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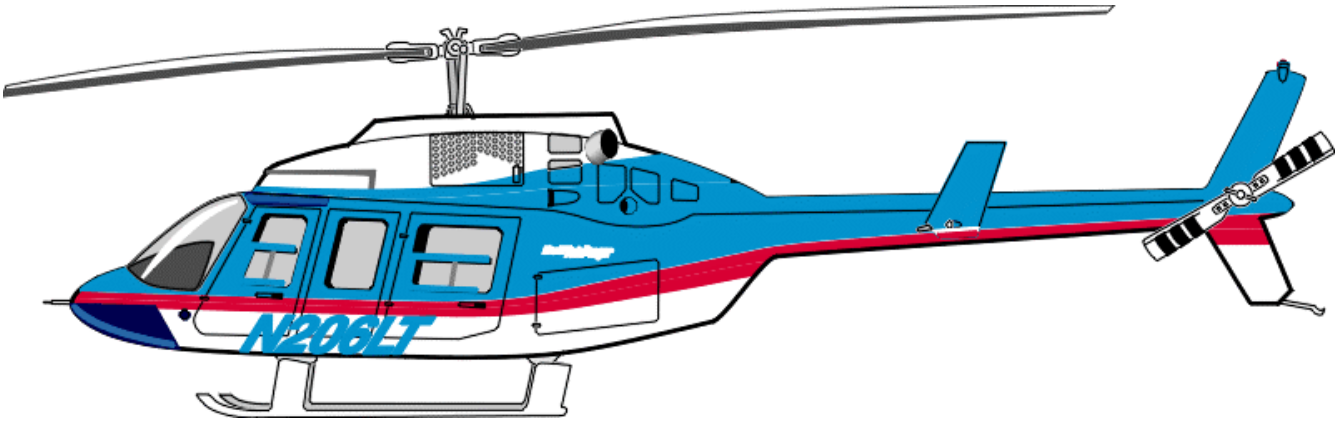
THIS MANUAL CONTAINS INSTRUCTIONS FOR:

Operation of DynaFlight-SeisBag™ And Simulator

DynaFlight-SeisBag Deployment and Retrieval Navigation 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-SeisBag 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 time.

What is the simulator?

The DynaFlight-SeisBag Simulator uses the actual software used on the DynaFlight-SeisBag™ Airborne Guidance system. When you have become comfortable with the method of operation of this simulator, you will easily become familiar with the actual operation in the helicopter.

How do I control it?

For the simulator, you will use the number pad on your keyboard on your computer, and a few choice letter keys to simulate the operation of the helicopter. In the helicopter 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, deploy and retrieve is sensed from the actual switches for the carousel.

Simulator Software Installation Instructions:

The following are the instructions for the installation of the DynaNav DynaFlight-SeisBag Simulator software.

Cautions:

You will require some room on your **C**: hard-drive to install and run this program. In general if you are running with less than, say, 50 megs free space on your hard drive it is recommended that you not install any more programs on this drive.

You have to be running Windows 95, 98 or 2000 or NT for this simulator to work.

If you have been e-mailed an "BagAir Sim Install Image.exe" install image:

- In your e-mail program, save the attachment to a temporary folder. In your e-mail program, right-mouse click the attachment and select 'save as' or 'save link as'. You will be asked to choose a temporary destination folder for the file. Chose any folder that you like, and hit 'save'. You will have to remember where this attachment is saved, so write the folder path down if necessary.
- Go to this temporary folder with your browser (Windows Explorer) and Run the program "BagAir Simulator Full Install (date).exe" (double click on this image).
- Step through the install wizard, accepting the defaults are OK, you may be required to enter your name and company name.
- After this is finished, the program will be installed as a normal windows application and will be available to run by using 'Start – Programs – DynaFlight SeisBag Simulator – DynaFlight SeisBag Simulator'.
-

If you have downloaded an "BagAir Simulator Install Image.exe" install image from our web site:

- Go to the folder that you stored the "BagAir Simulator Install Image.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 finished, the program will be installed as a normal windows application and will be available to run by using 'Start – Programs – DynaFlight SeisBag Simulator – DynaFlight SeisBag Simulator'.
-

To TERMINATE THE SIMULATOR PROGRAM at any time, just hold the ALT key down and hit F4 (usually designated ALT-F4 by regular computer users). If you are running the program you should normally use the "Quit" button.

How much of this manual will I have to read before I can begin using the simulator?

After installing and running the program on your computer, very little is required to run the program. To get the simulator to do certain things, you might have to read some of the stuff below, but much of the operation is obvious once you get started, so feel free to just try the simulator out any time you like, and read to fill in the blanks where necessary.

Instructions for the use of the DynaFlight-SeisBag and the simulator

The number pad on the PC Computer for simulator

The number pad (to the right of your computer keyboard) is used for most of the control of the system. The “Num Lock” must ON for this to work properly. If the keys aren’t working, try changing the “Num Lock” (on the number pad). The numbers used are 2, 4, 6, and 8 as the arrows as well as the number 5 is used as an “Enter” or “Accept” button.

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 (Areas, Lines, Flight Plans, Nav Points, etc). Until you make a choice from the list you will not be permitted to do anything else.

Navigating the list:

For simulator on your PC computer, use the 2, 4, 6, and 8 keys on the Number Pad to navigate through a list. (These are the four arrows on the keypad). Down is down the list one at a time, and up is up the list 1 at a time. 4 (left) is back up the list faster and faster each time you hit it (for long lists). 6 (right) is down the list faster and faster each time you hit it. Holding a key will result in a repeat.

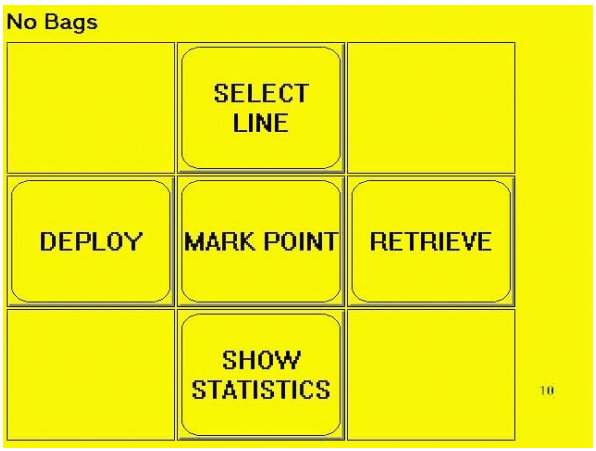
Select the chosen item from a list by hitting the ‘5’ (center) key on number pad.

For the helicopter the same as above accept you use the tophat up, down, left and right to select in the list, then hit the enter switch.

‘Hitting’ or 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 button on the number pad of your keyboard that let you select numbers). Each button has a small message or title on it.



What is it for?

Each ‘button’ on the button pad that is visible can be ‘pushed’ or activated through the Keypad on the computer or the tophat switch on the helicopter 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.

Selecting a button

When you are looking at a button pad, the individual buttons correspond to the layout of the number keys on the number pad or the same direction on the tophat switch on the helicopter. Hitting a number on keypad will activate the corresponding button on the button pad. On the helicopter, push and hold for one second will highlight and lock the button, it will then stay highlighted for a second, thus allowing for hitting of the accept or enter switch after release. An optional push – hold and accept feature is available on version 4.5 and later. This feature can be turned on and off in the TUNEUP software.

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 ‘w’ key on the keyboard. (In the actual machine, we would push down the top hat button on the 5-way tophat or special button set-aside for this purpose called the ‘window’ button.) In Navigation mode, pushing the window button once will alternate between the “Navigation” window and the “Job Review” window. To jump to the “Button” windows, simply hit the ‘w’ key or the Window button twice in less than a second and you will then be able to see and use the Buttons.

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 Select Area list, from which you must select the Area name you are going to work on. Once you have selected an Area, you will ONLY have the button pads to work with until you select a Line to work on. In the Line selection, you can then select either a specific Line to work on, or Flights for flight plans (version 4.5

and later). Once a Line or Flight Plan is selected the system will display the Navigation window. You will now have 2 default windows to look work with – the Navigation window and the Line List window. Try this and see. Again, While in the Navigation window, by double hitting the window button you will jump to the Buttons window with the SELECT LINE button. You can then continue to rotate through all of the windows until you are back at the Navigation Window.

Deploy/Retrieve Operations

On the simulator, hitting the 'd' key on your keyboard will deploy a bag when you are on or close to the target, hitting 'd' once will set ready, hitting 'd' the second time will do the actual deploy (this is to simulate the time it takes to hold the deploy switch on the helicopter). For the retrieve the 'r' key on the keyboard is used on the simulator in the same way as the deploy action. In the helicopter the deploy/retrieve is sensed from the actual Deploy/Reset switch for the carousel.

Speeding up/down and Turning for the Simulator

Speeding Up

If you are in the Navigation window, then you can speed up by hitting (and/or holding down) the 8 key on the keyboard number pad (the up arrow).

Slowing Down

If you are in the Navigation window, then you can slow down by hitting (and/or holding down) the 2 key on the keyboard number pad (the down arrow).

Turning left

If you are in the Navigation window, then you can turn left by hitting (and/or holding down) the 3 key on the keyboard number pad (the left arrow).

Turning right

If you are in the Navigation window, then you can turn right by hitting (and/or holding down) the 6 key on the keyboard number pad (the right arrow).

Stopping / Re-starting

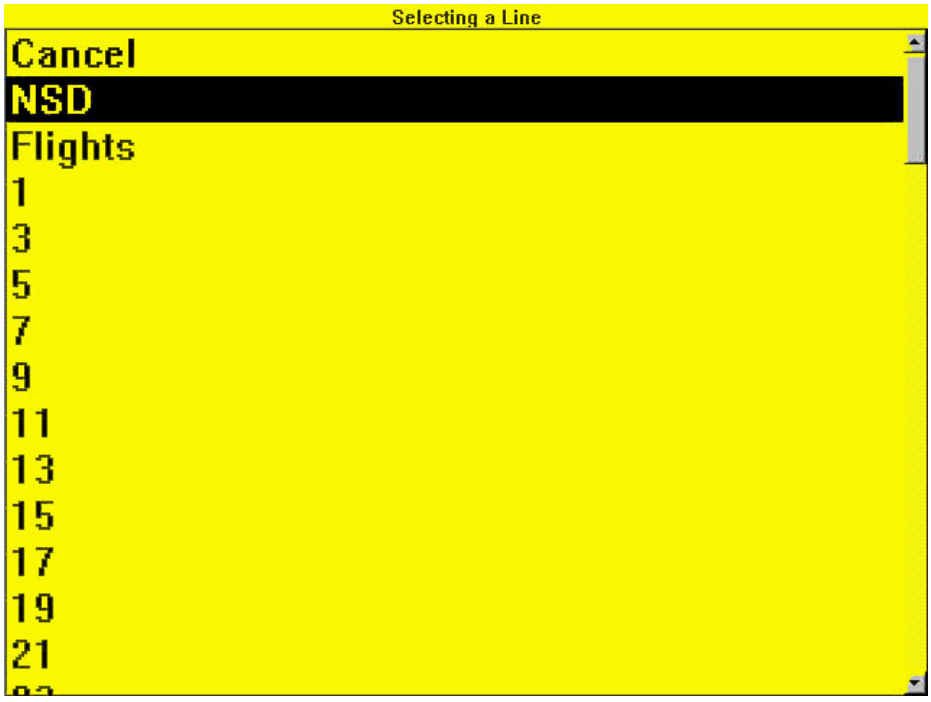
If you are in the Navigation window, then you can instantly stop/restart by hitting the 5 key on the keyboard number pad (the center key).

The windows that are available while 'on the job'

- You can 'window' through the available windows by hitting the 'w' key on the computer keyboard or the center of the Tophat switch in the helicopter.
- If you window off the Navigation window, you will be in the 'Selecting a Nav Point' viewing the list of Bag Drop locations for that line or flight plan as well as your stored Nav Points for Landings, Helipads, etc. associated for this area. You can scroll to any point on this list and accept to lock the selected navigation point.
- If you visit this window for more than one second, then when you hit the 'w' key or the Window button again, you will toggle back to the navigation window. If you hit the 'w' or the Window button in less than a second after entering the 'Selecting a Nav Point' view, you will window through the buttons and moving map windows before returning to the navigation window.

Selecting a Line or Flight Plan in 'Selecting a Line' Window

- When you hit the "Select a Line" button, the 'Select a Line' window appears and gives the choice of 'Cancel', 'NSD' (provisions for optional Non Standard Deploy selection), 'Flights' or the Lines for the selected Area.
- If you select 'Flights', this will bring you to the 'Select a Flight' window for selecting a Flight Plan as described later in the section "**Using the Flight Plan mode**".
- The Lines contain all the Bag Drop points for that particular line. When a Line is selected, the system will automatically go to the Navigation Window and point to the closest Bag Drop point to the helicopter.



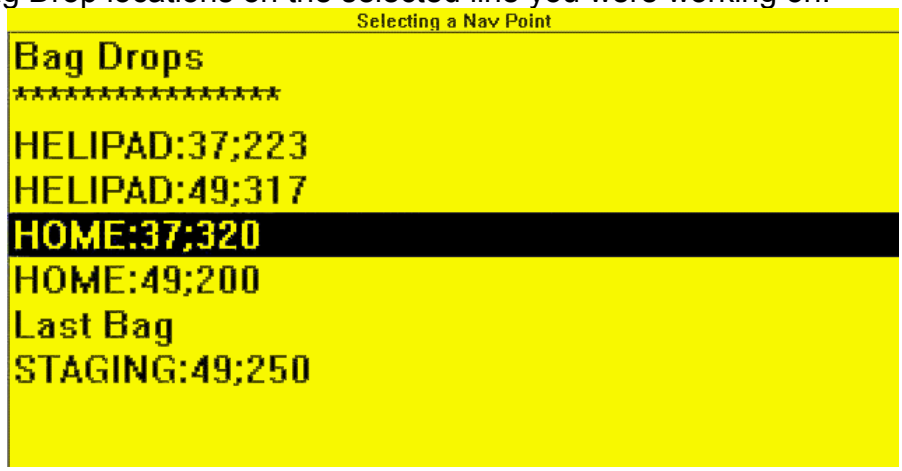
Selecting a Bag Drop Point in the 'Select a Nav Point' window:

- When navigating to a target point, pushing the Window button once will bring up the '**Select a Nav Point'** window which contains all the Bag Drop points for the selected line as well as nav points for that particular selected line (helipads, Staging, etc.) including the Last Bag drop point.
- This list is in a sequence of lowest Bag Drop point number to the highest, with the Nav Points interspersed according to their closest Bag Drop location.
- When you window to this list, the closest Bag Drop point will be highlighted.
- At the top of the list is a selection **'Navpoints'** for all the NavPoints stored for the area you have selected. Select and enter to get to the list. See: **Selecting a NavPoint in the 'Select a Nav Point' window**
- If you push the tophat switch up, down, left, or right you will scroll through the list to select a bag location or an included Nav Point to go directly to.

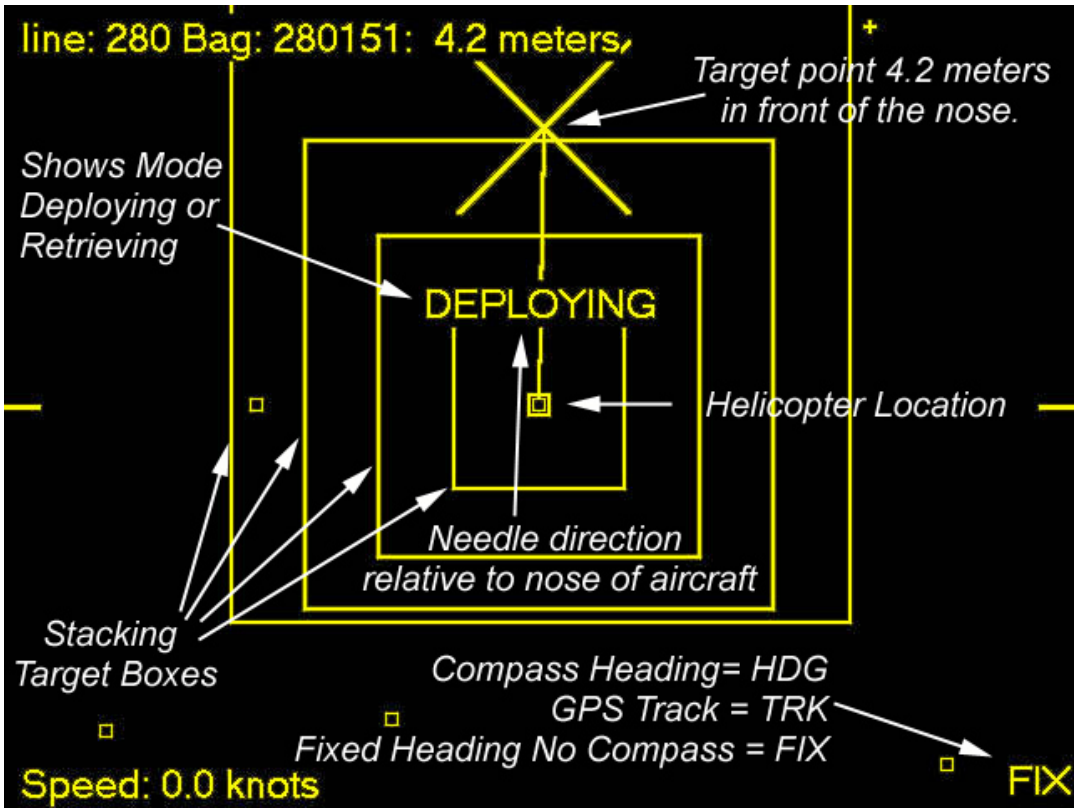
- By hitting the enter button when you have selected a point, it will lock to that point to navigate to. When a point is selected and locked for navigation, a '*~*' appears in front of the item. When you go back to this window and hit enter again, it will unlock that nav point and will automatically go back to Navigation Window in the Automatic Select mode (automatically navigates to the closest bag location on the selected line). Also if you are Deploying or Retrieving, the system will go back to Automatic Select navigation once the bag has been deployed or retrieved on that selected target location. This allows you to select the start point of a layout, then continue automatically.

Selecting a NavPoint in the 'Select a Nav Point' window:

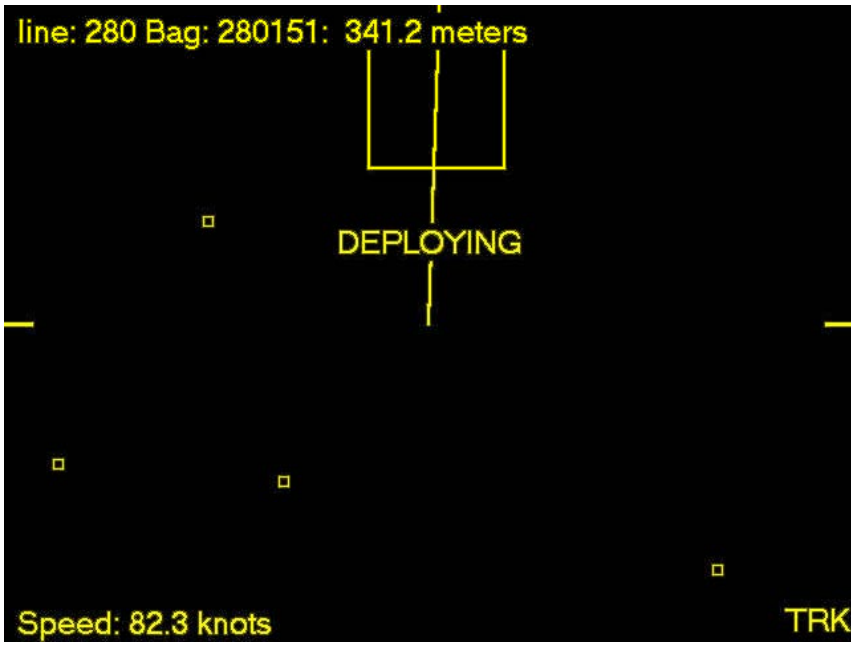
- When in the Navpoint window all of the stored Nav Points such as Helipads, Staging, etc. will be available in a list. This list is sorted alpha-numerically.
- The closest NavPoint will be highlighted and by hitting the 'Enter' switch you will lock to this NavPoint.
- You can scroll up and down the list to select another NavPoint and hitting the 'Enter' switch will lock to the selected NavPoint.
- At the top of the list is **'Bag Drops'.** By selecting and entering this you will go back to targeting Bag Drop locations on the selected line you were working on.



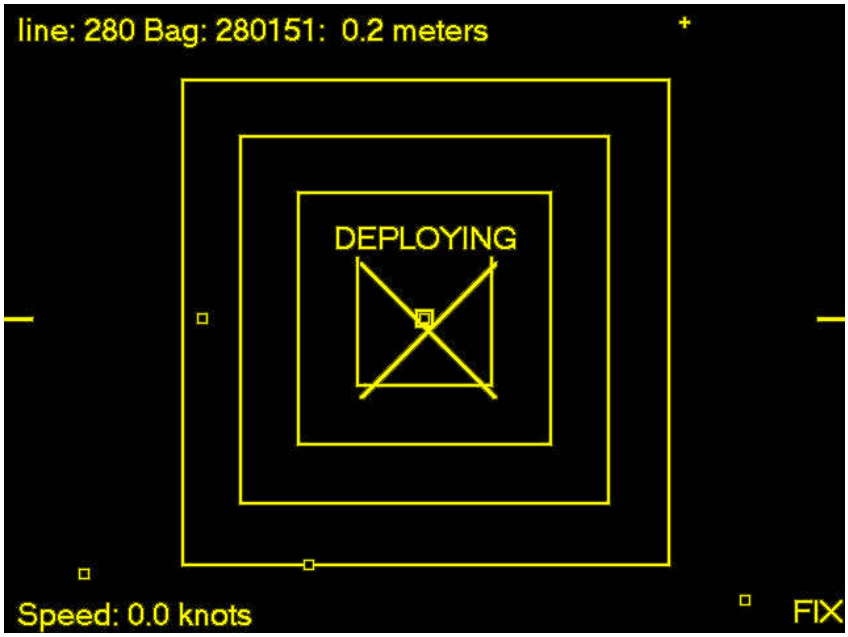
The Navigation Window:



Instructions for the use of the Point Nav Instrument window:

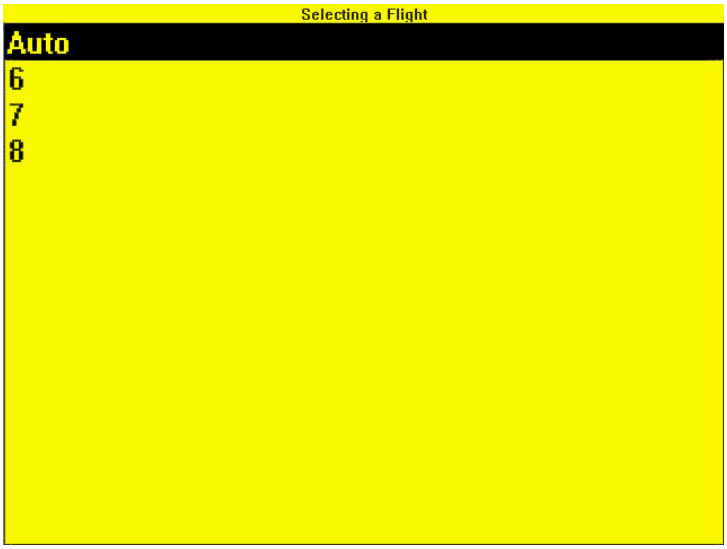


- It puts you in the middle of the screen. The target is at the other end of the line leading from the center of the screen (you). You steer to get the target straight ahead of you (aim for the target).
- The distance to the target in meters is displayed at the top, and your current ground speed is displayed at the bottom left.
- When you are in the Point Navigation Instrument window and using the simulator, then you can change speed and direction using the keypad as indicated above.
- If you are not near any of the existing Nav points and you would like to try this, just slow down, then mark the current location by hitting MARK POINT, and then select a name for the nav point or if you are in Demo Area you can store the point as one of the Demo Area Lines (100, 300, etc.). You can then select this nav point by hitting SELECT LINE, and choosing the Line you just marked. This will automatically switch to the Point Nav Instrument window and point to the point you just marked to navigate to.
- Try visualizing the stacking 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.



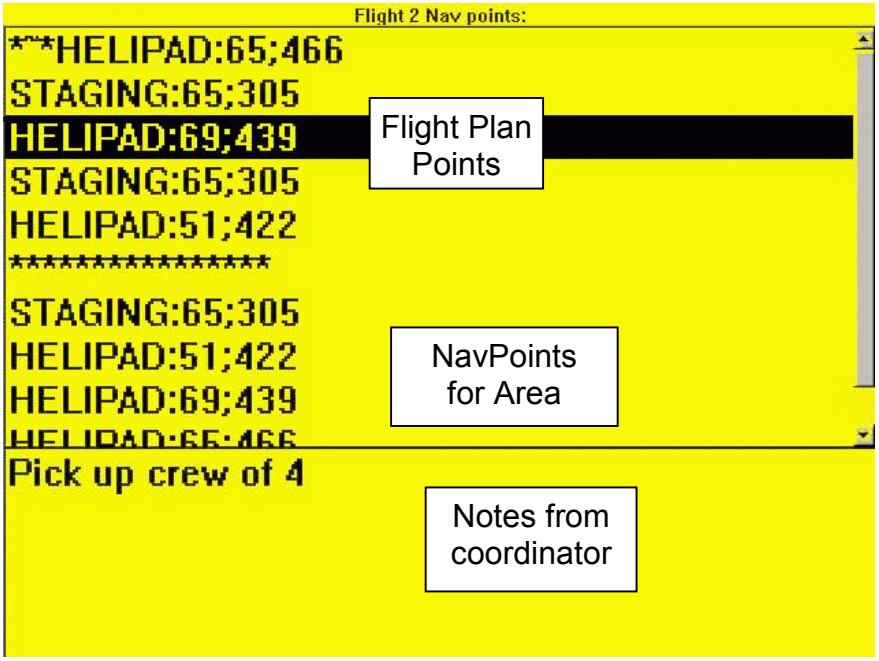
Using the Flight Plan mode

- When you select '**Flights**" from the Select Line List, it jumps to '**Selecting a Flight'** window. The default setting is '**Auto'**
- If you simply hit the Enter switch, the point navigation instrument will give the navigation to the bag locations, etc. in the exact order and sequence that the Ground Coordinator has entered them.
- As you complete one plan, it will automatically sequence to the next plan and remove the completed plans out of the '**Selecting a Flight**' list.
- You also have the option at any time to specifically select any one of these plans to do out of this list, or any one of the Nav Points while in that particular plan.



Viewing Flight Notes on Flight Plan Navigation

When navigating in the Flight Plan mode. A single push of the window switch brings you to a list of locations for the specific flight plan being shown; The upper list are the Flights points of the flight plan in order of sequence; the lower list, separated by a line of stars **********, is the nav points stored for the area you are working on such as helipads, staging, etc. Flight Notes sent by the coordinator to you show up on bottom of window.



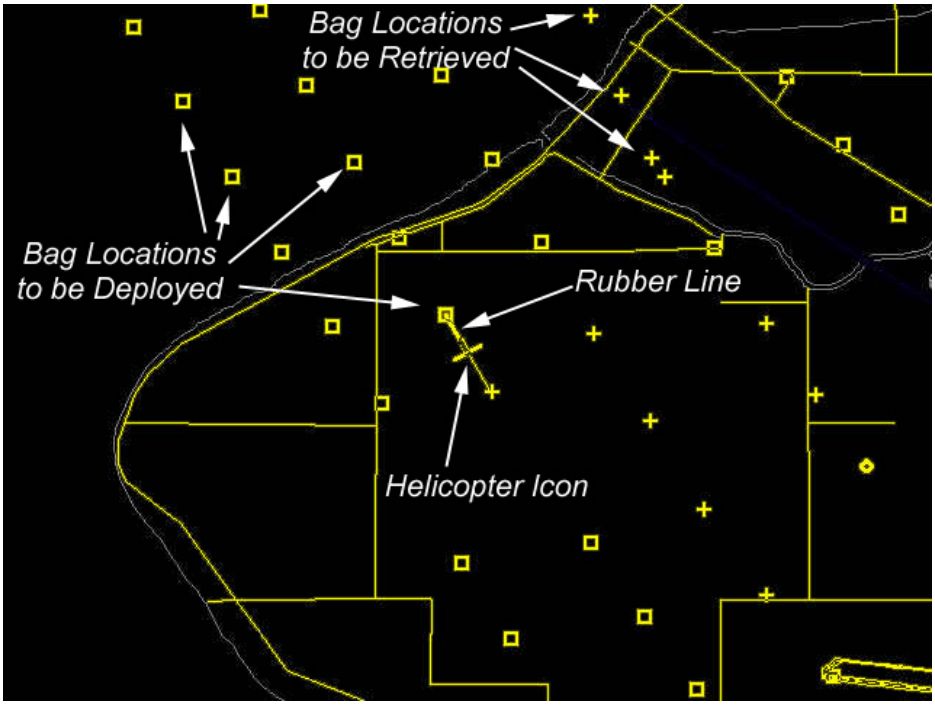
How do I add a new nav point in the helicopter?

In the helicopter, you can only add a new point by flying over, hovering or when landed by hitting **MARK POINT** button. As this is the center button, all you have to do is hit the Enter switch. At this time, you will be presented with a choice list of names (which you can edit on the ground computer, by the way). Choose one of the names, and the current location will be marked. If you have chosen a duplicate name, the location will be marked with this name with a number appended that will distinguish it from the other ones of the same name. With the optional Nav Management software (in the base computer) these names can be edited later to make them more easily identifiable.

These points added in the helicopter are not the Bag drop locations, but only points for job related navigation or storing a point for later recalling the location of an event such as Helipads, etc..

The optional **NavPoint** management ground based software can be used to add new nav points by map selection or importing Navpoint SEG files. This list of nav points is stored for each specific Area created on the SeisBag-Ground software.

Instructions for use of the Moving Map 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 Bag Drop and Retrieve nav points are displayed to scale over the background, and a ‘rubber band’ connecting your current location to the Bag Location or 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.

TUNEUP Software:

Accessing the TUNEUP software

The software is installed as part of the SeisBag Ground software on the Base Computer. First plug in the aircraft PC Card into the PC Slot on the ground computer, then run TUNEUP by using 'Start – Programs – DynaNav Seismic - 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. 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 a 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

- Delay time before Deploy switch is recognized: (100 ms) milli-seconds-
  This setting is for the time delay of the switch activation before the DynaFlight system will accept the Deploy as being valid. Some carousels are set up for at least 1 second of hold time befor release of the bag off the hook. If this is the case, the delay time should be set for something just under the 1 second time, e.g. 800 ms (milli-seconds).
- Maximum Distance from bag to switch to compass: (50m) meters –
  This is the distance that the helicopter has to be within for the internal compass to turn on for pointing to the location of the bag while turning in hover.
- Maximum Distance to Accept bag drop: (50m) meters –
  This is the maximum distance from the Bag Drop that the system will record the drop as being valid. Dropping a bag further than this will not mark the selected bag as being dropped, however the event is recorded as a NSD – Non Standard Deploy.
- Speed below which the compass (hdg) switches on: (8m/s) meters per second-
  This is the speed of the helicopter below which the compass will turn on to give heading information to the Navigation Needle.
- Speed above which the compass recalibrates: (16m/s) meters per second –
  As the compass does not know the direction in which it was installed relative to the nose of the helicopter, the compass will re-calibrate this direction by using the Track information from the GPS. This speed is a speed above which it is assumed the helicopters nose is pointing in the actual direction of flight after hovering.
- Speed above which the compass first calibrates: (15m/s) meters per second –
  As the compass does not know the direction in which it was installed relative to the nose of the helicopter, the compass will calibrate this direction by using the Track information from the GPS. This speed is a speed above which it is assumed the helicopters nose is pointing in the actual direction of flight.

Switch Items

- Compass enabled (yes)
  This will turn on/off the internal compass. If it is turned off, the Navigation Needle will go into FIX mode and fix the direction of the needle as if the nose of the helicopter were to stay in the same direction. The speed below which it goes into the FIX mode is the same as the “Speed below which the compass (hdg) switches on´explained above.
- Automatic Multi-line retrieval DISABLED (yes)
  When this is turned off, the system will automatically point to the nearest Bag Retrieval location on all the lines on the job. If it is more efficient to pick up bags on adjacent lines, then this should be turned off.
- BackTracking Enabled (No)
  If the system has been authorized for the BackTrack™ optional software, then this enables the BackTrack navigation selection and navigation needles.
- Laser EDM Enabled (No) -Not Applicable for DynaFlight-SeisBag
- Video Output Enabled (No) -Not Applicable for DynaFlight-SeisBag
- Moving Map Background Images Enabled (Yes)
  This is if there has been a map images for the Moving Map window available and you do not want them to show up under the Bag Drop locations.
- Using Older Laser (no)
  Not Applicable for DynaFlight-SeisBag
- Raw Data Recording DISABLED (no)
  This should be disabled only if the PC Card for the aircraft has very little memory (less than 16megs)
- Data Transceiving Enabled (Yes)
  This is used to enable the Tracking of the helicopter on the SeisBag Ground Software. This is used for systems with the Telemetry option installed.
- Data Sending Enabled (Yes)
  This is used to enable the sending of the updated information from the helicopter to the SeisBag Ground Software. This is used for systems with the Telemetry option installed.
- Data Receiving Enabled (Yes)
  This is used to enable the receiving of the updated information to the helicopter from the SeisBag Ground Software. This is used for systems with the Telemetry option installed.

Count Items

- Number of Raw files to maintain: (4)
  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 deploy/retrieve switch events for later recovery. This file is used in the BackTrack software to create a flight path for back tracking the actual flight path of the helicopter to search for Bags that have been inadvertently dropped. Because the Deploy switch event is also recorded, then, if this

happens to be the cause of the inadvertent drop, the location for that can also be targeted

- Number of Laser files to maintain: (8) - Not Applicable for DynaFlight-SeisBag
- Maximum Distance to see Bags: (1500M, zero disables) –
  The Navigation needle shows all the Bag Drop locations display as a rotating map relative to the nose of the helicopter. This adjusts the total distance of the map across the Navigation Window.

Back Track

- Screen width from track: (80 m) meters –
  This sets the screen width of the left/right navigation needle for steering down the curved lined path of the BackTrack

Questions or Suggestions?

Feel free to contact DynaNav Systems Inc through our web site or Ph: 604-465-0009, or email vern@dynanav.com

Quick Reference Guide for DynaFlight-SeisBag™

Special Notes:

Before you can navigate to any bag locations for your area, the data has to be created on the SeisBag Ground™ software and transferred onto the Aircraft PC Card. This Card is located in the right slot of the left door of the DynaFlight processor box in the aircraft.

At the beginning of the job, it is recommended that you pick a particular surveyed and flagged point that has a Bag Drop Location created for it and fly to that target and make sure that the survey data matches the actual survey points. If it does not match, let the coordinator know before beginning job to get the data repaired.

For Normal Automatic Select Navigation Mode

- After the DynaFlight boots up, select the area name designated for your job site.
- Push the **"SELECT LINE"** button and push your enter switch.
- Scroll to the Line number you are going to work on and push your enter switch.
- System automatically shows you the closest Bag Drop location.
- When you deploy or retrieve the bag, a message pops up that the Bag has been dropped and automatically gives the next closest Bag Drop location.

For Normal Automatic Select Navigation with first Bag Drop Selected

- After system boots up, select the area name designated for your job site.
- Push the **"SELECT LINE"** button and push your enter switch.
- Scroll to the Line number you are going to work on and push your enter switch.
- System automatically shows you the closest Bag Drop location.
- Push the window switch once and scroll to the specific Bag Drop location you desire and push the enter switch.
- System is locked to that particular Bag Drop location or Nav Point until deployed.
- When you deploy or retrieve the bag, a message pops up that the Bag has been dropped and automatically gives the next closest Bag Drop location and stays in Automatic Select Navigation Mode.

For Automatic Flight Plan Mode

- After system boots up, select the area name designated for your job site.
- Push the **"SELECT LINE"** button and push your enter switch.
- Scroll to the '**Flights'** and push your enter switch.
- The **'Select a Flights'** window highlights **'Auto'**, push your enter switch.
- System is locked to the first Bag Drop location on Flight Plan.
- When you deploy or retrieve the bag, a message pops up that the Bag has been dropped and automatically gives the next Bag Drop location in the Flight Plan.
- The system will continue to automatically switch from point to point and flight plan to flight plan in the sequence that the coordinator has created them.