready to accept the settings scroll to this and “Enter”.
- Turn spray on (on simulator pull the Enter trigger switch), and it will inform you that an Origin has been set.
- Continue spraying on your first line, then turn spray off (on simulator pull the Enter trigger switch). A baseline will now be set, and your primary Roadway navigation window will now be visible. This will now indicate the next sequence in the Pattern, if one has been selected.
- You can use the Enter(trigger) button to toggle the Spray on/off. The AirAg Tuneup can be set up so that the first Baseline created by this Enter button method will not be marked as Sprayed (see AirAg Tuneup Software below). This is can be very useful for setting Baseline without actually spraying.

Selecting a Preset or Existing Job

- Select the **SELECT JOB** button.
- Select the job from the list available for this customer and pull the Trigger “Enter” switch.
- You will be asked to “Start/Restart This Job Now” or make changes to the job. Upon Entering this, you will be given the list of the original settings in the Job Settings window. Again, any available changes can be done here.

Flying Boundaries for the Job (normally for helicopter operations)

- Select **FLY BOUNDS** button
- Select “**Create a New Job and Fly its Bounds**” from the list. If you are adding bounds to your existing Job, the select “**Add NEW BOUND to: (Job Name)**”.
- The next window is a black screen drawing tablet. By hitting your ‘**Enter**’ button, you will toggle on/off your marking which will paint up on this screen. This screen will automatically scale itself to fit the area that you are marking.
- When the boundary is almost complete, toggle off marking with your ‘**Enter**’ Button, then hit your ‘Window’ button and select “**Add this Bound as an INCLUDED area**”
- You can also “**Add this Bound as an EXCLUDED area**” to an existing area, which will mark the area flown as excluded from your job area.
- You can have as many Included and Excluded areas on the same job as you want by selecting the area, then select **FLY BOUNDS** and then select **Add Bounds**.
- When you have a selected job, you can also add Buffer Zones by selecting the job and the select Fly Buffer Zone from the list. This will then step you through a selection list for setting the parameters for the Buffer Zone. Again you Start and Stop recording by using your ‘**Enter**’ switch.



Flying around your new field on the Simulator

For practice you will see the aircraft moving on the moving map pointed in the direction of flight. This map can be used as a reference for picking a field to do an application on.

FlexGuide

Free Form Field

- All of the navigation lines representing each of the swath lines will be presented on the screen during the turns. This allows the pilot to intercept any of the lines to do his application on. The score bar and the Job Review map will let the pilot know the areas that he has already covered.

Back and Forth

- After applying the first line (Baseline) on the field, the navigation screen will appear with the next line (swath -1) to the left of your first line. If you would like the line to your right, the use your Tophat switch up/down to increment the Target cursor to the line you want to intercept (this target line number is displayed in the upper left corner of the Nav display). You can now do your teardrop turn to intercept this line to apply. After each line has been sprayed the next line in the series will be automatically targeted.

Race Track

- After applying the first line (Baseline) on the field, the navigation screen will appear with the navigation in Free Form indicating “**Marking Swath B by Spraying**” in the display window. You can now fly and intercept any line or the other edge of the field as required to spray the B line. After this line has been sprayed the navigation needle will now be displayed for three different lines:
 - 1/ A Nav line will appear that splits the Baseline and the Line B to start a Race Track pattern to fill in between Baseline and Line B
 - 2/ A Nav line just on the inside of Baseline (between Baseline and Line B) will be available to intercept that line and continue the Race Track pattern using Baseline and Line B to the same side as this line.
 - 3/ A Nav line just on the outside of Baseline will also be available to intercept that line and continue a Race Track pattern using Baseline and Line B to the same side as this line.

Squeeze

- After applying the first line (Baseline) on the field, the navigation screen will appear with the navigation in Free Form indicating “**Marking Swath B by Spraying**” in the display window. You can now fly and intercept any line or the other edge of the field as required to spray the B line. After this line has been sprayed the navigation needle will now be displayed showing the intercept to the line next to Baseline to continue a squeeze pattern between Baseline and Line B.

Advance and Decrementing the Patterns and Swath lines

- The Top Hat switch is used, while in the navigation window, to advance or decrement your target swath on your selected spray pattern. Advance of is accomplished by pushing the top hat switch **up** that will advance the selected pattern to the **right** of the direction that you are flying. Pulling top hat **down** will decrement to the **left**.

- By selecting the top hat switch to the left or right will appropriately select the line to be sprayed to the left or right of the direction of flight as well as put the navigation needles in Free Form mode to intercept any line that will best work for the pilot. After he has sprayed this line, the navigation needle can be reverted back to the pattern using the Up or Down on the top hat switch.
- In Free Form mode Up and Down of the Tophat will target a specific line (the Target Line shown in the upper left of the Nav window). To CANCEL the target line and go back to Free Form, push the Tophat left or right.

The windows that are available while ‘on the job’

- You can ‘window’ through the available windows by hitting the ‘window’ button on the joystick or the center of the Tophat switch in the aircraft. See “**How do I rotate through the visible windows**” in section above.
- Using the “**Show Statistics**” then “**Change Pilot Settings**” – “**Select Nav Windows and Order**”, the pilot has a choice of what windows and order that he prefers.
- The “**Roadway**” is the standard line navigation window shown as roadways.
- The “**Review**” window views the present field with center showing the Last Spray Point and baseline up. This is window can also be zoomed in and out.
- The “**Live**” window showing Spraying being recorded live on the map which rotates to show flight direction up. This view also has zooming capability.

Completing a Job

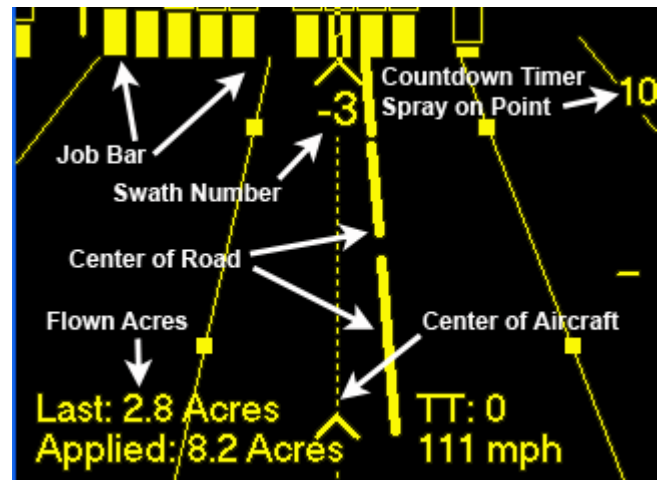
- Once you have reviewed a job and are satisfied it is completed, Window to the buttons with “**Job Done**” and push this button.
- This will remove this job name from the list in the “**Select Job**” window. This does not remove the job from the data card it only removes it from the list so as to not clutter the available jobs for this customer.
- If you later need to put this job back on the card to do more on it, you can change its “Job Status” from True to False on the AirAg Office software. Once the Air Card is Synchronized, it will show up on the “**Select Job**” list for that Customer.

The Roadway window:

This window consists of one primary navigation aid, and other secondary aids.

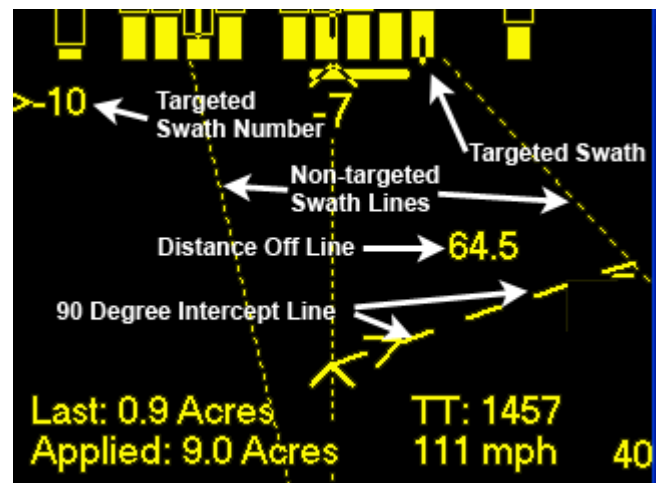
The primary navigation aid: the 'Roadway'

- The biggest difference between the simulator and the real instrument is that the real instrument is angled back. The 'roadway' appears in your peripheral vision like a line on the road, and behaves just like one. Its behavior will then make good sense when you are turning and shifting sideways.
- This line shows both your offset and your angle of attack to the targeted swath line. In Free Form you will see all of the swath lines show up as you are crossing them at an angle. The actual line number you are crossing shows in the center top of the Navigation Screen.
- When using a Pattern and you are intercepting a swath line, the Navigation screen will show you a 90 degree intercept line. Once you are close to the actual swath line, this line will disappear.
- The distance off line also shows (in feet or meters) on the middle of the same side as your swath line.
- The Target Line number shows on the upper left of the Navigation Screen.



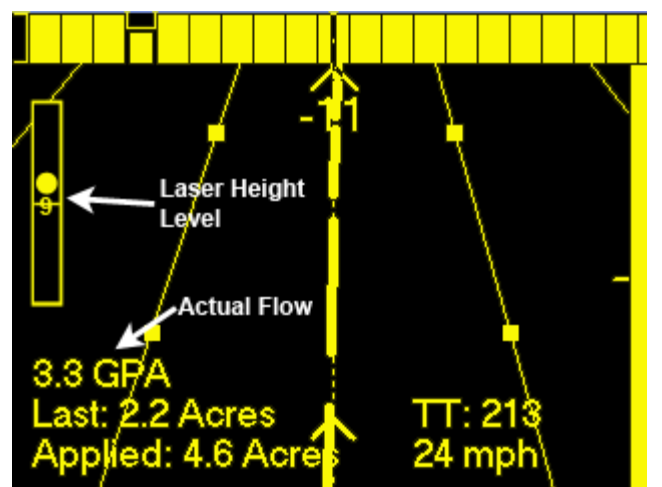
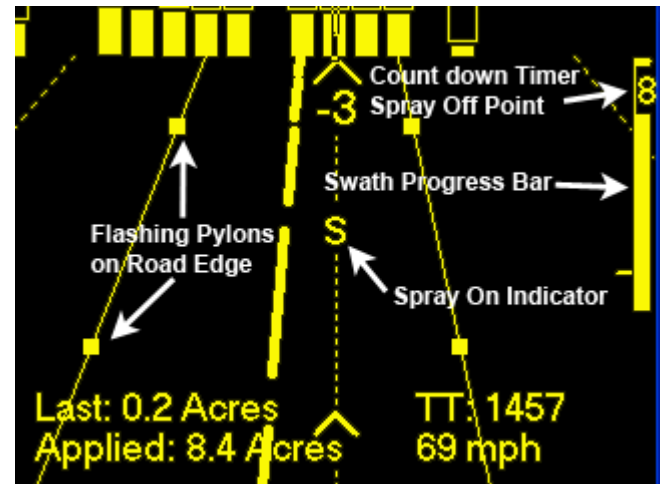
The 'Job Bar'

- This is the moving bar across the top. It has a white (bright yellow in aircraft) block for every swath in the field. If a swath has been sprayed, it will show a proportional amount relative to the longest spray line blacked out.
- In Forestry applications with jobs that are pre-defined with polygons the white block will be partial black relative to the longest line in the polygon and will turn all black if the line is totally sprayed.
- This 'Job Bar' moves side-to-side so that at any given time the center tick lines up with the swath you are currently over. This means that when you are moving ACROSS the field, the job bar is moving across the screen as fast as you are moving across the field.
- The width of the 'Job Bar' swath lines can be adjust by selecting the "Show Statistics" button and then select "Change Pilot Settings" and the "Change JobBar Size ATrack" for size while flying down the Roadway and "Change JobBar Size XTrack" for flying across the Roadways, wider for ATrack and smaller for Xtrack is best.



The ‘Swath Progress Bar’

- This one moves along the right-hand-side of the screen. If you are coming up on a part to be sprayed or been sprayed, you will first see the number of seconds to this counting down before spraying should be turned on/off. The Black either has been sprayed is not to be sprayed. When the leading edge of the white is one second from crossing the center, the screen flashes, indicating that spray should be turned ON.
- When the back part of this white bar reaches one second from crossing the center of the instrument, you get another flash of the screen, indicating that you should turn spray OFF.
- This instrument gives you 12 seconds of view of the swath you are on at any given time.
- If you are PAST the last portion of the line to be sprayed, you get a count-down at the bottom on the right hand side to indicate how many seconds you are now past the area to be sprayed.

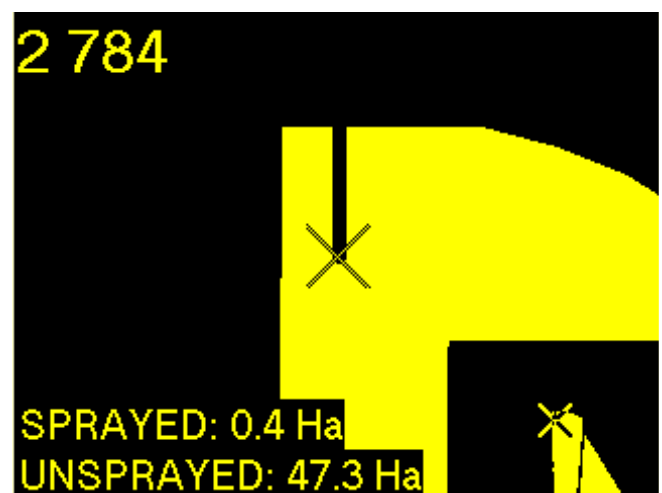


TT – Turn Time

- This is a timer that displays the time from Spray off to Spray on. Resets each time.

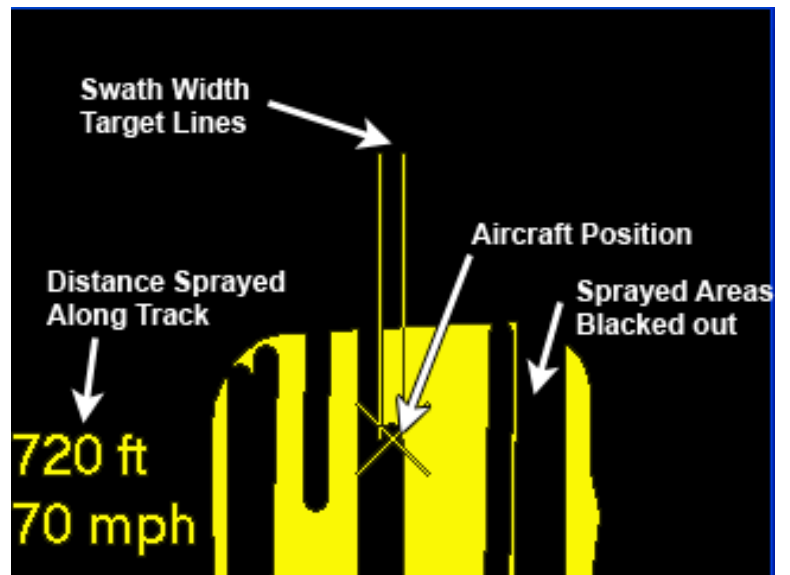
The “Review” Window:

- When you first enter this window, it will show you at the last point on the field, This point is in the center of the display screen.
- The small window on the right is an overview of the complete job area.
- First, you can **Zoom** in and out by moving the top hat switch up and down. Then push left or right to begin scrolling around. The next time you visit this window, it will be at the zoom that you left it at. The numbers on the upper left of the screen tell you which swath number you are on (the center X), and how many meters along from where you first started spraying the baseline.
- When you push the window button once again, you be back to the Nav Window.



The “Live” Moving Map Window:

- When you Rotate windows using the ‘Window’ button from the Nav window (or once when spray is ON), it will be a ‘Live rotating moving nav map’ version of the field, with you in the lower center.
- The dual Dotted Line is the actual width of your selected Swath and in the direction of your flight path Projected as the swath width.
- This is an ideal tool for navigating parallel curved lines and for ‘painting’ long runs on rising/falling terrain such as in Forestry and Mosquito applications.
- This Instrument can also be used for Clean-ups and Headland applications.
- In the AirAg Tuneup kit



Point Navigation Mode:

What is the Point Navigation Mode about? (NAV MODE)

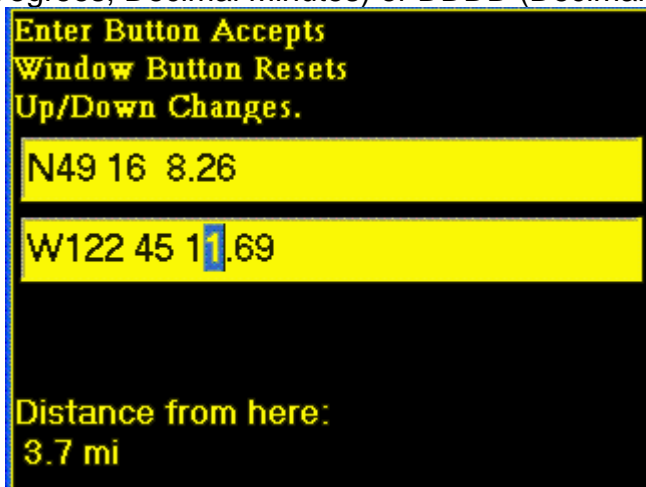
If you select the SWITCH TO NAV MODE button you will have new set of buttons to choose from. With appropriate choices, you will be presented with a full moving map (scalable), and a point nav instrument to use that will show you the distance and bearing to any chosen nav point. It is specifically designed to get you exactly over top of this nav point. Try it to see what happens as you pass over a given nav point.

How do I select an existing nav point?

- When you first hit NEW JOB you will then select a Nav Point from the existing stored points. This Nav Point will direct you to that location while flying to spray or apply your First Baseline.
- If you have selected **Switch to Nav Mode** button, you will have a set of buttons available, one of which is SELECT LOCATION. You will be presented with a list of existing nav points to choose from in a list. Select and enter the desired one and the Nav windows will be available in the Window rotation.

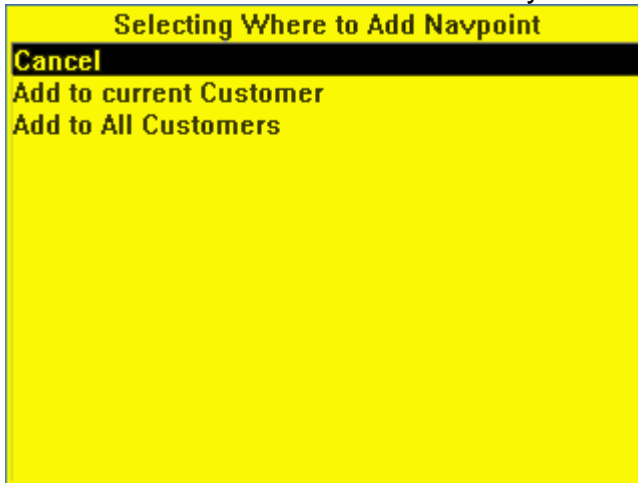
How do I add a new nav point?

- In the aircraft, you can add a new point by flying over (or parking over) a point and hitting MARK LOCATION. You will be presented a window showing the exact Latitude and Longitude of the Marked point as well as you can select which form of Latitude Longitude you are given. This can be changed from DDMSSS (Degrees, Minutes, Seconds) DDDMM (Degrees, Decimal Minutes) or DDDD (Decimal Degrees).

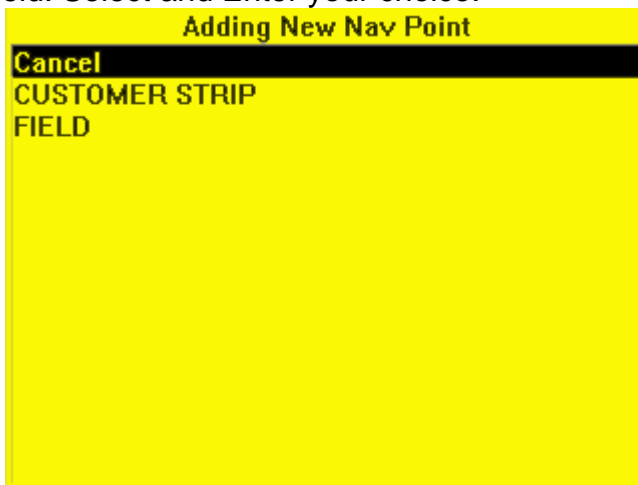


- You can now change this location to a new location by using your Tophat switch to scroll left or right to the next digit and up and down to change the values. Once the correct latitude and longitude is entered, you will see the distance to the new Nav Point is from the original nav point.
- At any time you can reset the numbers back to the original by pushing the **Window** button. Once the correct position is displayed the hit the **Enter** switch.

- You will now be asked to select and enter this point for ONLY the current Customer or All of the Customers. Select and Enter your choice.



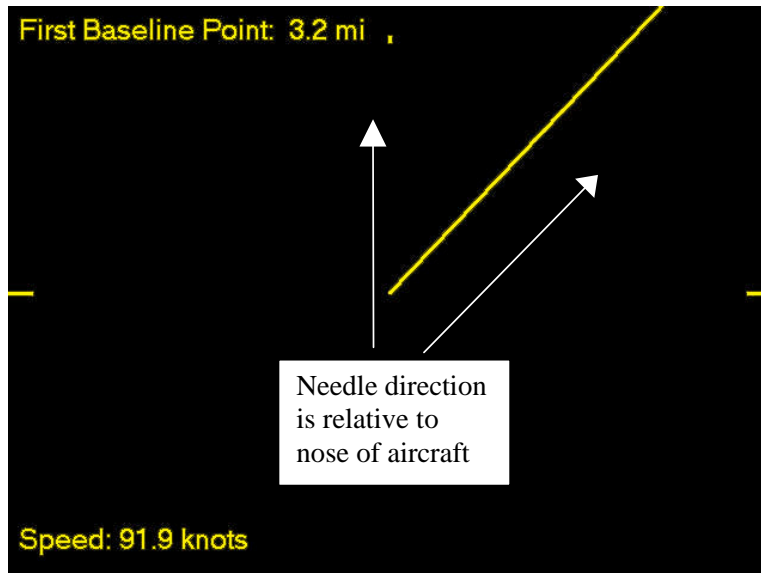
- You will then be asked to enter whether it is a Customer Strip (runway) or a Customer Field. Select and Enter your choice.



- At this point you can select this Nav Point to navigate to by Selecting the **Select Location** button and selecting this point from the list.
- NOTE:** When ever you add a Nav Point, it is recorded forever. You may edit and rename this Nav Point name in the AirAg Office software as well. You can also add new Nav Points in the AirAg Office software. There is no limit to the number of these points.
- Each job will have its own nav points automatically stored. Last Sprayed Point and First Baseline Point are always automatically created for each job.

Instructions for the use of the Point Nav Instrument window:

- This Point Nav instrument automatically comes up if you are far enough away from your selected job or if NEW JOB has not been first sprayed yet. This Point Nav instrument is also available when in the Navigation Mode.



- This instrument will automatically replace the “Rotating Job Map” window when far enough away from your spray area. Also

It is one of the windows in the window rotation once a Nav Point has been selected.

- It puts you in the middle of the screen. The target is at the other end of the line leading from the center of the screen (you). You steer to get the target straight ahead of you (aim for the target).
- The distance to the target is displayed at the top, and your current ground speed is displayed at the bottom. The units displayed will depend on your pilot preference selection.
- As you get close to your target a set of squares of different sizes will stack. Try visualizing the squares as tunnel you are looking down through when you are over top the target point. All the squares line up when you are dead over the target.

Instructions for use of the Moving Map in the Navigation mode of the DynaFlight unit:

- This map is north-up.
- You are always at the center of the moving map.
- It is scalable from 0 to 8, with the scales 3 to 8 being the ones that are most often used.
- Each scale may or may not have a map image in it where you are flying. If there is no map image, a black screen is presented as background.
- Any features such as nav points are displayed to scale over the background, and a ‘rubber band’ connecting your current location to the nav point selected.
- Use the SELECT MAP SCALE button to choose the scale you wish to use. The best strategy is to start at scale 8 and work down to the one that best suits your current needs.

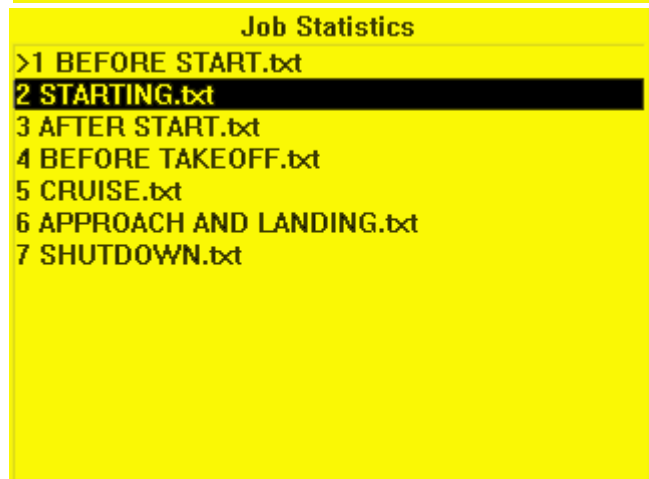
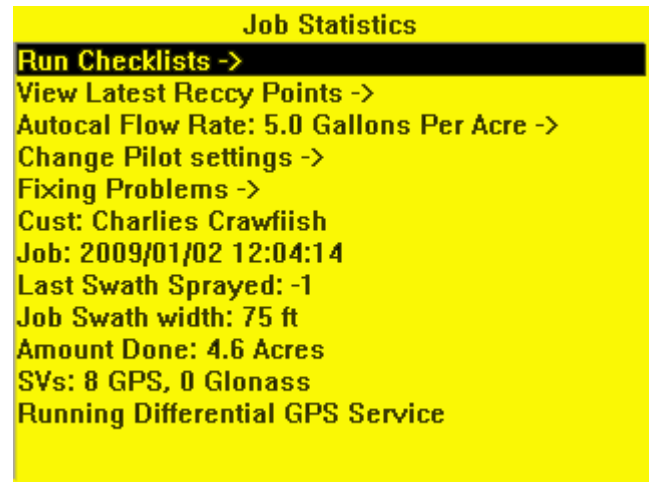
Show Statistics

Job statistics

- This contains both information as well as where you can change the settings for Pilot Preferences, Flow Control, Laser Height, etc. The lines with the right hand arrow are adjustable information, the rest is the Job Information.

Run Checklists

- This is a utility to have a complete set of checklists to be able to call up and step through and check off using the Tophat and Enter switches.
- As each of the sections have been completed, a right arrow > is placed before the item.
- For each time you step through the items and get to the end, the list will automatically go to the next item.
- These Checklists are in standard text format and available for you to edit or create new ones. They are on the AirCard in the Dynanav folder in a file folder called "Checklists". If editing or creating, make sure you keep the same format as on the original lists.
- At any time you can jump to or go back to any of the checklists.



Flow Rate

- This is where you can change the flow rate for the flow control. Select and then change the rate to you desired rate and pull the Enter switch.

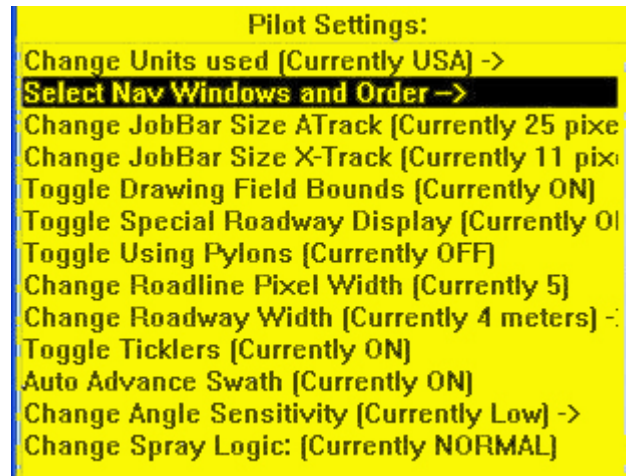
Pilot Settings

Change Units

- By selecting this, you can change the units such as Length Units (Feet or Meters), Area Units (Acres or Hectares) and Speed Units (Knots per hour, Meters per Second, Miles per Hour or Kilometers per Hour).

Select Nav Windows and Order

- In the Window rotation, you have a choice for which Nav Windows you want displayed. The are as described above for 'Roadway', 'Review' and 'Live' as well as the DynaView (an optional touchscreen computer for job review and other functions). Chose the the setting that works best for you.



Change JobBar Swath Pixels

- The width of the 'Job Bar' swath lines can be adjust by selecting the "Show Statistics" button and then select "Change Pilot Settings" and the "Change JobBar Size ATrack" for size while flying down the Roadway and "Change JobBar Size XTrack" for flying across the Roadways, wider for ATrack and smaller for Xtrack is best.

Toggle Special Roadway Display

- This toggles (on/off) the Navigation Display from the standard parallel Road lines to the Special Roadway that visual looks more like roadways painted on the ground.

Toggle Using Pylons

- This toggles (on/off) the flashing pylons that are on the sides of the Roadway. These flashing pylons are intended to help you see the display in your peripheral vision while still looking outside of the aircraft.

Change Roadline Pixel Width

- This lets you change the size of the centerline width. Sometimes the centerline can be increased in size for better visibility, particularly if the display is positioned farther from your eyes.

Change Roadway Width

- This changes the total width of Roadway from the left edge of the Roadway to the right edge of the Roadway as displayed on the bottom of the Nav display window.

Toggle Ticklers

- This turns on/off the rotating visual "Ticklers" that will begin to grow on the side of the Roadway display if the pilot is more than 1 foot off course.

Auto Advance Swath

- In a pattern, the Swath will advance to the next swath in the pattern when you break line after turning spray off. If you want to manual advance the swathh with the tophat switch, then turn this setting “Off”.

Change Angle Sensitivity

- The angle that the Roadway more than the actual actual angle. This angle sensitivity can be changed to Normal, Low or lowest.

Change Spray Logic

- In certain installations where the connection to the Spray on/off electrical connections are reverse to the Normal “Power On for spray” logic, then this setting can be changed for INVERTED Logic.

Fixing Problems

- The most important thing in this window is to “Save Diagnostic Informatiion” if you are having problems. This will store information from the GPS engine plus other things onto your AirCard so we at DynaNav can determine where the problem is most likely to be.

AirAg Tuneup Software:

Accessing the TUNEUP software

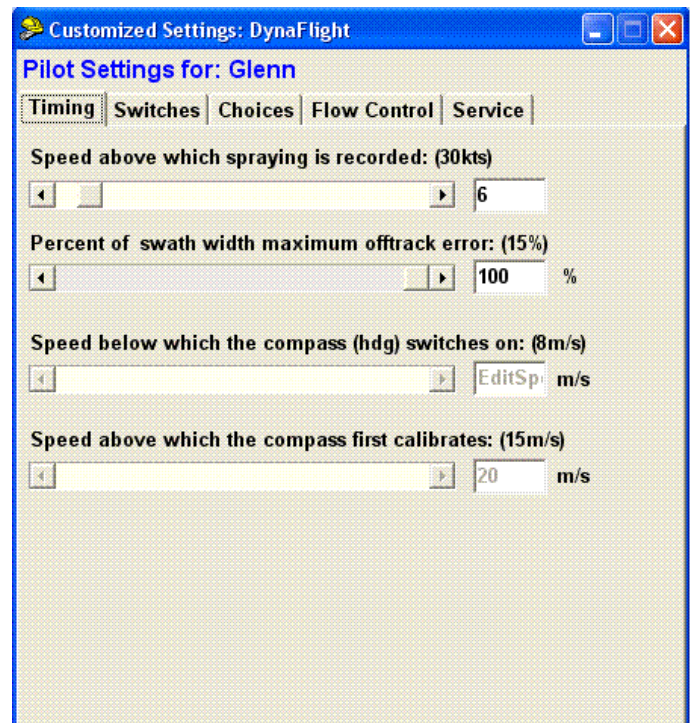
The software is installed as part of the AirAg Office software on the Base Computer. First plug in the aircraft PC Card into the PC Slot on the ground computer, then run “Air Ag Tuneup” by using ‘Start – Programs – Dynanav Ag – AirAg Tuneup’. When the program is operational, change the drive letter to the letter assigned by the computer for the PC Card of the Aircraft card (for the simulator setup, select ‘C’ Drive). If you are not sure which letter, use your Windows Explorer to see which drive letter assigned. If the drive letter is correct then the green message will appear saying “(PC Card Name) is good”.

Changing the settings on TUNEUP

The following is an explanation of the individual switch settings. The numbers in the brackets show the default values – use these if you are not sure of what is required.

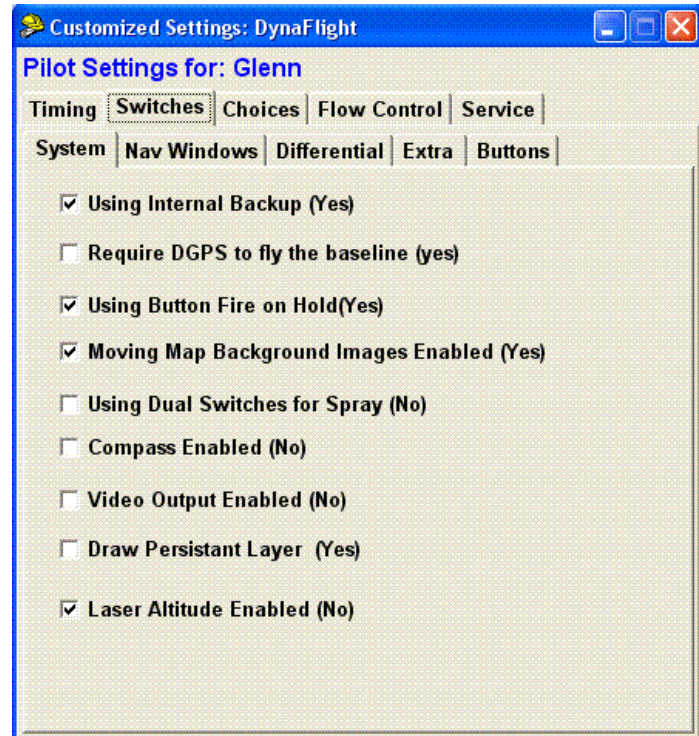
Time Items

- **Speed above which spraying is recorded: (30kts)** – Below this speed the DynaFlight will not record any spraying activity. When the valves are opened for testing or flushing on the ground, it will not record this as an application.
- **Percentage of swath width maximum offtrack error: (15%)** – Most Aerial Spraying this will be set for 100%. If during application, you want to re-apply the swath if you are more than a certain percentage offtrack, then change this setting. When you are off track by more than this percentage, the DynaFlight will not record this on the job review map as a valid scoring on this line. This will leave a gap that is painted on the job review map so that you can go back and intercept this line and apply the materials in this gap for complete coverage. This does not have an effect on spraying headlands. For unusually heavy terrain, this should be set high. If using the Rotating Moving Map for application, then set this to 100%.
- **Speed above which the compass (hdg) switches on: (8m/s)** - Not Applicable for DynaFlight-AirAg
- **Speed above which the compass first calibrates: (15m/s)** – Not Applicable for DynaFlight-AirAg



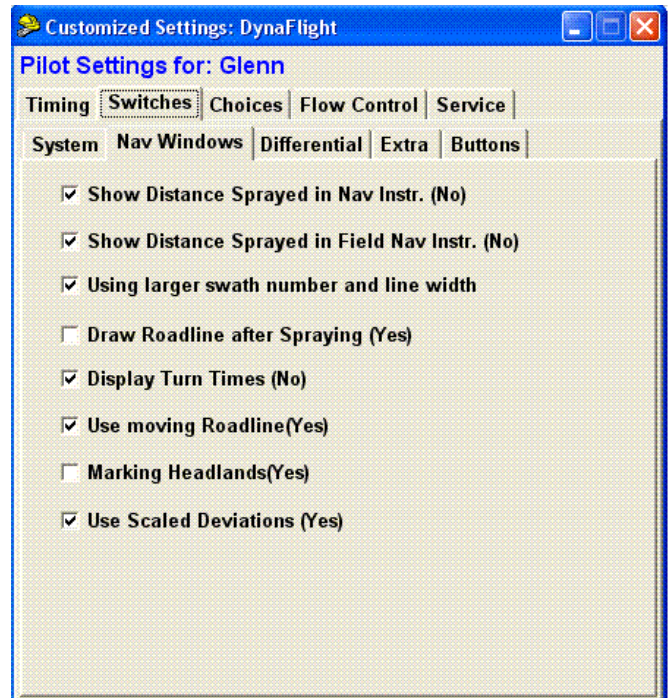
Switches - System

- **Using Internal Backup (Yes)** – This turns On/Off the internal data storage in the Air unit for data recovery if required.
- **Require DGPS to fly the baseline (yes)** – This is to be turned on if the contract requires that DGPS is to be 100% active. As sometimes your reception of DGPS Satellite may be occluded, you can still spray your baseline without DGPS.
- **Use Button Fire on Hold (yes)** – This option is for the tophat switch action on the Buttons in the display window. When used, the Enter switch is not required for acceptance of the buttons – the pilot simply has to push and hold his desired button and the action will be accepted. Enter is still used to enter in the desired selection from the list windows.
- **Moving Map Background Images Enabled (Yes)**- This is if there has been a map images for the Moving Map window available and can be disabled if you do not want them to show up.
- **Using Dual Switches for Spray (no)** – This option is used for buckets and other application systems that use a gate that has separate switch actions for opening and closing of the gate. For this option the Spray1 and Spray2 inputs are wired to the separate open and close switches
- **Compass enabled (no)** - Not Applicable for DynaFlight-AirAg
- **Video Output Enabled (No)** - Not Applicable for normal DynaFlight-AirAg operations.
- **Draw Persistent Layer (Yes)** – This creates a dotted boundary around polygons to be able to see the outer boundary even though it has been sprayed off. When the job is completed you will still be able to see the boundary of the polygon (field).
- **Laser Altitude Enabled (No)** – If the Laser Altitude module is installed, then this should be enabled to allow for the information to be displayed in the Nav Window.



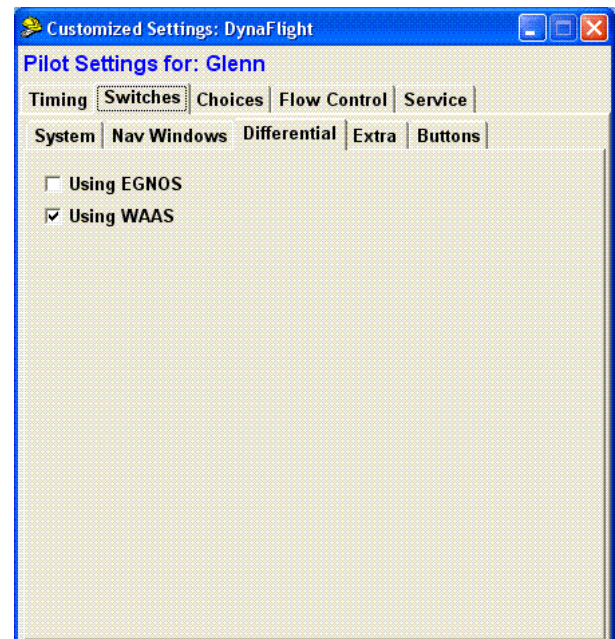
Switches – Nav Windows

- **Show Distance Sprayed in Nav Instr.** Shows the lineal distance in middle of Roadway Screen of each time you have the Spray turned on. Resets to zero on next spray event.
- **Show Distance Sprayed in Field Nav Instr.** Shows the lineal distance in middle of Rotating Map Screen of each time you have the Spray turned on. Resets to zero on next spray event.
- **Using larger swath numbers and line width (yes)** – If you would like to see larger number and guidance needle width for more visibility.
- **Draw Roadline after Spraying (yes)** draws a white line down the center of the black sprayed area.
- **Display Turn Times (no)** – If you do not want to have the turn times (TT) displayed on the guidance display, you can un-check this option.
- **Use Moving Roadline (yes)** Changes the center navigation needle from a dotted moving line to a solid line.
- **Marking Headlands (Yes)** Changes
- **Use Scaled Deviations (Yes)** – Normal Roadline Needles uses Logarithmic scaling so that the needle is more sensitive as it approaches centerline and less as it moves away from centerline. By un-checking this option, the needle will be linear (you may want to use this if the swath widths are less than 10 meters or 30 feet)



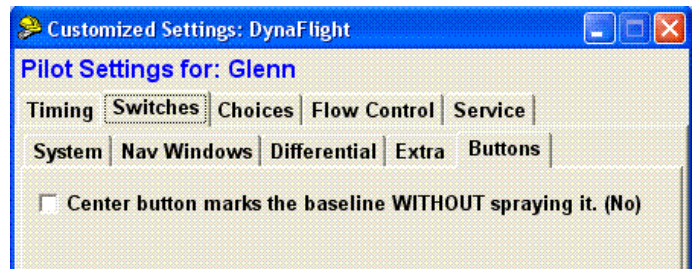
Switches – Differential

- **Using EGNOS** Should be selected if operating in continental Europe. It selects the European correction satellites as a default if other corrections are not being used.
- **Using WAAS** should be selected if in continental North America. It selects the North American correction satellites as a default if other corrections are not being used.



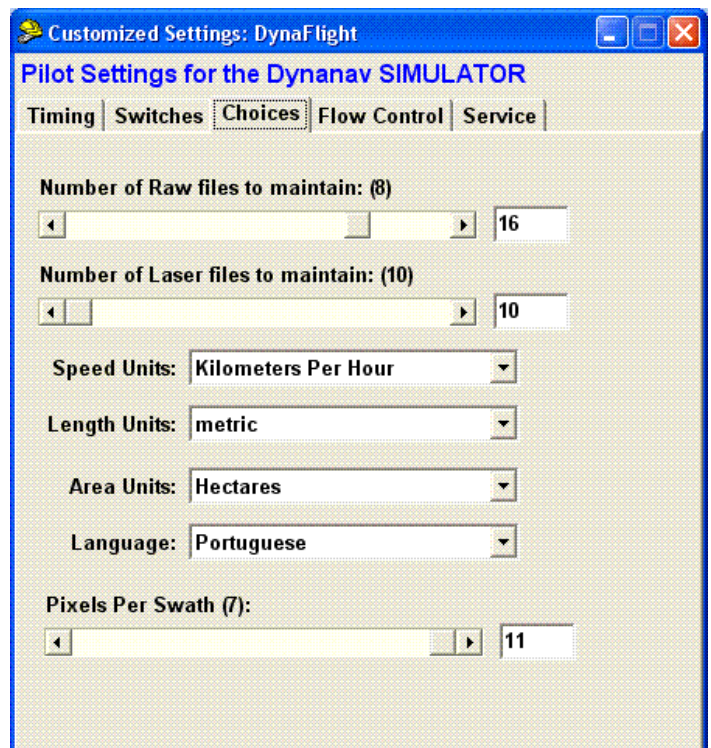
Switches – Buttons

- **Center button marks baseline WITHOUT spraying it (No)** Should be selected if you need to fly and mark the baseline without having the system record it as being sprayed. An example is using a roadway to mark the baseline while cars are on and not wanting to turn on spray handle.



Choices

- **Number of Raw files to maintain: (8)** - As each Raw file uses 1 meg of memory on the aircraft PC Card. If the PC Card has lots of memory, then the number of Raw Files can be increased. These Raw Files record the actual flight path as well any event such as the Spray on/off for later recovery.
- **Number of Laser files to maintain: (8)** - Not Applicable for DynaFlight-AirAg
- **Speed Units:** - This is a choice box of the speed units displayed on the Navigation Window. These choices are: Knots; Meters Per Second; and Miles Per Hour.
- **Length Units:** – This is a choice box of the length units that are displayed in the various windows. These choices are: Feet/Miles; Metric; and USA Survey foot.
- **Area Units:** - This is a choice box for the area units in the various windows. The choice is Acres or Hectares.
- **Language:**- You can select the language to operate the DynaFlight aircraft system
- **Pixels Per Swath (7)** – This is the setting for the # of pixels per swath on the Job Review Map. It will always be an odd number e.g. 5,7,9,11, etc. For larger Areas this can be less so as to see as much of the area in the review window, for small areas this can be increased to see more detail. (recommend 9 pixels for most operations).



Flow Control

- **Flow Control – Frog** this is used when the DynaFlight-AirAg system is used on the FROG Bucket system from Heli-Alpine.
- **Flow Control – AutoCal** this is used when the DynaFlight-AirAg system is coupled to the AutoCal Flow control system. Turn this on to operate in the Aircraft.

Service

- **Reset GPS Receiver (one shot)**
– This is used when the DynaFlight-AirAg system is moved to a new location and the GPS receiver does not want to lock onto the new location. This resets the receiver to look for the new location.



- **Rebuild Card from Internal Backup (emergency)** – If job has disappeared during a bad shut down, this can be used to rebuild the job from the data stored internal in the Air unit.

WARRANTY REGISTRATION for DynaFlight-AirAg and -Forest

Company Name: _____

Contact Name: _____

Address: _____

City: _____ **State/Province:** _____

Country: _____ **Postal code:** _____

Phone: _____ **Fax:** _____

E-Mail: _____ **Web:** _____

Product Name: _____ **Ser. #** _____

WARRANTY POLICY

DynaNav Systems Inc. (DynaNav) warrants that its DynaFlight™ products are free from defects caused by faulty material or poor workmanship for a period of one (1) years from the date of sale. Date of sale shall mean the date of the invoice to the original customer for the product. DynaNav gives full software support for one (1) years from the date of sale for the version of software purchased. Shipping F.O.B. Pitt Meadows.

Optional extended warranty packages are available for purchase through the ServicePak program.

Products not manufactured by DynaNav carry the same warranty which DynaNav receives from the manufacturer of the product and no other warranty. All ordered replacement parts or parts replaced during the warranty period assume the un-expired portion of the original parts warranty.

THE WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXCLUDED.

DYNANAV SHALL NOT BE LIABLE FOR THE LOSS, DAMAGE OR EXPENSE ARISING DIRECTLY OR INDIRECTLY OUT OF THE PURCHASE, INSTALLATION, OPERATION, USE OR LICENSING OR PRODUCTS OR SERVICES. IN NO EVENT SHALL DYNANAV BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE DUE TO ANY CAUSE.