



TRACK'AIR
Aerial Survey Systems

ZUTPHENSTRAAT 55, 7575 EJ
OLDENZAAL, THE NETHERLANDS

Tel +31 - 541 229030 - Fax +31 541 229033 - Hot line +31 6 51363197
Email: info@trackair.com Internet: <http://www.trackair.com>

THE TRACKER

snapSHOT



Aerial Survey Navigation and Photography

USERS MANUAL

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1 - ABOUT THIS MANUAL

Last updated 7 August 1998

Please note that this manual might not exactly match the software you are using. As the system is being changed and improved all the time, the written material can become slightly different from the current software release. Manuals are updated as often as possible to reflect changes made to the software. We would appreciate if you could indicate to us chapters which are totally outdated or conflict with the actual operation of the software.

UPDATES

Software updates on CD contain the complete copy of the manuals. Compare the table of contents of your manuals with the new copy to determine which chapters have been updated. Simply discard the old chapter and replace them with a print the new and updated chapters.

PAGE AND CHAPTER NUMBERING

Pages numbers include the chapter number and the page number, E.G. 15 - 3, meaning page 3 of chapter 15.

Chapters are in no particular orders. Newly written chapters are added at the end of each manual.

MANUAL AND ON LINE HELP

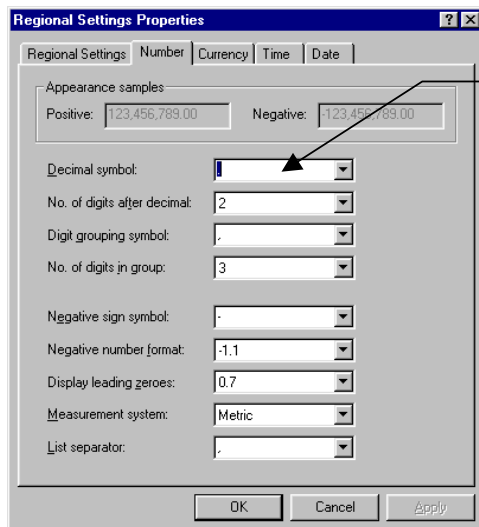
Generally the online help and the manual will be kept as similar as possible. As a rule, new additions and modifications to the software will first be described in the online help before being included in the manuals.

2 - INSTALLATION NOTES

Last updated 7 August 1998

DECIMAL SYMBOL

The computer must be configured to operate with **snapSHOT**. snapSHOT only recognizes the dot (.) as decimal symbol. If your computer uses the comma (,) then you must change to dot (.). To change this settings, select MY COMPUTER > CONTROL PANEL > REGIONAL SETTINGS > NUMBERS. This setting can be re-changed at any time.



Place a dot . in this box and press apply.

OTHERS SETTING

We have chosen to develop Tracker under Windows 95 for your comfort and because we believe that the Windows operating system has much more to offer than any other existing alternative. **However, the makers of Windows 95 did not design their operating system to trigger aerial survey cameras with an accuracy of a few meters from airplanes flying at 100 meters per second.** It is therefore essential to disable some of the cool features of Windows 95 which unfortunately do interfere with the good operation of the system.

- Power management (hard disk sleep mode, display blanking, etc.) has to be fully disabled. Refer to your computer manual and Windows 95 manual.
- All screen savers have to be disabled.
- All automatic and scheduled system agents (disk scanning, defragmenter, etc.) have to be either suspended before the mission or disabled.
- The task bar should be made invisible before you start the **snapSHOT** program. Press the **Start** button, select **Settings | Taskbar...** and deselect the **Always on top** option.
- Deactivate or remove all gadgets and applications which are not indispensable to run THE TRACKER (animated icons, cursors, funny sounds, etc.)
- Unless you have a powerful Pentium pro or better, refrain from draining your computer resources while on the survey (like playing games or viewing a video). This will inevitably cause problems with the automatic camera triggering.

MULTITASKING SNAPSHOT WITH AN OTHER PROGRAMS

Although the current Tracker is still a 16 bit application, the ample resources of Windows 95 allow you to run another real-time program at the same time as **snapSHOT**. For example it is OK to log GPS raw data on the hard disk from another serial port while Tracker is in operation. Nevertheless, we advise you not to run any multimedia application while on the photo line.

3 - SNAPSHOT OVERVIEW

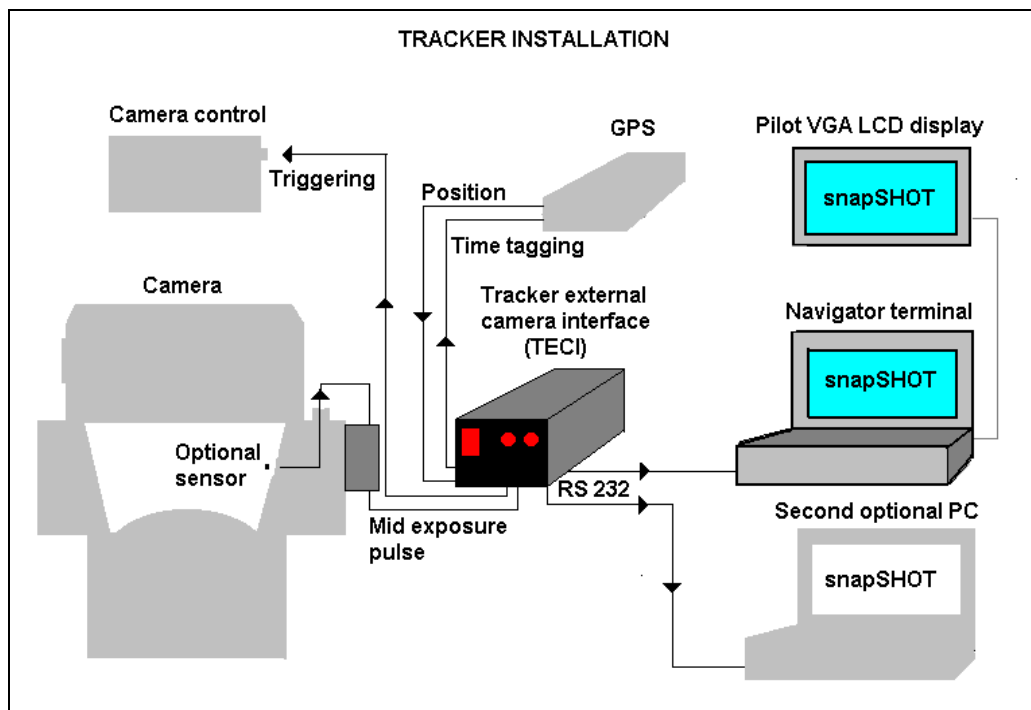
Last updated 7 August 1998

- Aerial survey navigation and management system operating on commercial portable PC's.
- Interface to any type of GPS receiver.
- Graphic moving map display showing the airplane in relation to the current flight plan.
- Connection for a DGPS receiver time tagging recording system.
- Automatic programmed camera triggering.
- Accurate mid-exposure pulse generator installable in older cameras.
- Automatic recording of the coordinates of each photograph during the flight.

snapSHOT is a complete airborne support system for aerial survey. It consists of software running on a portable PC and the **TECI** external electronic interface connecting the GPS, camera and the PC.

One of the main features of **snapSHOT** is to allow real time recording of photo positions for older cameras not equipped with a mid exposure pulse. Additionally **snapSHOT** provides the crew with a GPS driven moving map display showing the airplane in relation to the actual flight plan. During the flight, **snapSHOT** maintains a current status of the progress being made. The graphics continually reflect the changes and show an exact outlook of the situation. In addition **snapSHOT** can automatically trigger the camera at predetermined locations.


The **snapSHOT TECI** external interface can be used in conjunction with the MEP, a computerized mid-exposure pulse generator that can be easily installed by the user in any type of camera (Zeiss RMK, Wild RC10, etc.). During the survey, it allows **snapSHOT** to log automatically the coordinates of each photograph into its internal database.

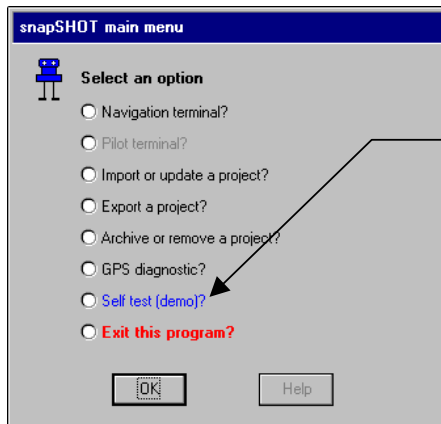


4 - QUICK DEMO

Last updated 7 August 1998


If this is your first time on board, the following will allow you to simulate automatically a small survey flight and become familiar with the **snapSHOT** interface.

Start the **snapSHOT** module by clicking the icon . The following dialogue box will appear:



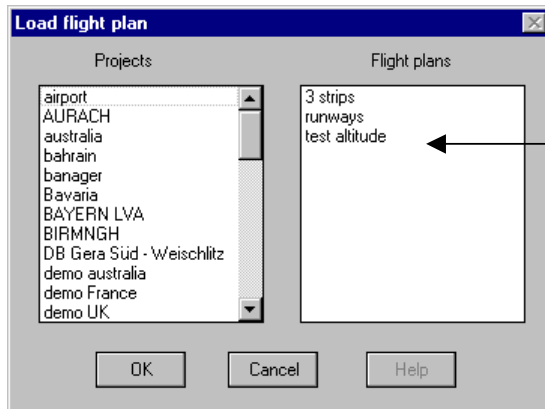
1) Select the **self test (demo)** option and press OK.

2) Please leave the mouse alone, the demo will run by itself.

3) To interrupt the flight and exit the program, press the stop button .

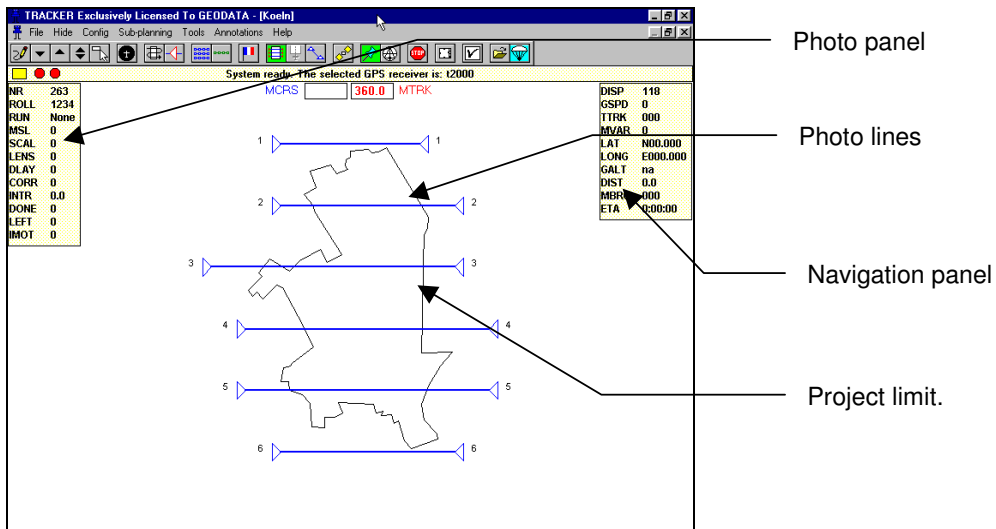
WHAT IS HAPPENING?

At each step, the demo pauses for approximately 5 seconds.

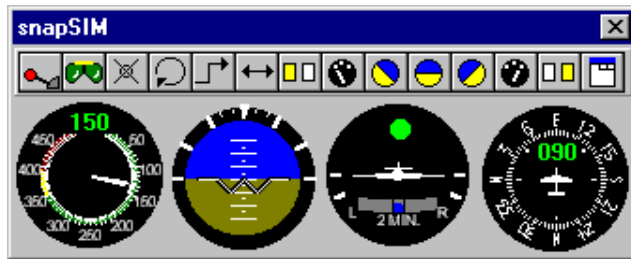


First a project and a flight plan are selected from a list showing all the projects available in the database.

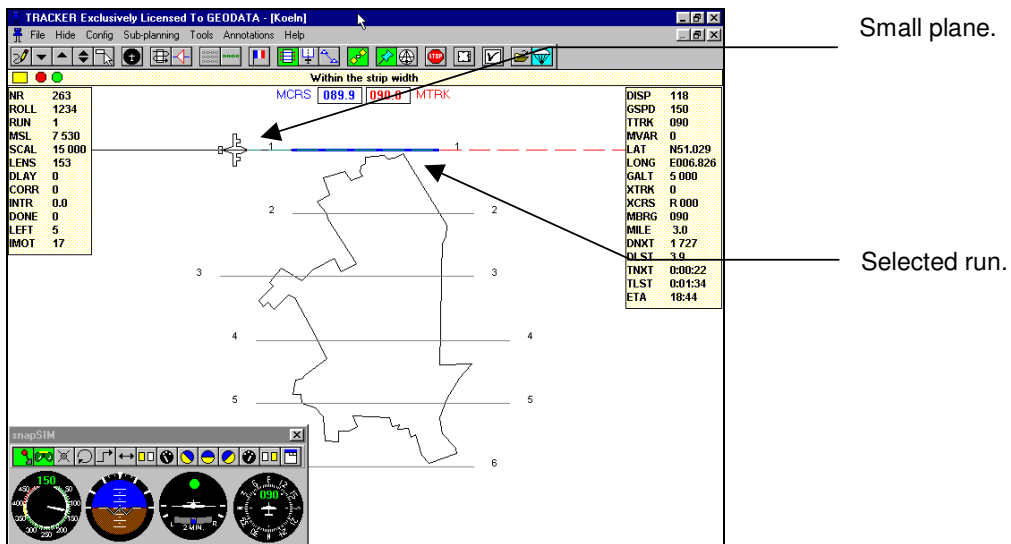
Once the project is loaded, the display shows an overview of the area.



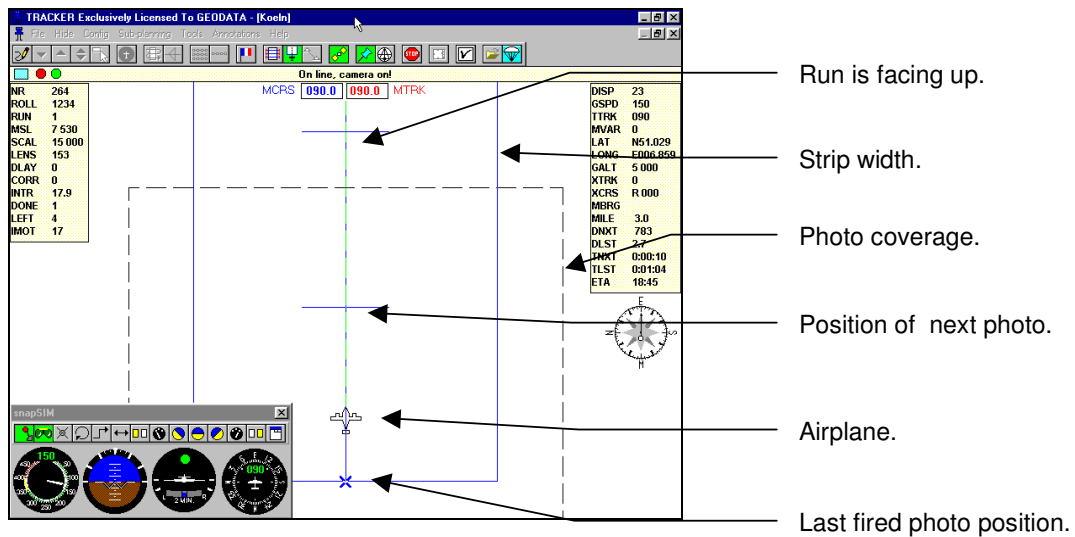
Next, the simulator is started.



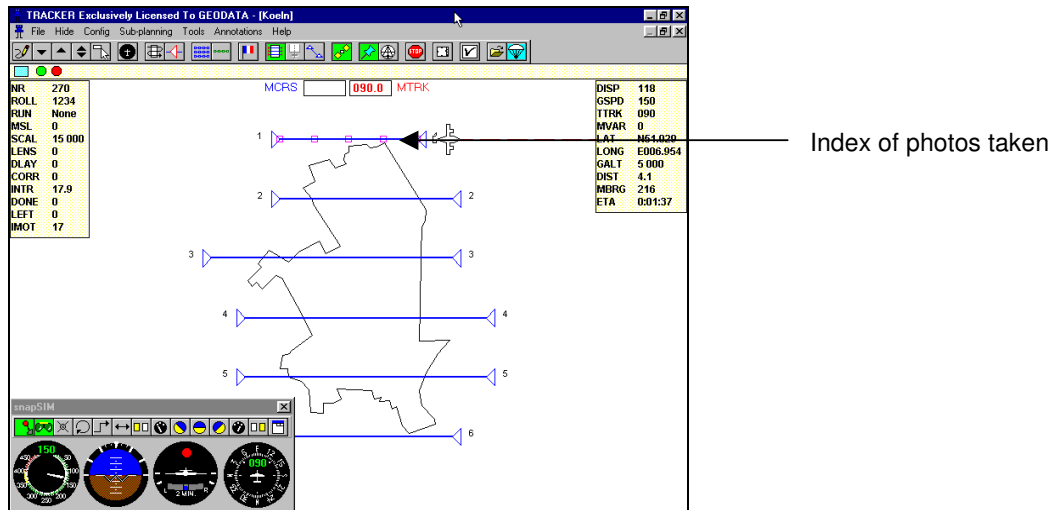
A run is selected and the plane is flown on track by the simulator auto-pilot.





A short distance (0.5 mile) from the beginning of the strip, the display is changed to the **Trackup** display (the run is rotated so that the airplane is facing upward).



At the end of each run the display returns shortly to the Overview mode.



6) Each time a new run is automatically selected and the display returns to Trackup.

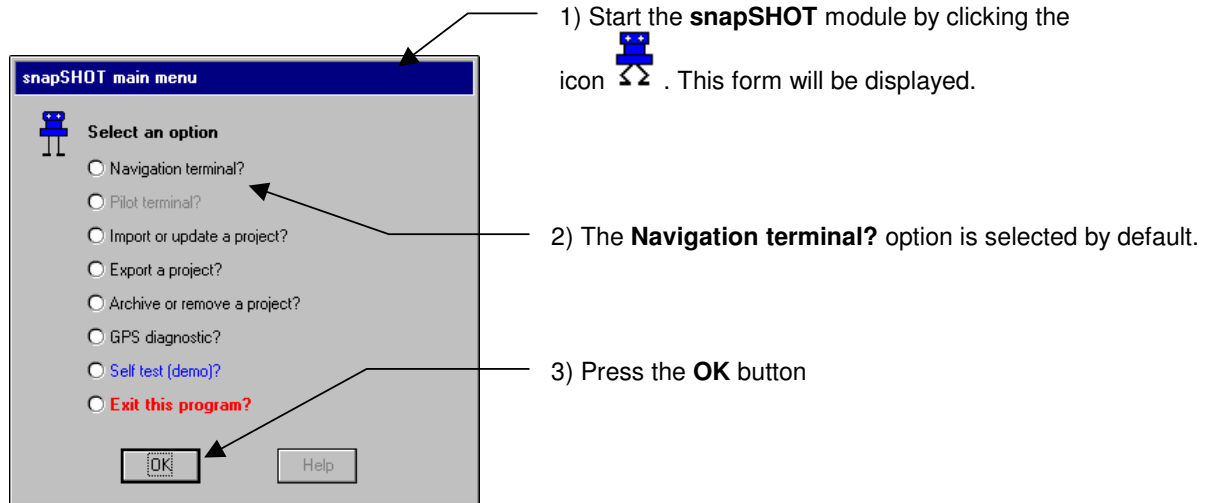
7) To interrupt the flight and exit the program, press the **Stop** button  or the **Exit** button 

8) Otherwise, after all the runs have been flown, the program will end automatically.

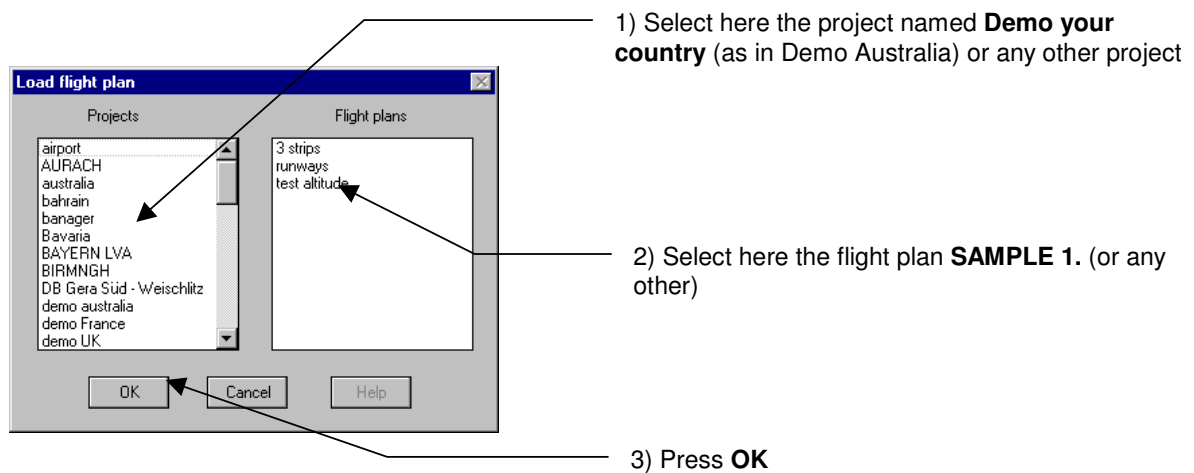
5 - QUICK TOUR

The following will allow you to carry out a small survey flight simulation yourself. Even if you make mistakes, nothing will go really wrong. In the unlikely event that an error is occurring, just restart the program. The purpose of this small demo is only to give you a rapid overview of the system. Please stick to the instructions for the best results.

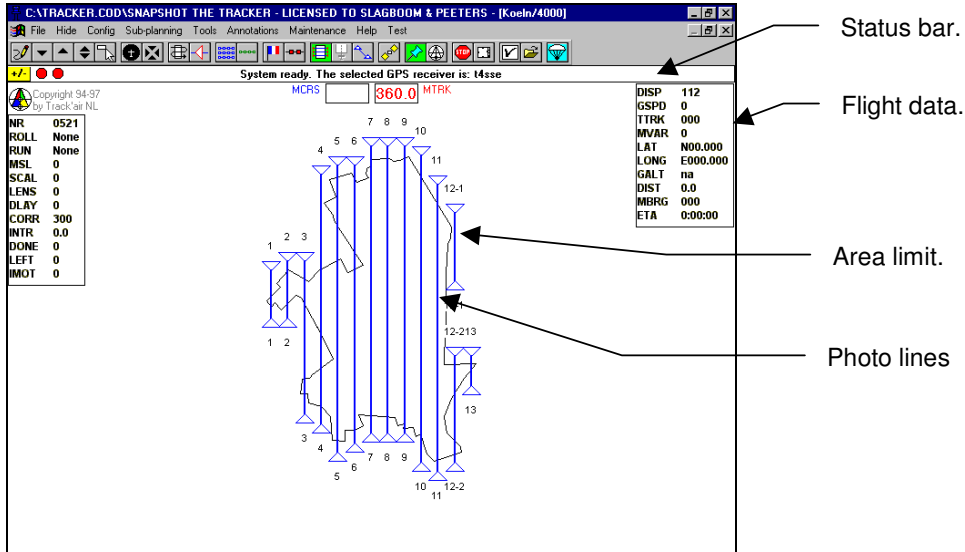
Remark: Please remember that using the **TRACKER** system requires a minimum knowledge of the Windows interface and that using the plane simulator requires some basic understanding of airplane control. Have a good flight!



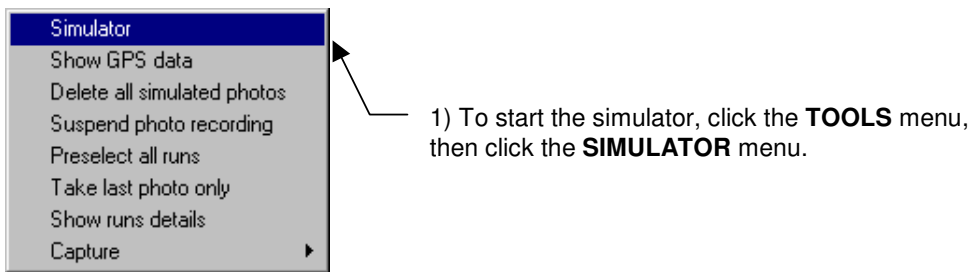
This window allows you to select a flight plan from the database. The left list displays all the projects which are currently in the database. Picking the name of a project will display in the right list the names of the flight plans which have been saved in this particular project. There can be many different flight plans in one project, or just one.



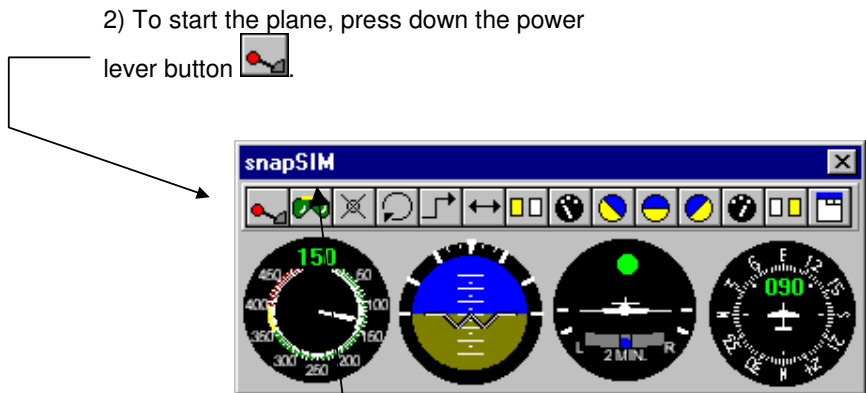
Once your project has been loaded, the display will look like this.




Let us start the simulator and get airborne.

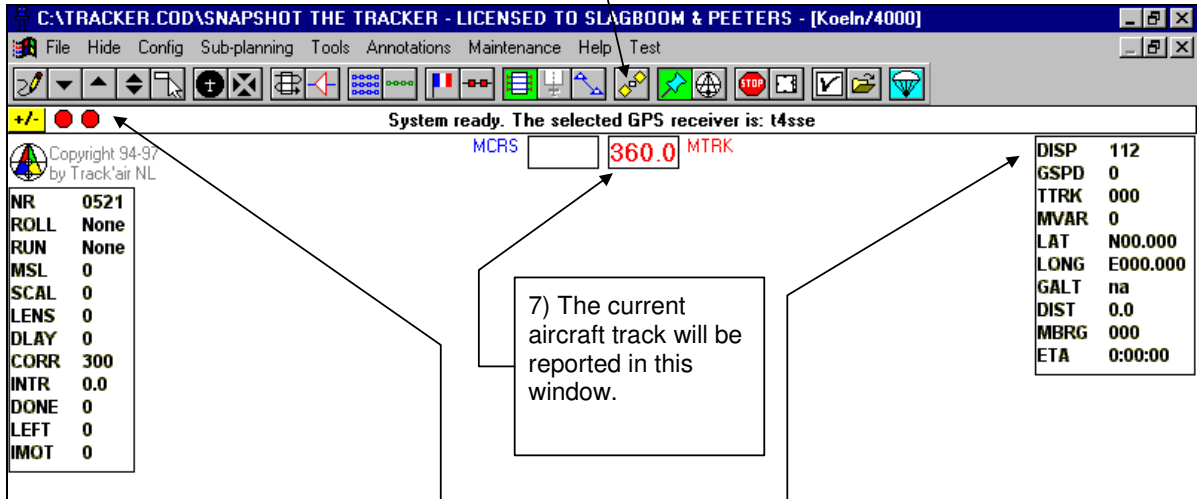


The simulator window will show up in the left bottom corner of the display.



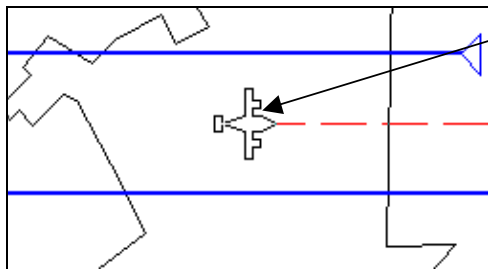
3) To simplify the first flight, Press the auto pilot button (the "pilot" shades).

5) On the main toolbar, press the GPS button  to connect the computer to the GPS.
 (the same action has to be carried in the air to connect the computer to the GPS receiver).

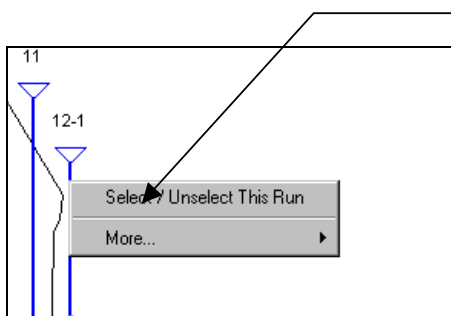


6) These LED's will start flashing, indicating that a GPS message is being received by the **snapSHOT** system.


8) The aircraft ground speed will be reported at the top of the right navigation panel.

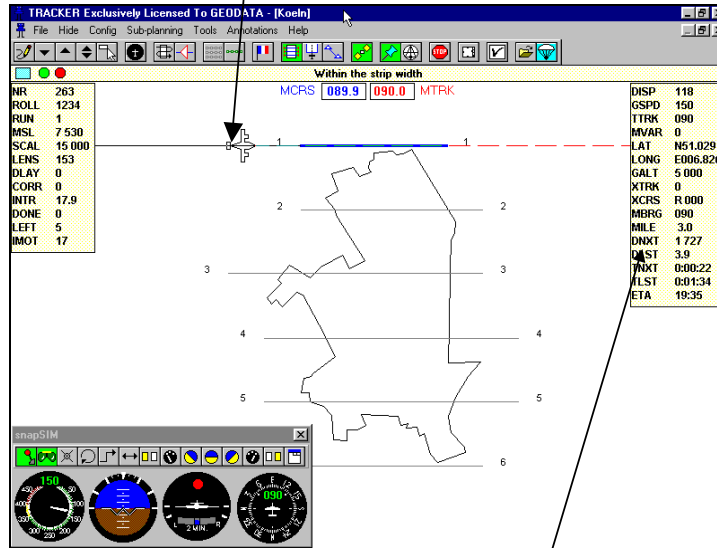


9) The airplane should become visible, cruising in the middle of the area.




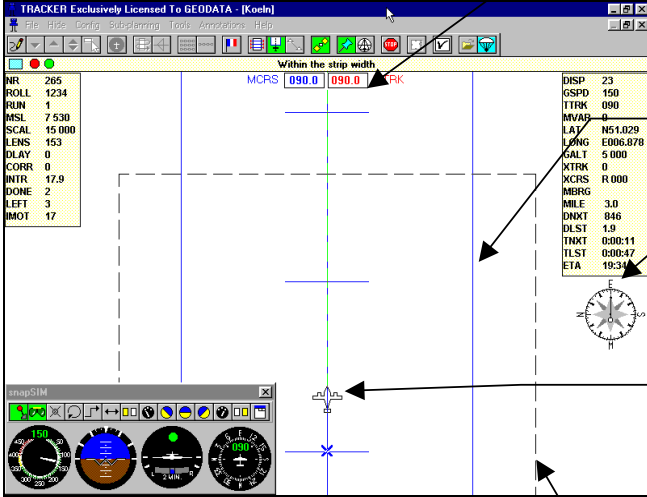
9) To select a run, click a run anywhere with the **RIGHT** mouse button on the side you want to start the run from (left half = from left, right half = from right, etc.). This click will pop a menu from which you can select the run.

10) As soon as the line has been selected, the **auto pilot**  simulator function will move the plane on track, 4 to 5 miles before the camera on point.



11) The distance and time to the first photo can be read in the right panel, TNXT (time to next) and DNXT (distance to next).

12) Let us now switch to the "TRACKUP" view, the display mode that will be used by the pilot to track along the line. Press the **TRACKUP** button  on the main toolbar. The display will change to this:



Magnetic course and magnetic track.

Outline of the photo strip

Compass rose

In this view, the small plane is stationary in the middle of the lower screen area. The photo run is rotated so as to face up.

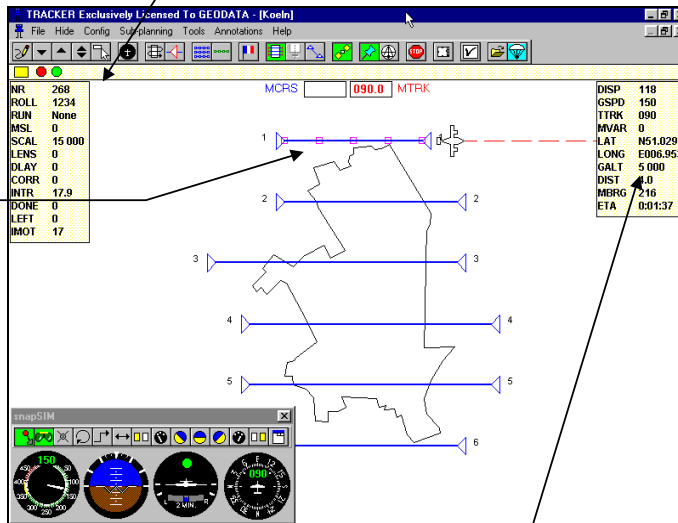
The large dotted rectangle around the plane symbolizes the photo coverage.

13) The auto pilot will guide the plane approximately on track along the centerline. Once you have crossed the threshold of the strip, the camera will start firing at each predetermined photo position. This is indicated by a small blue cross.

14) At the end of the line, the display will return to the overview mode.

NR: Next photo number
ROLL: Current film number
RUN: Selected run number
SCAL: Required photo scale
RMSL: Required MSL altitude
DLAY: Camera delay.
CORR: Triggering correction.
DONE: Photos completed
LEFT: Photos left
IMOT: Image motion
LENS: Required lens
INTR: Photo interval

The photos taken are displayed as small squares.



DISP: Current display scale
TNXT: Time to next photo
DNXT: Distance to next photo
TLST: Time to last photo
DLST: Distance to last photo
XTRK: Cross track distance
XCRS: Bearing difference
GALT: GPS reported altitude
GSPD: Ground speed
MCOG: Magnetic track
GPOK: GPS Signal OK
MVAR: Magnetic variation
ETA: Estimated time end of run
MBRG: Bearing to beginning of run.
TTRK: True track
MILE: Length of the run (miles)

15) You are now ready to fly another run. Refer to the **SIMULATOR** topic to get more practice with the simulator.

6 - FEATURES SHARED BY ALL MODULES

The following describes features and behaviors that are common to all TRACKER modules.

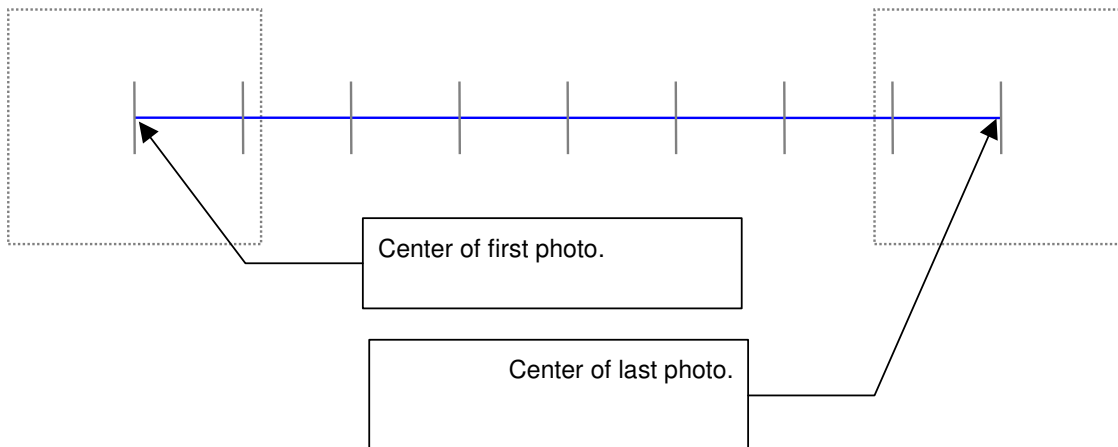
DRAGGING THE DISPLAY

To move the entire drawing area, **PRESS AND HOLD** the **LEFT** mouse button anywhere on the map area, drag the mouse to another spot and release the button. The whole map will be shifted. While the mouse button is held down, the cursor changes to a 4 heads arrow.

The screenshot shows the TRACKER software window titled "TRACKER Exclusively Licensed To GEODATA - [Koeln]". The interface includes a menu bar (Planning Tools Help), a toolbar with various icons, and a main map area. The map displays a white outline of a landmass with several blue horizontal lines representing flight runs, numbered 1 through 6. A 4-headed arrow cursor is positioned over the map. A text box on the left side of the screenshot provides instructions on how to drag the display. On the right side, there is a legend or list of symbols including GPOK, DISP, GSPD, TTRK, MVAR, GALT, RMSL, XTRK, DNXT, TNXT, MBRG, MILE, DLST, TLST, and ETA.

GRAPHIC REPRESENTATION OF RUNS

Tracker represents runs and strips by their centerline and crosswise ticks which represents the photo positions.



7 - MAIN TOOLBAR (OLD)

Last updated 12 October 1998

See chapter 54 for the new buttons



HSI MODE

While in the overview mode, toggling this button will keep the small aircraft in the center of the display so that it remains always visible. In this case, the background drawings and runs will appear to be moving and the small airplane will appear to be fixed at the screen center.



AUTO TRACK

- When **the HIS mode is selected**, this button will activate the "all in view" function: The display will be automatically zoomed to keep the entire project within the edges of the display area. This function is not very useful with large blocks but it comes handy with large scale single runs.
- When **the HIS mode is not selected**, then this button will activate the auto-track function: When the airplane leaves the display area, the display will automatically re-center on the small plane.



PRE-SELECT

Run the automatic pre-selection which allow runs to be automatically selected. Refer to the pre-selection chapter.



END OF RUN SLIDERS

Toggle this button to move the end of run triangle markers. Refer to the sub plan chapter.



INDEX

Display an index of the photographic coverage as it is when the program is started. Marked photos will also be displayed.



SHOW ONLY LAST ATTEMPT

Only the photos of the last run attempt are visible. This is only meant to be an helpful feature to isolate your last run attempt from the cluttering of the other photos.



SELECT RUN FROM A LIST

Click this button to display a list of the runs from which the active run can be selected.



SET CAMERA COUNTER NUMBER OR FILM NUMBER

This is a short cut to get into the camera and film number dialogue box to set the film number of camera counter number.



MARK PHOTOS

When this button is pressed, the photo positions are colored in red so that they can be easily distinguished from other photos. Marked photos are saved so that they can be found later, for example if they need to be repeated.



OVERVIEW MODE

This is the default display showing all the runs. You must return to this display to select runs, use the sliders, etc.

**TRACK-UP MODE**

When on line, switch to this mode to rotate the run so that the small plane appears to move upward on the laptop display.

**FERRY MODE**

Use this mode as a large scale map to travel to and from the photo site.

**OPEN SERIAL PORT**

Toggle this button to connect the laptop to the TECI external interface box via a serial port or to see the small airplane during a simulation.

**PINPOINT MODE**

This is the default. In this mode snapSHOT automatically triggers the camera via the TECI box. If this button is toggled up then the system becomes passive and expects the camera to be triggered on its own.

**MANUAL OVERLAP MODE**

Pressing this button allows the camera to be operated on its own via the overlap regulator. In this case, the photo positions are also being recorded.

**ABORT**

In case a run attempt has to be aborted before the end this button must be pushed and one should wait until READY is displayed on the status bar.

**SINGLE SHOT**

Press this button to trigger a single shot.

**SHOW CHECKLIST**

Press this button to pop the CHECKLIST.

**SELECT NEW PROJECT OR FLIGHT PLAN**

Press this button to leave the current flight plan and return directly to the project selection dialogue box.

8 - BUTTONS SHARED BY ALL MODULES



The following describes the buttons shared by all the Tracker modules:



1-REFRESH

Click this button to redraw the screen if it has not been properly painted or to remove garbage.



2-ZOOM IN (REDUCE SIZE).

Clicking this button will increase the scale of the drawing. Click until the drawing is at the required size. A beep and no effects will indicate that the limits have been reached. The maximum scale depends on the original size of the area.



3-ZOOM OUT (ENLARGE).

Clicking this button will decrease the scale of the drawing. Click until the drawing is at the required size. A beep and no action will indicate that the limits have been reached. The minimum scale depends on the original size of the area.



4-RESTORE

Clicking this button will restore the drawing to its first size and position.



5-ZOOM WINDOW.

Press this button down and draw a rectangle around the area to be enlarged.

Note: To draw a rectangle, position the mouse pointer on the rectangle upper left corner position, press the mouse button and while keeping it down, drag the mouse towards the right and down. A rectangle is displayed while this operation is taking place, when its size is satisfactory, release the mouse button.



23-OPEN NEW PROJECT

Click this button to return to the project selection dialogue box.



24-EXIT THE PROGRAM.

Click this button to shut down the program.

9 - SIMULATOR TOOLBAR

Last updated 5 April 2000



START STOP

Press to start the simulator.



AUTO-PILOT

With this function the plane will be automatically put on line as soon as a run is selected. If several runs have been pre-selected, the auto-pilot will carry on flying from one run to the other.



RESET START POINT

Changes the start point to the current plane position. When pressing the next button, the airplane will return to this location.



RETURN TO START POINT

Forces the plane to return to the start point which by default is the middle of the area, unless the start point has been changed with the previous button.



LATERAL DISPLACEMENT

The left mouse button moves the plane sideways 500 meters left.
The right mouse button moves the plane sideways 500 meters right.



REVERSE COURSE

(Very sharp) 180 degrees turn.

FLIGHT CONTROLS

The following buttons are used to control and fly the simulator:



LEFT "RUDDER" FINE CORRECTION.

Each click on this button gives you a 1/4 degree correction left.



LEFT STANDARD TURN

(3 degrees per second). Click once to get into a standard left turn.



LEFT BANK.

Click once to get into a bank. When the desired bank has been reached (see horizon), click again to stop the roll. The maximum bank is 60 degrees.



STRAIGHT AND LEVEL.

Click once to level the wing. The roll rate is approx. 5 degrees per second, so you must anticipate, as usual.



RIGHT BANK.

Click once to get into a bank. When the desired bank has been reached (see horizon), click again to stop the roll. The maximum bank is 60 degrees.



RIGHT STANDARD TURN

(3 degrees per second). Click once to get into a standard right turn.



RIGHT "RUDDER" FINE CORRECTION.

Each click on this button gives you a 1/4 degree correction right.

Tip. Only use left and right standard turns. Adjust the course with several small rudder corrections.

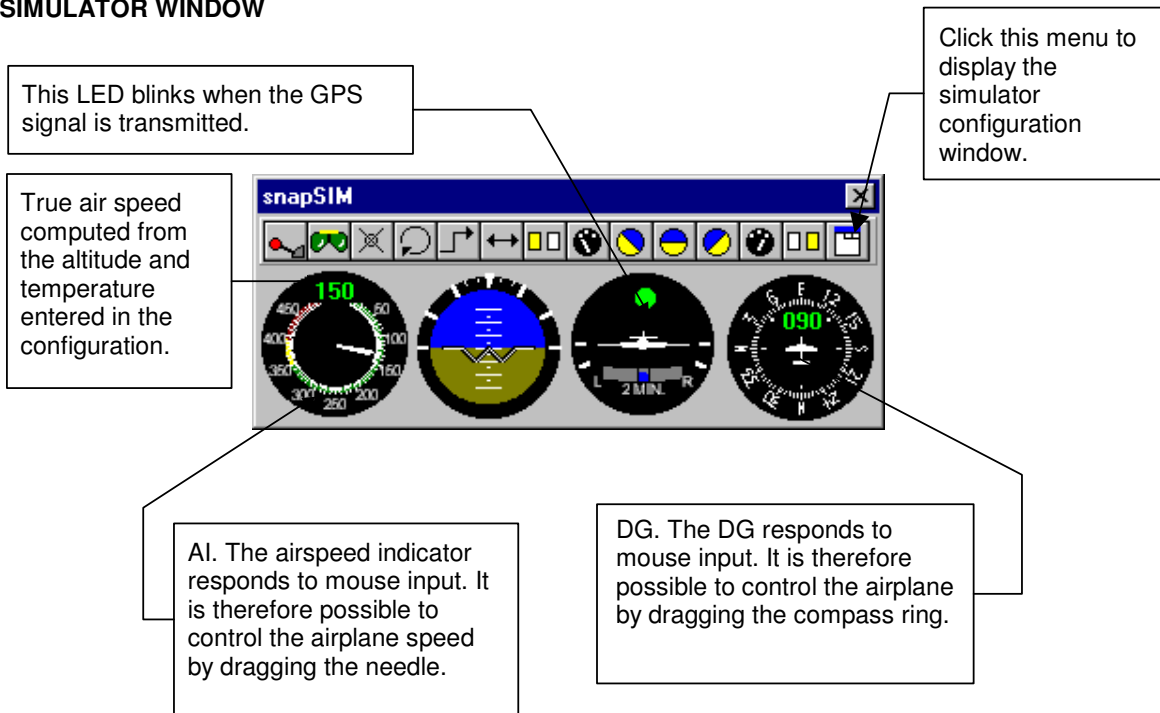


SHOW SIMULATOR CONFIGURATION BOX.

Press this button to access the simulator configuration parameters.

10 - SIMULATOR

SIMULATOR WINDOW




SIMULATOR FUNCTIONS

AUTOPILOT

With this function the plane is automatically established on track as soon as a run is selected. If several runs have been pre selected, the auto pilot will carry on flying from one run to the other. The plane will approximately track the center line and it is not possible to give corrections.

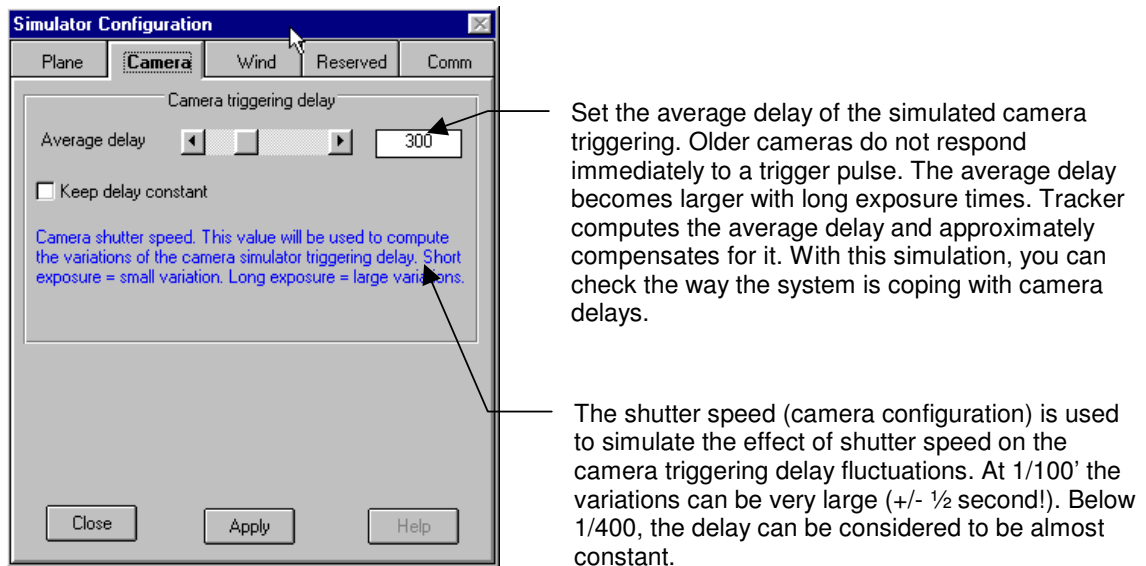
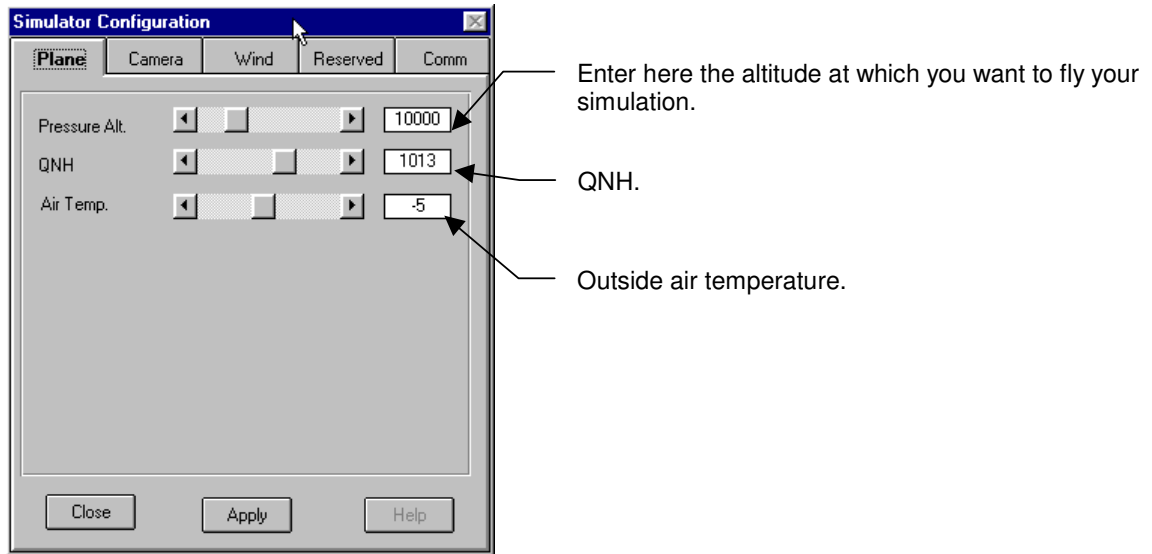
MOVING THE AIRPLANE

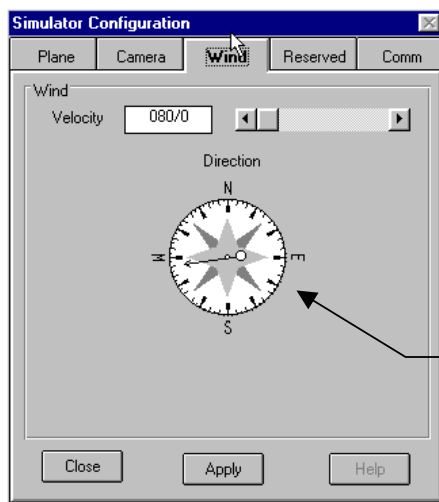
You can move the aircraft from one spot to the other on the display simply by placing the cursor where the aircraft should go and clicking the **LEFT** button while holding down one of the shift keys (ALT, CTRL or SHIFT).

To access the configuration dialog, press the configuration button on the simulator toolbar 

SIMULATOR CONFIGURATION FORM

(This is an advanced feature that is not required for normal operation.)





Change the wind speed with the slider. Tip: If you are new to the **TRACKER** simulator, do not use wind.

Remark: The auto-pilot function does not correct for wind. Set the wind to 0 when using it.

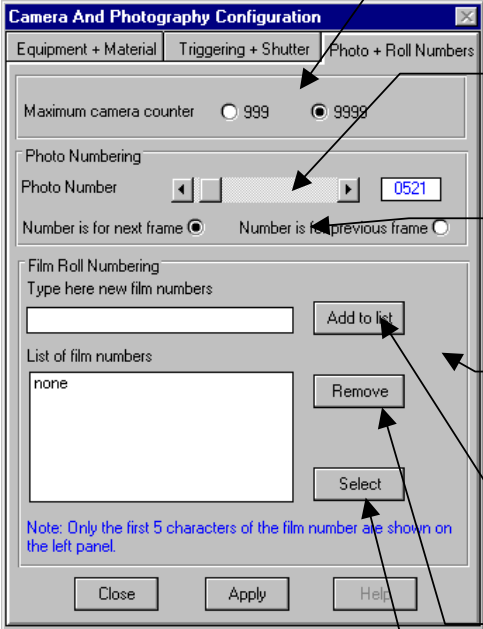
Set the wind direction by dragging the needle in the direction the wind should blow.

11 - NORMAL OPERATION

A good understanding and practice of the procedures described here are considered to be the minimum knowledge required before committing yourself to a photo flight.

FILM IDENTIFIERS AND PHOTO NUMBERS

To ensure a good project management it is necessary to let the system know the identifier of the film in use as well as the number of the camera counter. Do not forget that **snapSHOT** is generally not directly connected to the camera counter.



The screenshot shows the 'Camera And Photography Configuration' dialog box with three tabs: 'Equipment + Material', 'Triggering + Shutter', and 'Photo + Roll Numbers'. The 'Photo + Roll Numbers' tab is active. It contains several sections: 'Maximum camera counter' with radio buttons for '999' and '9999'; 'Photo Numbering' with a 'Photo Number' spinner set to '0521' and radio buttons for 'Number is for next frame' (selected) and 'Number is for previous frame'; 'Film Roll Numbering' with a text input field, an 'Add to list' button, a 'List of film numbers' area containing 'none', a 'Remove' button, and a 'Select' button. A note at the bottom states: 'Note: Only the first 5 characters of the film number are shown on the left panel.' At the bottom of the dialog are 'Close', 'Apply', and 'Help' buttons.

To change these numbers, click the **CONFIG + CAMERA AND PHOTOGRAPHY CONFIGURATION** menu. This form will be shown.

Indicate here the type of counter fitted on your camera (999 or 9999).

Use the slider to set the photo number. The new counter number will be displayed on top of the left data panel.

Indicate here whether the current camera number applies to the next photo (most cameras) or to the previous photo.


Use the Film panel to prepare the film identifiers that you are going to use in the next future. The film identifiers will be stored and you simply have to click to select a new number.

Type an identifier in this box and press Add to list.


To remove an identifier, highlight it then press **Remove**.

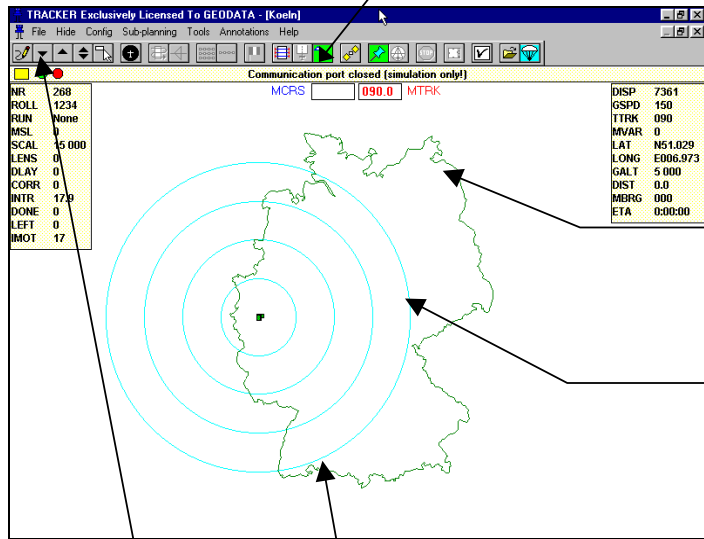
To change the current film number, highlight the new number in the list, then press **Select**. In the left data panel, you can verify that the film number has been correctly updated.

CONNECT TO THE GPS

To connect the computer to the TECI interface, refer to the **INSTALLATION** manual. Once the cables are properly installed, press the GPS button  to start receiving the GPS data. This action opens the serial communication port and initiates the TECI interface (or reads the GPS signal in case of a direct connection).

FERRY MODE

During the flight to a site the airplane might be too far to appear in the overview display (approx. 50 NM). In this case pressing the ferry button  will switch to a small scale display similar to this.



This outline was digitized in snapLIM and saved as in the **CHARTS** projects.


The distance between circles can be set in the display configuration menu.

The shift function is available: Press the mouse button to drag the display.

The display control functions (zooms) are operative.

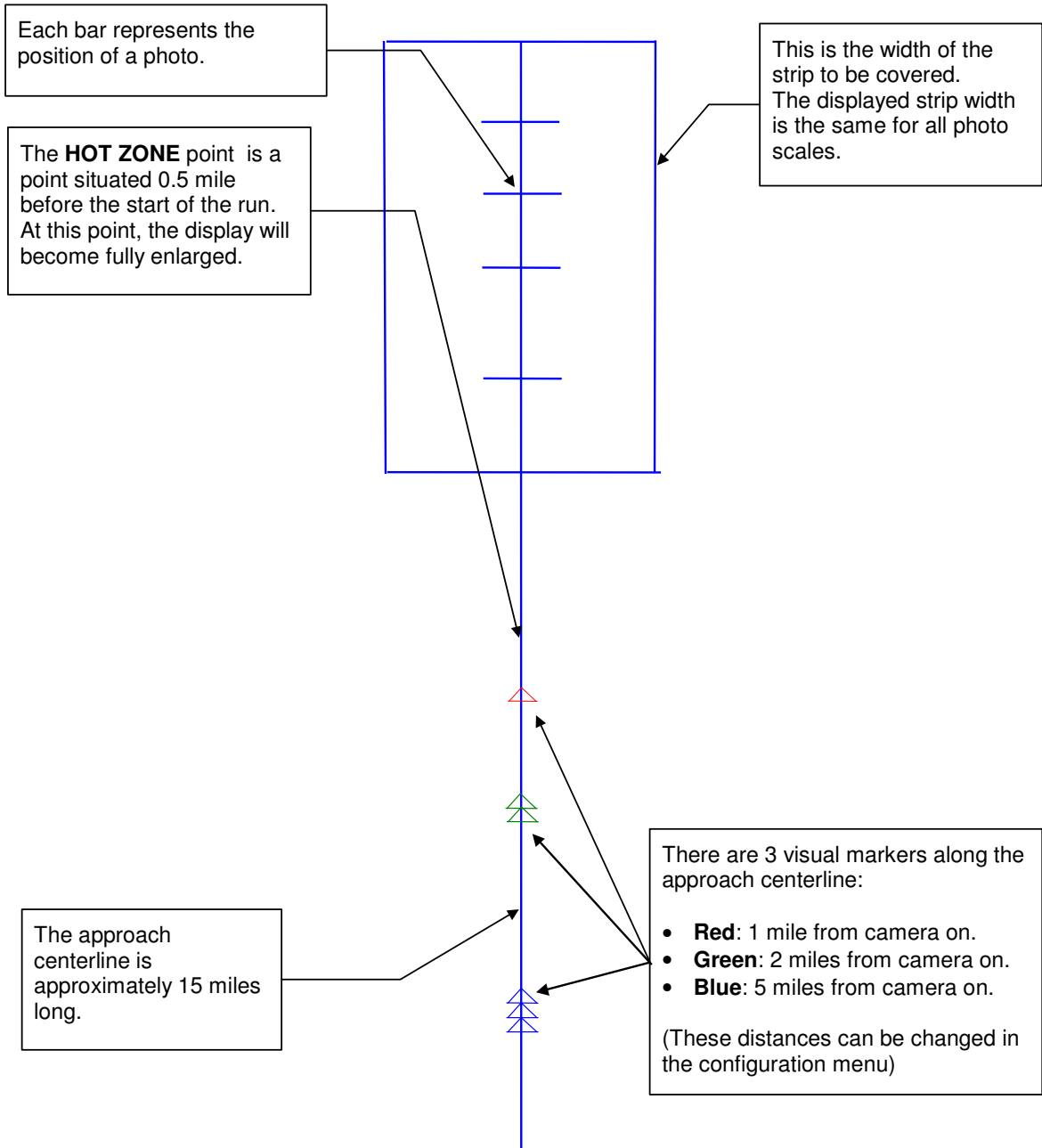
This view can also be used to display aeronautical information. Refer to the **CHARTS** topic for additional information.

TRACKUP MODE

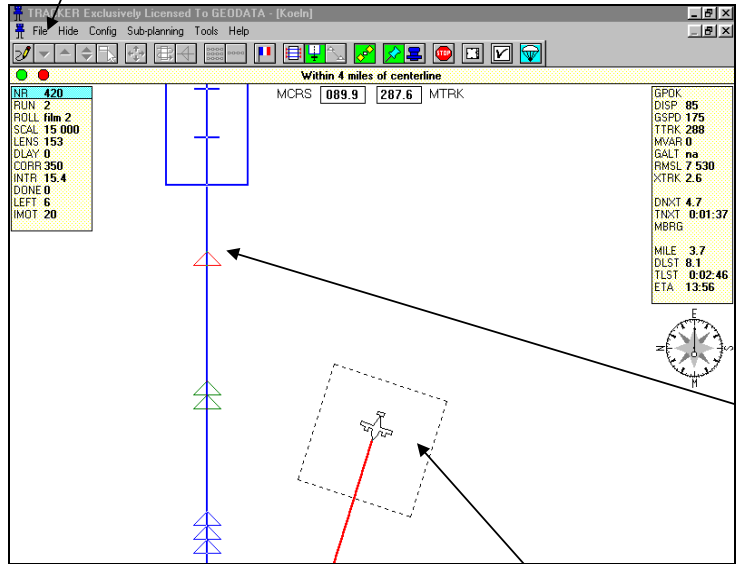
When a line is selected and the plane is in the vicinity of the line start (within approximately 10 miles), the **Trackup** button  is enabled. In this view the run is rotated so that it appears vertically in the center of the display. Regardless of the actual run orientation, one has to fly in the middle and toward the top of the display to track along the line.

In this mode, an automatic display control keeps the scale adjusted. The display will be scaled down or up as required. The closer the plane is to the line, the larger the scale will become. During the final turns toward the beginning of the strip, the display has always the same scale (approximately 1:20000) so the pilot can develop his own feeling for it.

Just before reaching the beginning of the line, at a distance of 0.5 mile (**HOT ZONE**), a final enlargement will scale the strip so that it covers approximately half of the display. This implies that the strip width is always the same, regardless of the actual photo scale. The larger the photo scale, the larger the display scale and vice versa. Although this might seem unexpected at first, we have established after years of experimenting that this is an effective display which does not put unnecessary stress on the pilot.

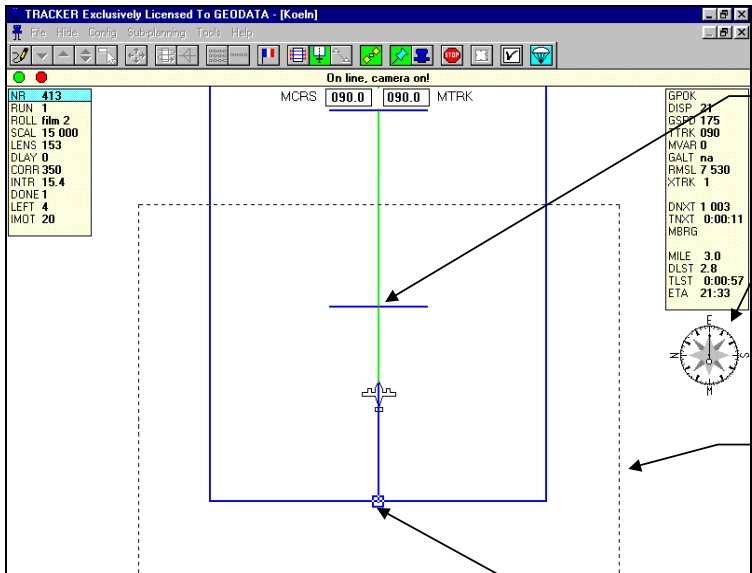


The display scale will become progressively larger while the plane is getting closer to the centerline. During the approach turns, the scale will first stabilize at approximately 1/20000, then the display will be fully enlarged just before reaching the photo line.



This mode is a moving map display, meaning that the small plane remains at the same spot on the screen while the run is moving. The small plane rotates on its axis following the direction of the ground track.

The **HOT ZONE** point is a point situated 0.5 miles before the start of the run. At this point, the display will become fully enlarged.



Each photo location is shown to help the pilot leveling the aircraft in time.

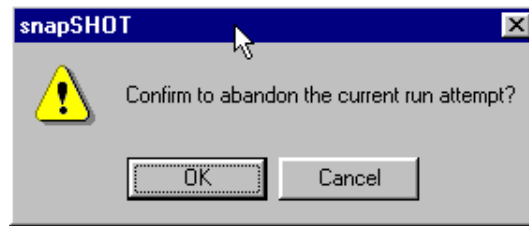
The compass rose provides a visual reference to the pilot.

This rectangle represents the photo coverage. We found that pilots are less likely to overcorrect when they have a visual reference showing the effect of tracking errors.

Position where the last photo was triggered.



INTERRUPTING A PHOTO RUN

To abort a photo run, press the abort button . This dialog box will be displayed.




Press OK and wait for the system to save the data to the database. The display will first return to the overview mode if you were in the Trackup mode. The message **Ready** will be displayed on the status line when you are clear to carry on. **Disrupting the system before this message is displayed can result in a loss of data.**


SWITCHING BETWEEN TRACKUP AND OVERVIEW

While on line it is possible to switch between **Trackup**  and **Overview** . Once you have pressed the button the system will delay the switching until the current cycle is over. This can take up to ½ second. Depending on the power of your computer, it might be advisable not to disrupt unnecessarily the process and to switch only when required.

12 - CAMERA TRIGGERING

AUTOMATIC CAMERA TRIGGERING


Press the automatic triggering button  to let **snapSHOT** take care of the camera triggering (only available with **TECI** connected). You must pay attention to the following points:


- The **HOT ZONE** point is a point situated before the start of the run. Warning, **snapSHOT** will only start firing the camera if the plane has been established within the width of the strip before reaching this point. For faster planes (>250 knots), this distance can be increased to .9 mile. For very slow plane, it can be reduced to 0.2 mile. Rolling out of a sharp turn directly on line does not work with **TRACKER**! This distance is required by the system to establish timing synchronization between the external hardware interface and the computer.
- The message **SYNCHRONIZATION OK** will be displayed when the synchronization has been carried out successfully. In case of synchronization error, the system will abort the run by itself.
- Automatic triggering in version 1,8 is limited to a minimum **3.0 seconds** interval between 2 photos. Note that it is advisable to use real time DGPS to fly at this rate.
- At the end of the line, **snapSHOT** automatically extends the line until the **TECI** has finished transmitting the last camera position and all data has been processed. The saving action is then further delayed during the automatic switching from **Trackup** to **Overview**. Finally, the database is opened and the photos are saved. To avoid accidental data loss during this critical period, wait for the message **Ready** to be printed on the status bar before acting again on the computer.
- While on line, if the plane exits the strip width corridor, the system will automatically abort the run.
- While on line, it is possible to switch to manual overlap when the terrain height variations exceed the tolerances. To do this, adjust the camera overlap regulator if required and switch on the camera serial mode. Make sure that the camera fires on its own, then press the manual overlap button  when you are satisfied that there is enough overlap between the automatic cycle and the manual cycle. During the transition, photos are fired both by the automatic mode and by the camera itself.
- Optionally, if for any reason the camera mid-exposure pulse is not received within a time out period (default = 1 second), the **TECI** will assume that the photo was not triggered and it will automatically trigger the camera again in order to avoid a missing photo. An error message is then displayed and the operator can choose his line of action.

Remark: very old types of cameras (RC8, old RMK) which use electrical relays for the triggering only require this feature. Contact us if you experience problems with your equipment.

- While on line, in case of sudden computer malfunction, the **TECI** will automatically attempt to carry on with the camera triggering on the base of the last computed parameters. The triggering will remain accurate for at least 25 seconds after a total computer failure if the pilot keeps the plane steady. This should leave enough time for the Navigator to take over manually without loss of coverage.
- While on line, in case of sudden GPS malfunction, **snapSHOT** will automatically attempt to carry on with the camera triggering on the base of the last computed parameters. The triggering will remain accurate for at least 25 seconds after a total computer failure if the pilot keeps the plane steady. This should leave enough time for the Navigator to take over manually without loss of coverage.

MANUAL OVERLAP

Press the manual overlap button  to place the system in manual overlap mode. In this mode the **snapSHOT** system only records the photo positions and does not trigger the camera. The following points are important:


- The plane should be established within the strip width 0.5 mile before the start of the run. For faster planes (>250 knots), this distance is increased to 1 mile. This distance is required by the system to establish synchronization between the external hardware interface and the computer (to be able to compute accurate photo positions).
- While on line, if the plane exits the strip width corridor, the system will automatically abort the run.
- While on line, it is possible to switch to automatic triggering when the terrain height variations allow it. Press the automatic camera triggering mode button . Make sure that the computer fires the camera, then switch off the camera serial mode when you are satisfied that there is enough overlap between the automatic cycle and the manual cycle. During the transition, photos are fired both by the automatic mode and by the camera itself.
- At the end of the line, **snapSHOT** automatically extends the line until the TECI has finished transmitting the last camera position and all data has been processed. The saving action is then further delayed during the automatic switching from **Trackup** to **Overview**. Finally, the database is opened and the photos are saved. To avoid accidental data loss during this critical period, wait for the message **Ready** to be printed on the status bar before acting again on the computer.

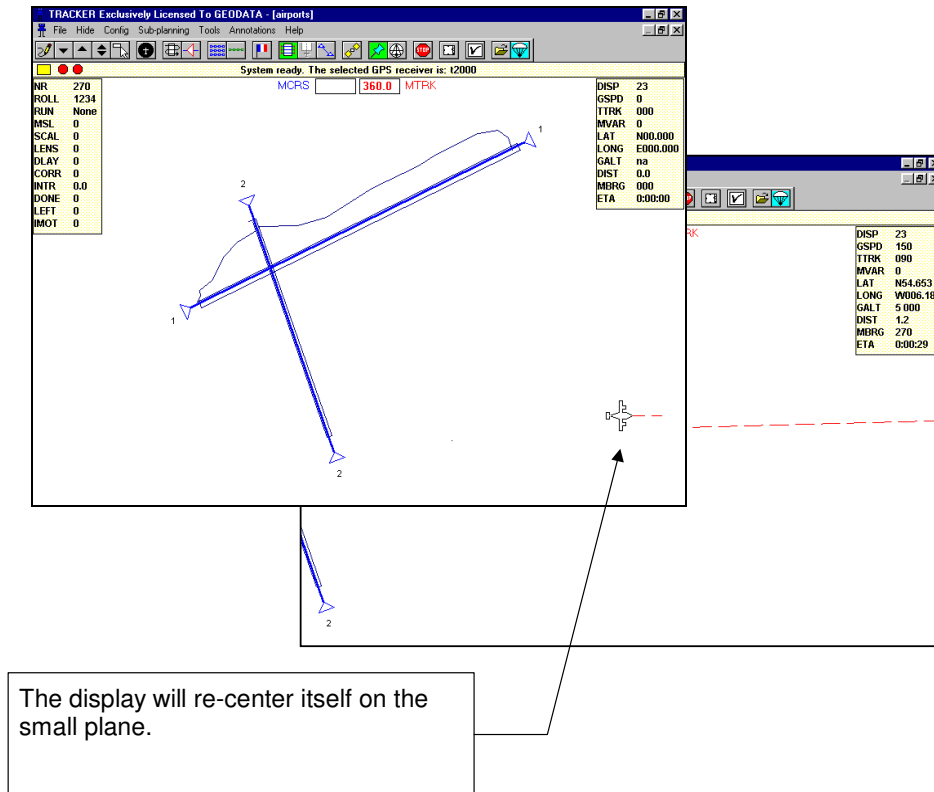
13 - AUTOMATIC DISPLAY AND TRACKING

To keep the small airplane and the project area in view, one can either set the display in a fully automatic mode or choose intermediate levels of tracking.

With some experimenting with the simulator it is possible to find the settings which suits your kind of operation. All settings are saved and automatically activated when the program is started.


AUTOMATIC TRACKING IN OVERVIEW

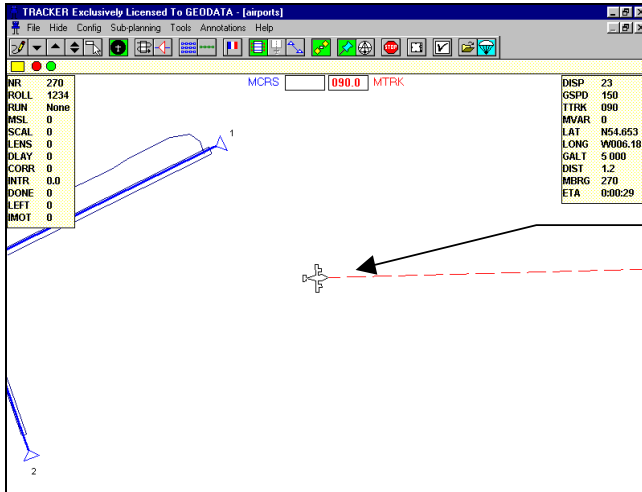
When HIS is not selected, this button  will activate the auto-track function: When the small plane exits the display area, the display will be automatically shifted so that the plane is back in the middle. Remark: After re-centering the display it is possible that the project area is not visible anymore.



AUTOMATIC TRACKING IN HSI MODE

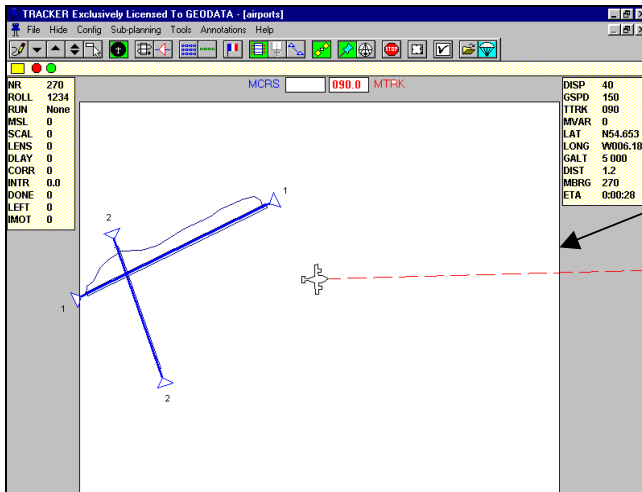
You select the HSI mode by pressing the HSI button . In HSI mode the small plane remains at the center of the display area and the project area moves relative to the airplane position.

When HIS is selected, It is possible to prevent the map of the project area to exit the display area by pressing this button . In this case the display is automatically zoomed in and out to keep the small plane and the project area within the limits of the display.



In HSI mode, the small plane remains in the center of the display.

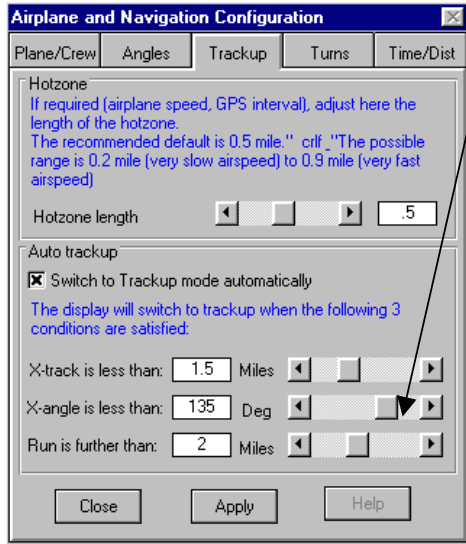
The map moves relative to the plane and can be hidden by the panels or be entirely outside of the display area.



If the option automatic zoom in HSI mode is selected, the project map will remain within the limits of the display. This is achieved by enlarging and reducing the scale of the screen. The white area represents the active area .

14 - AUTOMATIC TRACKUP

Normally the operator has to press the Trackup button  to switch to Trackup mode. It is possible to set the system so that the passage from map overview to Trackup is automatic.

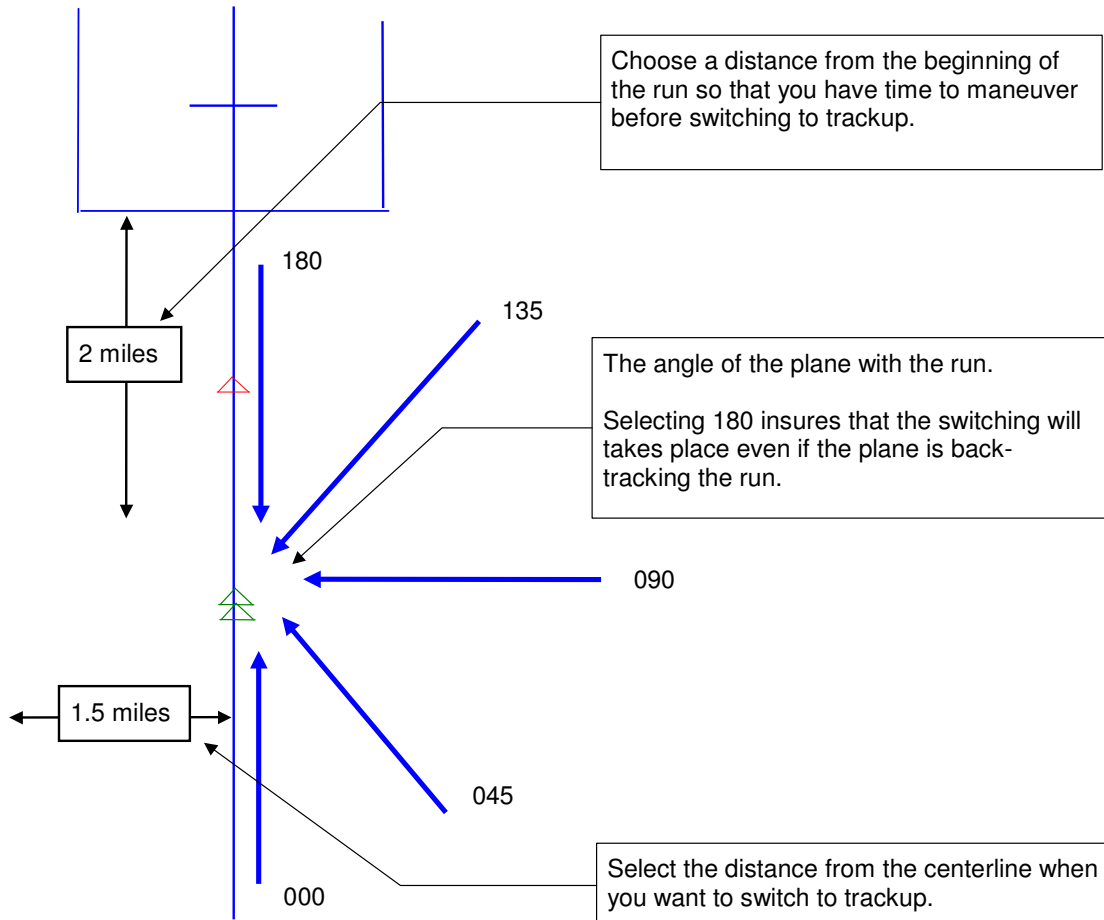


Set here the automatic switching to trackup mode.

3 parameters control when and where the overview mode will switch to the Trackup mode:

- The distance to the photo line (X-track)
- The angle between the plane and the run (X-course)
- The distance to the beginning of the run.

You will find the settings that suit you best by experimenting with the simulator set to your airplane performances.




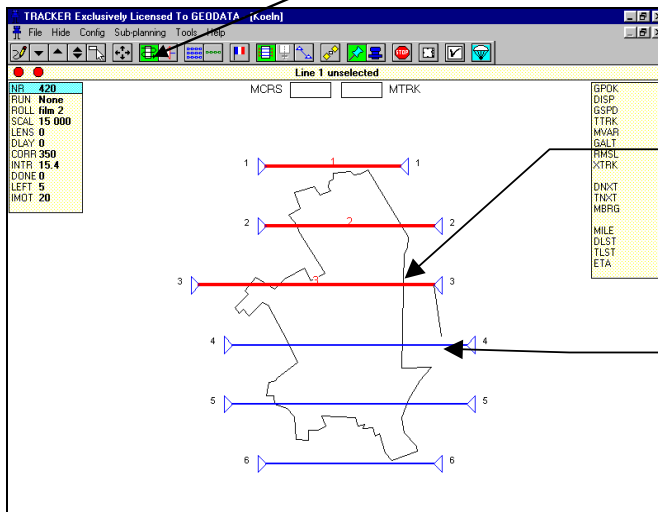
15 - RUN PRE-SELECTION

It is possible to select in advance the order in which the runs will be flown. One can pre-select a few runs or even a complete project. The selection can be changed at will. Pre-selection works also with sub flight plans and with partial runs.

Note: If the gap between 2 pre-selected runs is too small, then the pre-selection will not have time to work.

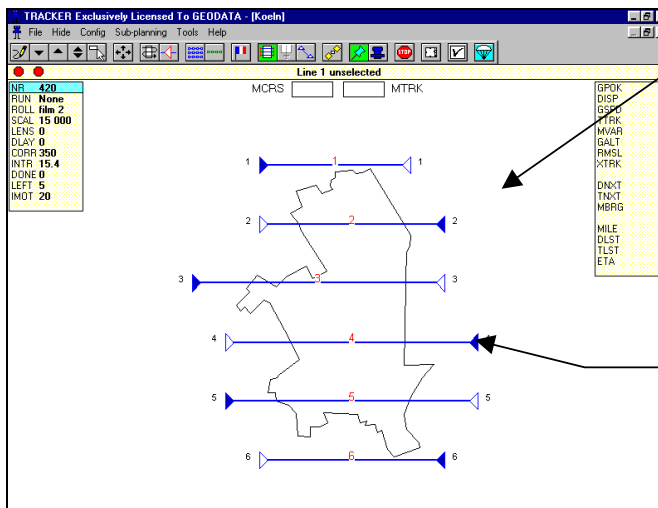
Note: Clicking the beginning of a run that extends outside of the display will re-center the display on the other side of the selected run.

Press the pre-selection button  then click one by one the runs to be selected.




Each time a run is clicked, the mouse will be attached to the other end of the run by a line. This line facilitates the selection of the next run.

The half side you click determines the direction from which you plan to fly the run.



The procedure will stop by itself when all the runs have been selected.

To interrupt the selection before all runs are selected, pop the selection button  or click the display with the RIGHT mouse button.

The solid triangular markers indicate the beginning of the runs.

Remarks: If you make an error, simply pop the pre-selection button up and start again. In auto-pilot mode, the simulator will carry on flying all the pre-selected runs automatically.

16 - INFORMATION PANELS

3 permanent data panels are available. Heading, navigation and photography. The user can modify the contents of the panels.

HEADINGS PANEL



Magnetic course of the run (MCRS). The magnetic course is the True course corrected for the local magnetic Variation. If the Variation is not part of the GPS receiver message, this angle is the True course (TCRS) unless you enter the Variation in the NAVIGATION CONFIGURATION PANEL.

Magnetic track: This is the ground track as reported by your GPS receiver. If the Variation is available, then the track is magnetic (MTRK), otherwise it is True (TTRK).

CONFIGURATION

To customize the look of the information panels, select the **CONFIG + DISPLAY CONFIGURATION MENU**

The 'Display Configuration' dialog box has several tabs: Options, Sizes, Colors, Abbrevs, Hide data, and Panels. The 'Options' tab is active, showing radio buttons for 'Photo Panel' (selected) and 'Navigation Panel'. Below are 'Font size' (set to 9), 'Font Bold' (checked), 'Font color', and 'Background color' buttons. There are also checkboxes for 'Show System Information On Left Panel', 'Hide photo panel', and 'Hide navigation panel'. At the bottom are radio buttons for 'Panels on each side', 'Panels to right', and 'Panels to left'. At the very bottom are 'Close', 'Apply', 'Reset', and 'Help' buttons.

- Choose here Photo panel or Navigation panel.
- Change here the appearance of the font: Size, bold, color.
- Change here the color of the panel background.
- Select here the appearance of the panels.
- Use the reset button to restore the defaults.

NAVIGATION DATA

DISP	118
GSPD	150
TTRK	270
MVAR	0
LAT	N51.006
LONG	E006.922
GALT	5 000
XTRK	R 46
XCRS	R 180
MBRG	253
MILE	5.2
DNXT	0
DLST	2.7
TNXT	0:00:00
TLST	0:01:06
ETA	21:26

DISP:	Current display scale.
TNXT:	Time to next photo.
DNXT:	Distance to next photo.
TLST:	Time to last photo.
DLST:	Distance to last photo.
XTRK:	Cross track distance
XCRS:	Difference in bearings.
GALT:	GPS reported altitude.
GSPD:	Ground speed.
MCOG:	Magnetic track.
GPOK:	GPS Signal OK.
MVAR:	Magnetic variation.
ETA:	Estimated time end of run.
MBRG:	Magnetic bearing to beginning of run.
TTRK:	True track.
MILE:	Run length in miles.

The user can change the abbreviations in the **DISPLAY CONFIGURATION MENU**. The meanings of these entries are:

- GPOK:** A GPS signal is received by **snapSHOT**. Note that this does not mean that the signal is correct, just that the connection is established and operating.
- GSPD:** The GPS reported ground speed in knots.
- GALT:** The GPS reported altitude, in the unit of the GPS receiver.
- XTRK:** The cross track distance. If the distance is more than a nautical mile, it is reported in miles with one decimal digit, otherwise it is reported in meters.
- XCRS:** X-course or angular difference between the aircraft track and the run track.
- DNXT:** Distance to the next photo. While approaching the line, this is the distance to the first photo. If the distance is more than a nautical mile, it is reported in miles with one decimal digit, otherwise it is reported in meters.
- TNXT:** Time to first or next photo in hours, minutes, and seconds. This value is calculated regardless of your current heading, assuming you would fly from the present position direct to the photo at the ground speed currently reported by the GPS.
- DLST:** The distance to the last photo. This value is calculated regardless of your current heading, assuming you would fly from the present position direct to the photo at the ground speed currently reported by the GPS.
- TLST:** Time to last photo in hours, minutes, seconds. This value is calculated regardless of your current heading, assuming you would fly from the present position directly to the photo at the ground speed currently reported by the GPS.
- ETA:** Your estimated time of arrival at the end of the run. If your computer time is set to the local time and the UTC time difference has been entered in the **Navigation configuration menu** then this time can be used to inform ATC of your position.
- TTRK:** The true track of the plane.
- MVAR:** Current magnetic variation. This is normally the variation reported by the GPS, otherwise it is the variation which you have entered in the system.
- DISP:** The approximate scale of the display. Fairly accurate if one cares to enter the physical width of the display in the **Display configuration menu**.
- MILE:** The length of the run in nautical miles

PHOTOGRAPHY PANEL

NR	270
ROLL	1234
RUN	3
MSL	7 530
SCAL	15 000
LENS	153
DLAY	0
CORR	0
INTR	17,9
DONE	0
LEFT	8
IMOT	17

NR:	Next photo number.
ROLL:	Current film number.
RUN:	Selected run number.
SCAL:	Required photo scale.
RMSL:	Required MSL altitude.
DLAY:	Camera triggering delay.
CORR:	Triggering correction.
DONE:	Photos completed.
LEFT:	Photos left.
IMOT:	Image motion.
LENS:	Required lens.
INTR:	Photo interval.

The user can change the abbreviations in the **DISPLAY CONFIGURATION MENU**. The meanings of these entries are:

NR:	The next photo number. This should correspond to the number of the camera counter.
ROLL:	Number of the film roll currently in use.
RUN:	The number of the selected run.
RMSL:	The required main sea level flying altitude for the current run. The ground height information is to be entered in snapBASE during the planning preparation, otherwise it is 0.
SCAL:	The required photo scale for this run.
LENS:	The required focal length.
DLAY:	The time difference in milliseconds measured between the time the camera was fired and the time it actually fired. The shutter response delay of many types of cameras is totally irregular and unpredictable.
CORR:	The time correction computed by snapSHOT to attempt to compensate for the camera shutter delays. Due to the way older rotary shutters were designed, this can only be approximate, but it helps reducing most irregularities.
DONE:	Photos already fired. This function ignores in-between shots.
LEFT:	Remaining photos on this run.
IMOT:	Image motion in micrometers (without FMC). Generally specifications do not allow more than 30 mu.

17 - DATA MANAGEMENT

Common to all Tracker modules.

OVERVIEW

Tracker uses a database system to preserve and manage all the data generated during the operation of the system. The file which contains all your data is an **ACCESS** database named **TRACKER.MDB** which is kept in the **TRACKER \ MDB** directory (folder). All TRACKER modules share this database. Without this database, the system cannot work. Each time a module is opened, a backup of the database is automatically created. This is a copy of the current database that can be used to recover the system should this become necessary.

Please note that if you do not use an external backup system (you certainly should), you should at least backup the **TRACKER.MDB** file to a floppy. Failing to do so exposes you to a possible total loss of data in the event of a hard disk failure (it happens!).

In case **TRACKER** is operated across several PC's, it is important that you decide where your **MAIN DATABASE** is going to be located. You can benefit most from the database system if you keep one primary database regularly updated with the current data from the other PC's. Otherwise the data will be scattered amongst several computers and you will be unable to extract profitable information from the database management system. **TRACKER** has a set of built-in functions that facilitate data exchange between the primary database and the others.

Once the main database PC is chosen, it is advisable for a large organization to name a database supervisor who will be in charge of the database maintenance and updating. The main aspects of the database administration are:

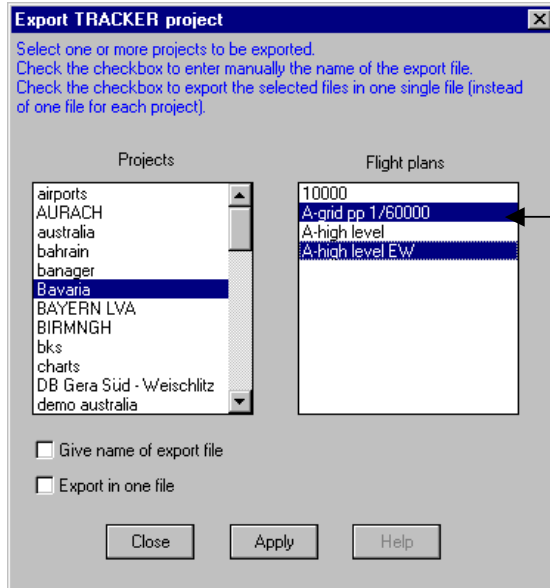
- If the planning is prepared on an office PC, it is necessary to transfer the flight plan to the portable computers used in the aircraft.
- After a flight or as soon as this is possible, it is indispensable to update the main TRACKER database with the data generated during the flights. This is particularly critical if several airplanes are involved.

To sum up, all **TRACKER** modules are linked together by a common database named **TRACKER.MDB**. All data generated by any of these programs are automatically saved to this database and immediately available to the others. In case the planning is not directly done on the portable computer, the flight plans have to be transferred before the flight from the main PC. After the flight, the project and its new flight information have to be copied from the portable PC database back to the main TRACKER database.

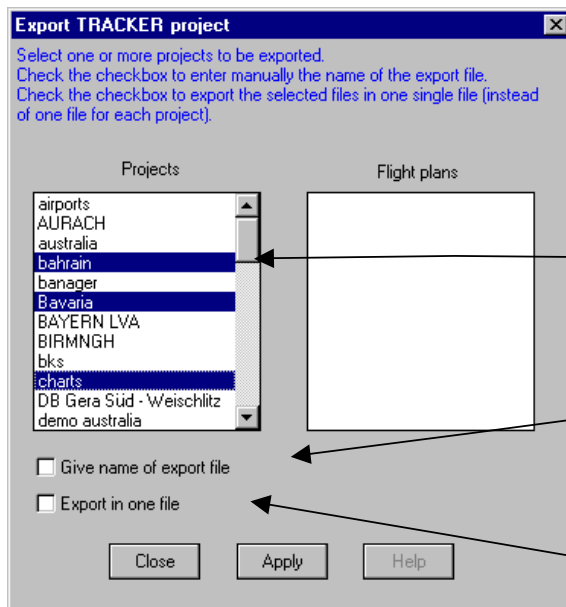
18 - EXPORT PROCEDURE

Common to snapBASE and snapSHOT.

Start the program or return to the main menu then select the **Export a project or flight plan?** option.



You can either select to export one project with all or part of its flight plans...

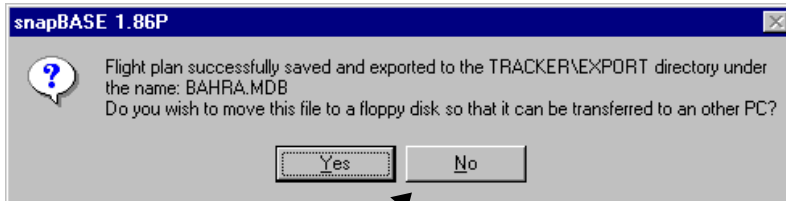


...or you can select to export several projects with all their flight plans.

Check this box if you wish to name of the export file yourself.

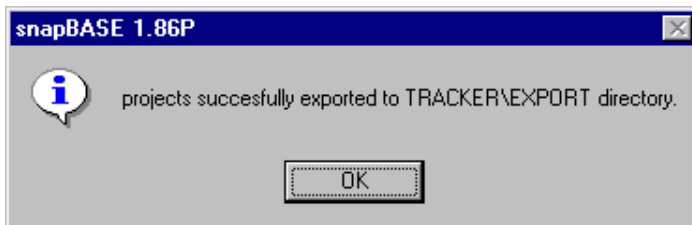
Check this box if you wish to export all the selected files into a single MDB file (5 projects maximum)

If you exported a single file then you will be asked if you want to copy it directly to a floppy disk.



Press **YES** if you want to copy your file to a floppy.

Else if you exported several projects you will be informed that the files have been exported to the **TRACKER/EXPORT** folder.



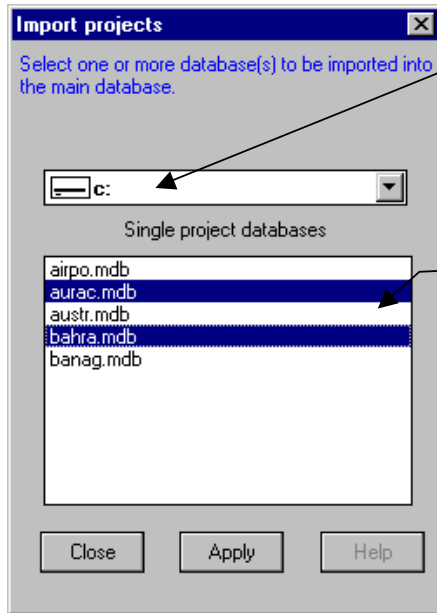
19 - IMPORT PROCEDURE

Common to snapBASE and snapSHOT.

Start the program or return to the main menu then select the **Import or update projects or flight plans?** option.

Open the combo box and select the a: drive if the flight plan is on a floppy.

Otherwise, the file to be imported should always be in the **TRACKER/IMPORT** folder.



Highlight the projects to be imported.

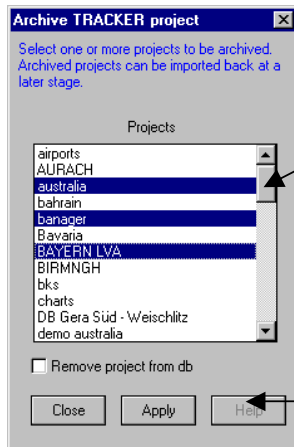
20 - ARCHIVING

Common to snapBASE and snapSHOT.

Archiving is the process of copying part of the database to a backup file. In order to speed up data access a project that has been archived can be removed from the main database. A project that has been archived can be loaded back into the database or sent to another **Tracker** user.

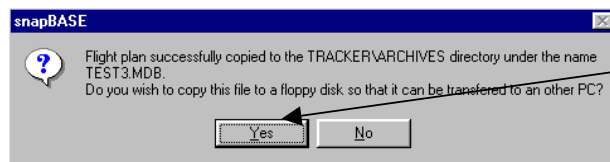
Remark: All archived projects are saved to the **TRACKER/ARCHIVES** folder.

Start the program or return to the main menu then select the **Archive or remove projects?** option.



Select the project(s) to be archived.

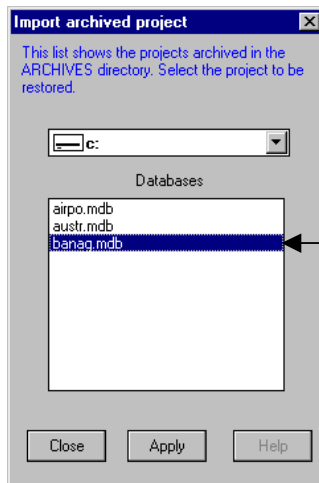
Select this option if you want to remove the project data from the database once it has been archived.



Press **YES** if you want to transfer the archive file to a floppy.

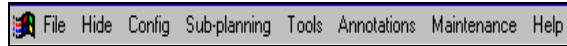
IMPORTING AN ARCHIVED PROJECT

Start the program or return to the main menu then select the **Import an archived project?** option.

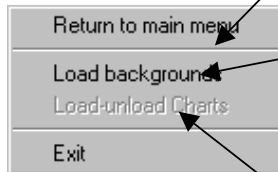


Select the project to be imported and click **OK**. To be imported, archived projects have to be located either in the **TRACKER/ARCHIVES** folder or on a floppy disk.

21 - MENUS



FILE MENU

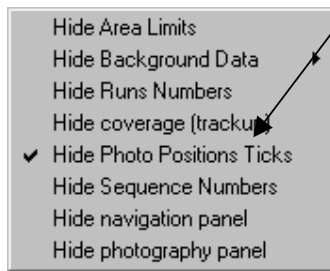


Abort current activity and return to the main menu.

Press here to load a background image. This menu is only available in the overview mode. Refer to the BACKGROUNDS topic for more information.

Press here to load a chart. This menu is only available in the Ferry mode. Refer to the CHARTS topic for more information.

HIDE MENU

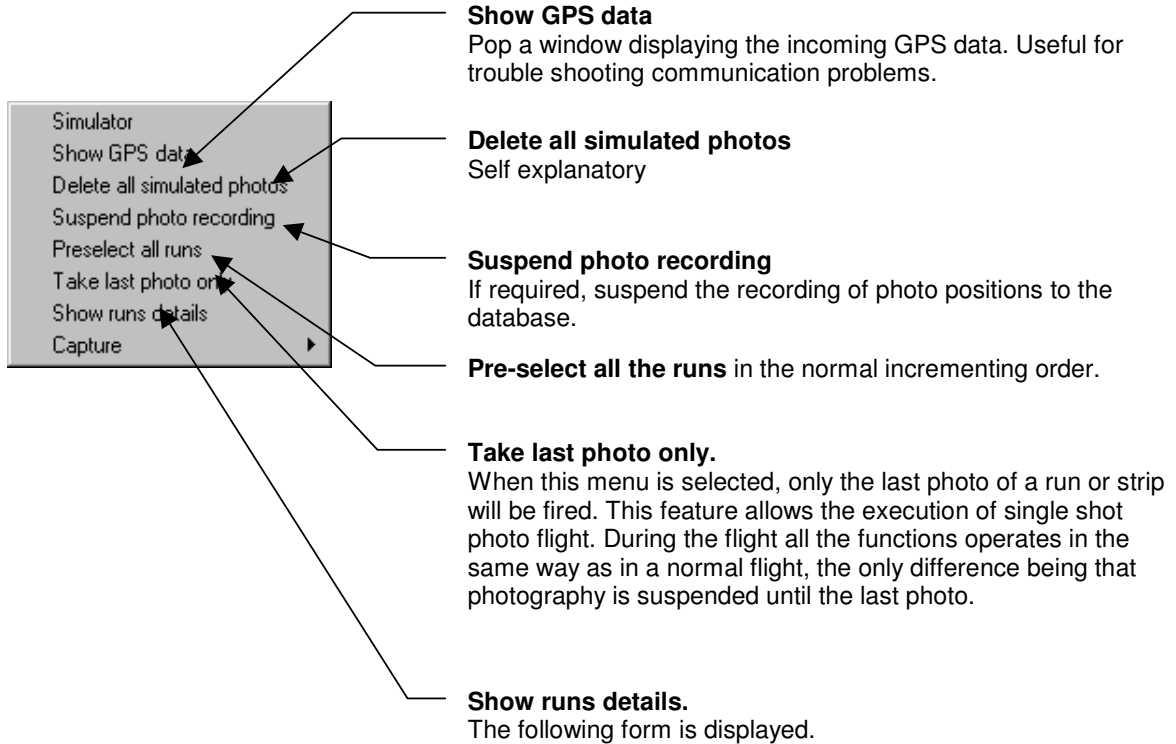


Select here the objects that should be hidden or displayed.

MAINTENANCE MENU

Only for troubleshooting, please do not use.

22 - TOOLS MENU



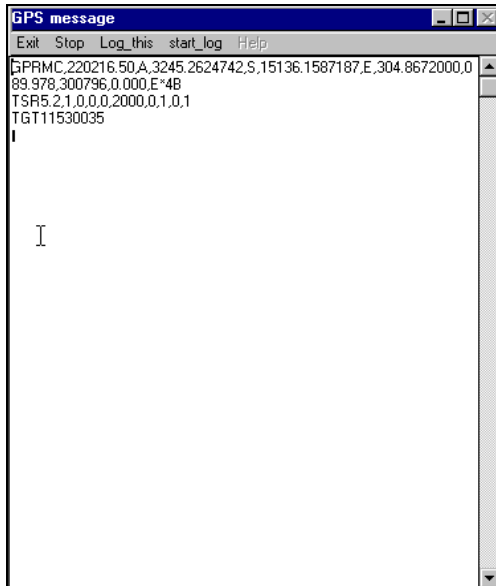
SHOW RUNS DETAILS

The following information window is displayed.

Runs	Scale	Elevation	Altitude	Length	Photos	Lens	Course
1	12000	0	591	0.0	0	15	090
2	12000	0	591	0.0	0	15	090
3	12000	0	591	0.0	0	15	090
4	12000	0	591	0.0	0	15	090
5	12000	0	591	0.0	0	15	090
6	12000	0	591	0.0	0	15	090
7	12000	0	591	0.0	0	15	090
8	12000	0	591	0.0	0	15	090
9	12000	0	591	0.0	0	15	090
10	12000	0	591	0.0	0	15	090
11	12000	0	591	0.0	0	15	090
12	12000	0	591	0.0	0	15	090
13	12000	0	591	0.0	0	15	090
14	12000	0	591	0.0	0	15	090

SHOW GPS DATA MENU

If you need to check and record the incoming GPS message while the program is running, select the **TOOLS > SHOW GPS DATA** menu. This window will be displayed.



Log this: To log the current message in the file
TRACKER\DATA\GPSLOG.TXT

Start logging/Stop logging: To log all incoming messages in the file
TRACKER\DATA\GPRECORD.TXT

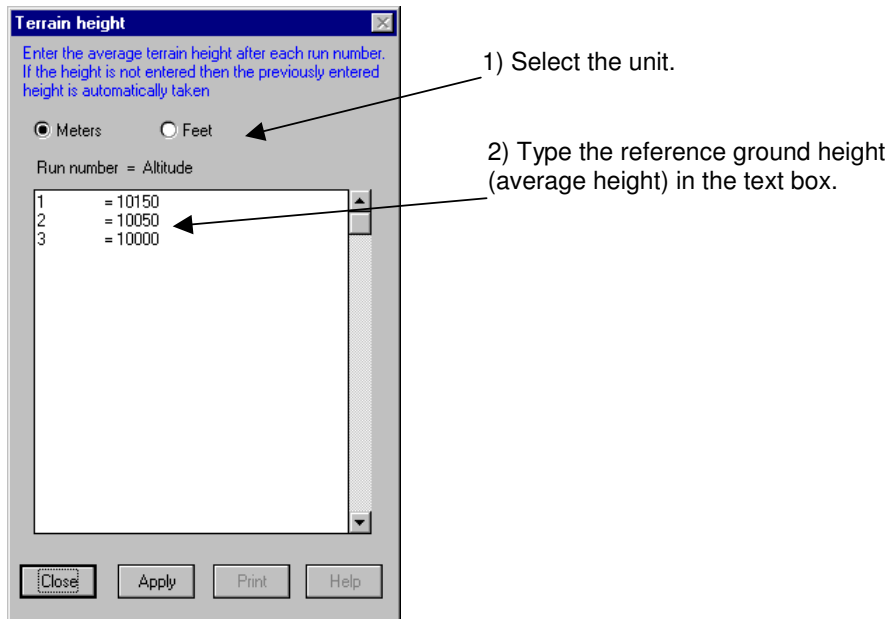
Stop/Start: To stop receiving and freeze the current message then resume.

23 - SAVING THE TERRAIN HEIGHT

Common to snapBASE, snapSHOT, snapPLAN.

It is possible to save the average ground height for each run. If this is done, the required flying altitude will be displayed in **snapSHOT** each time a run is selected.

- In snapBASE press the altitude button  to show the altitude dialog box.
- In snapPLAN and snapSHOT select the **TERRAIN HEIGHT** menu from the **TOOLS** menu



Note:

To speed up you can skip typing the heights if they are identical to the last height you typed. In this case the previous height is automatically taken.

1=1200
 2=1300
 3=1500
 4=
 5=
 6=
 7=1200
 8=800

Runs 4,5 and 6 will get 1500.

24 - AIRPLANE AND NAVIGATION CONFIG MENU

Last updated 7 August 1998

PLANE AND CREW

The screenshot shows the 'Airplane and Navigation Configuration' dialog box with the 'Crew' tab selected. The 'Pilot name' field is filled with 'Fed beron', the 'Navigator name' field with 'Wherearewe', and the 'Aircraft registration' field with 'N0001'. At the bottom of the dialog are three buttons: 'Close', 'Apply', and 'Help'.

Type here the information concerning the plane and the crew. These information will be used later in the reports and indices.

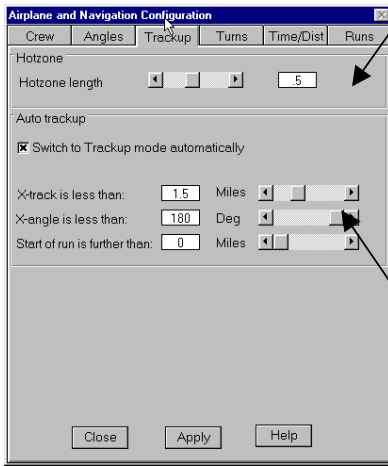
ANGLES

The screenshot shows the 'Airplane and Navigation Configuration' dialog box with the 'Angles' tab selected. It features a 'Correct systematic graphic error' section with 'W' and 'E' indicators and a numerical input field set to '0.0'. Below this is an 'Aircraft compass deviation table (30 degrees interval)' with a list of headings and steering values: 'For heading 360 Steer 005', 'For heading 030 Steer 035', 'For heading 060 Steer 065', 'For heading 090 Steer 095', 'For heading 120 Steer 125', 'For heading 150 Steer 155', 'For heading 180 Steer 185', 'For heading 210 Steer 215', and 'For heading 240 Steer 245'. A 'Reset all dev to zero' button is located below the table. At the bottom of the dialog are three buttons: 'Close', 'Apply', and 'Help'.

You can give a correction here in case the small airplane appears to be crabbing, meaning that it actually does not fly along its own lead line. This should normally not happen, so make sure that other parameters such as the variation and deviation are correct. If this is the case, please inform TRACK'AIR.

If you are using the drift option, then you must fill this deviation table.
Warning: If your deviation table is not absolutely correct, the angles and drift will become unreliable.

TRACKUP



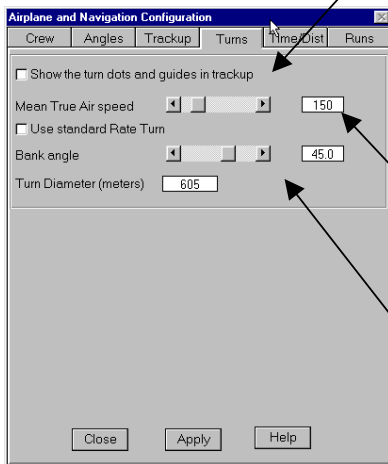
If required (airplane speed, GPS interval), you can adjust here the length of the hotzone. The recommended default is 0.5 mile. The possible range is 0.2 mile (very slow airspeed) to 0.9 mile (very fast airspeed). Some experimenting might be necessary with the simulator set to your plane speed and parameters.

Remark: it is highly recommended only to change the 0.5 mile default value when it is causing problem with your aircraft speed.

snapSHOT can automatically switch itself to the trackup mode. You can set here the 3 parameters which control when and where the overview mode will switch to the trackup mode:

- The distance to the photo line (X-track)
- The angle between the plane and the run (X-course)
- The distance to the beginning of the run.

ASSISTANCE FOR THE TURNS



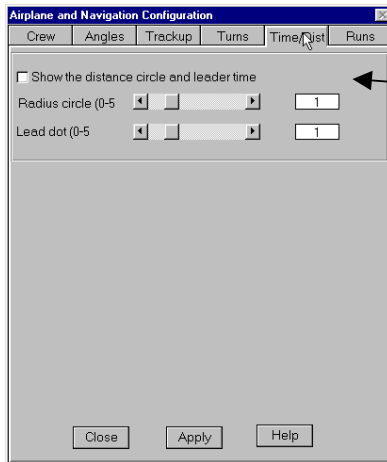
Select this option to display a dot on each side of the small plane. Each dot represents the diameter of a 180 turn, either using rate one turn or a given bank.

Warning: The dots are only guides to help positioning the plane, they do not account for wind or error in the input of the true air speed.

You have to enter the average true air speed which will be used for the calculation of the turn radius.

You can select here whether the guides display the radius of a standard rate turn based on the true airspeed or the radius of a turn at a given bank. In this last case you must enter the bank.

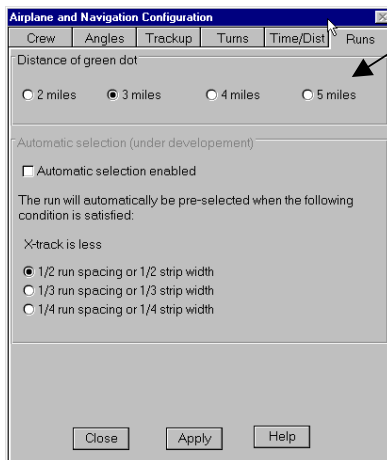
TIME AND DISTANCE INDICATORS



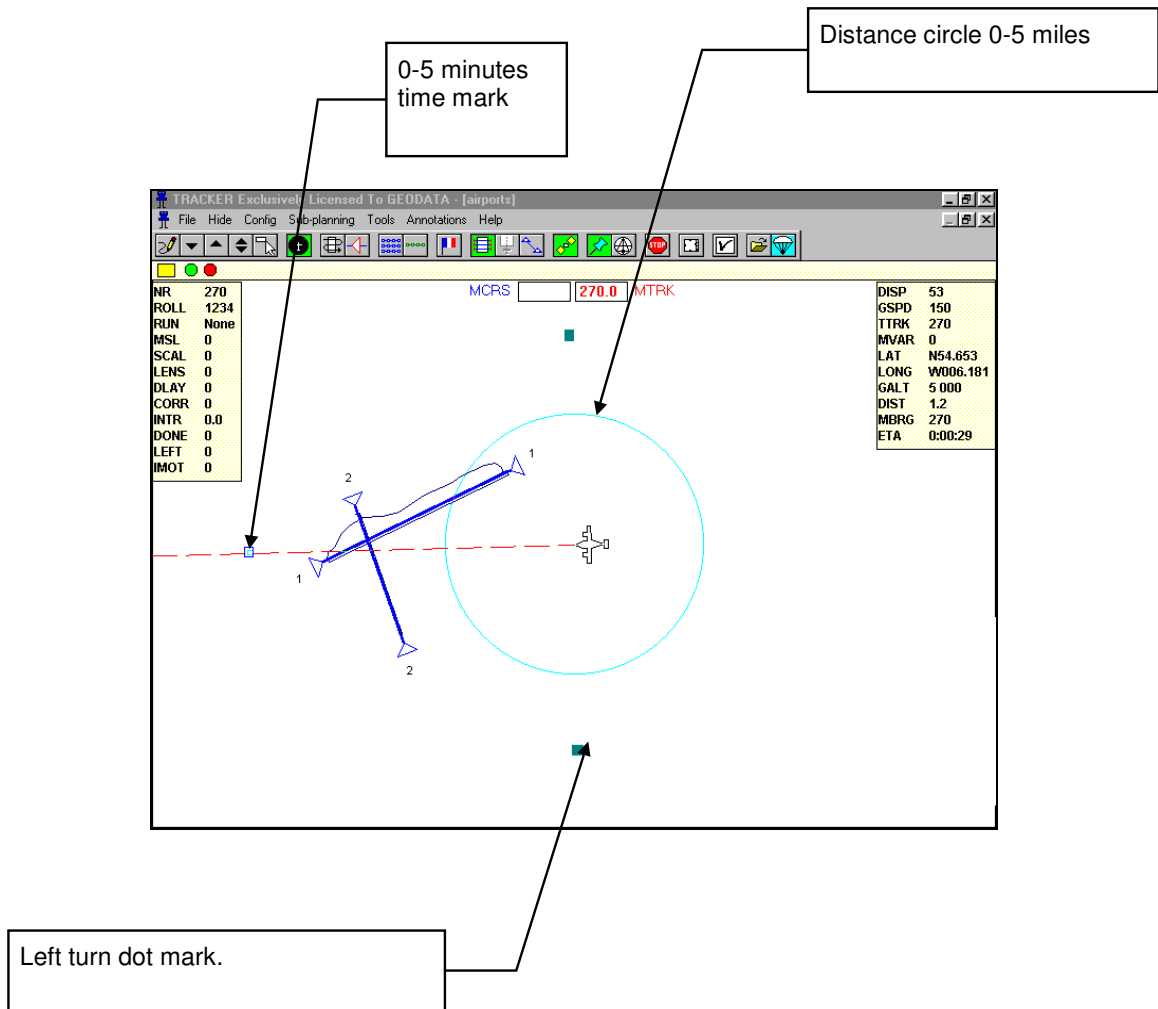
Select this option to display a circle around the plane as well as a time dot ahead of the small plane.

The radius of the circle can be set here as well as the position of the lead dot.

ASSISTANCE FOR THE RUNS

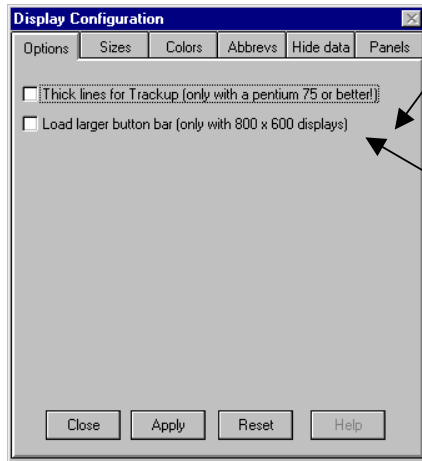


In the overview mode a green dot is displayed on the extended lead line. You can set here the distance from the start of the run at which this dot should be placed.



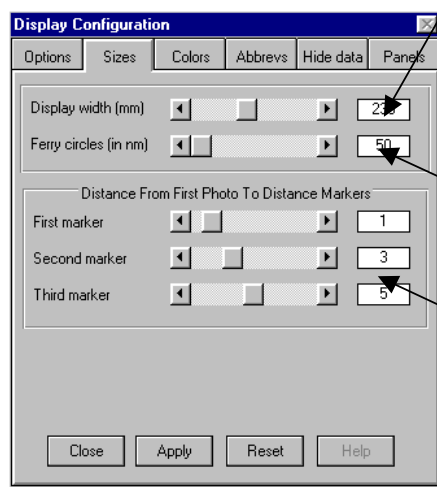
25 - DISPLAY CONFIG MENU

Last updated 26-Oct-98



Select here the **thick line** option for the Trackup display. Warning: Only select this option on a Pentium 75 or better. Otherwise the computer will not be able to cope with the graphics.

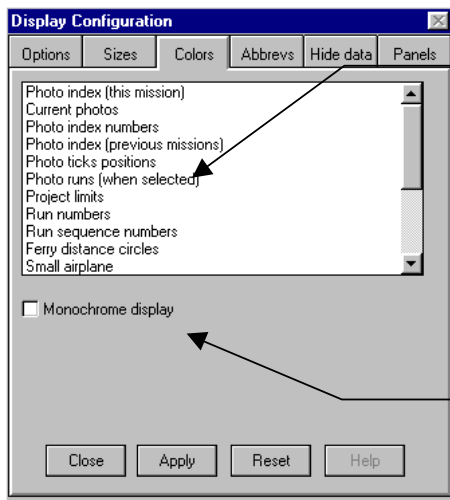
Select this option to load larger buttons. Works only with SVGA display 800 x 600.



To get an accurate display scale (**DISP**) in the navigation panel, set here the actual width of the screen in millimeters (Windows only reports an approximate screen size).

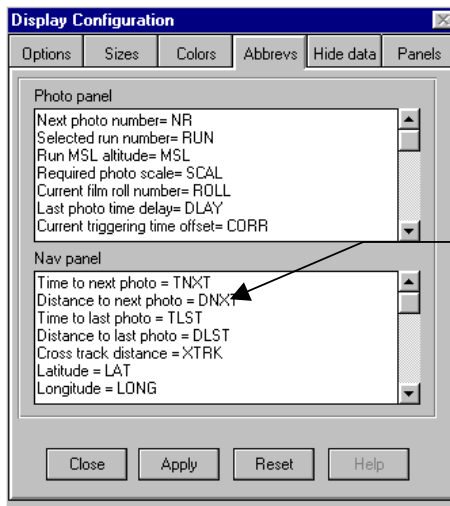
Set here the distance separating the circles displayed in the ferry mode.

Set here the distance at which the triangular markers should be placed from the beginning of the run.

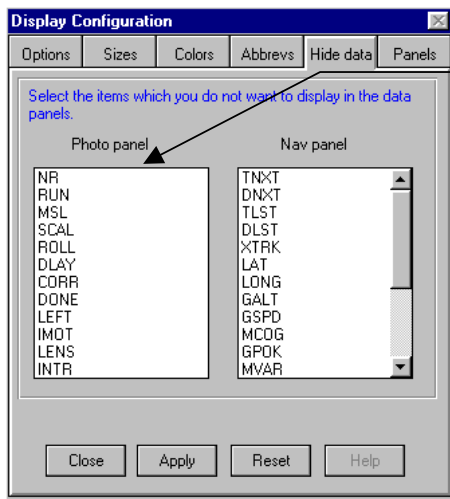


To change the color of an item, select it in the list and click the required color on the following form.

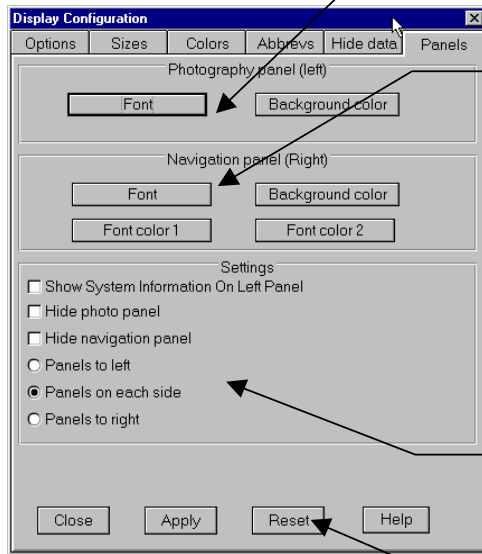
Check this box for a monochrome display.



Change here the default abbreviations for the navigation data panel. Maximum 4 characters.



Select here the items that should not be displayed in the data panels.



Photography panel (left)
Change here the photo panel settings, font (Size, bold, color, etc) and the background color.

Navigation panel (right):
Change here the navigation panel settings, font (Size, bold, etc) and the background color.

To ease the reading, the navigation panel alternate 2 different color fonts.

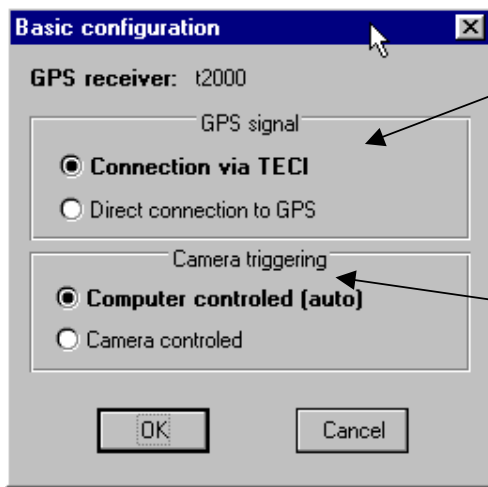
Font color 1 for the odd lines (1,3...)
Font color 2 for the even lines (2,4..)

Set both fonts to the same color if you do not like alternate colors.

Settings:
Select here the appearance of the panels.

Use the reset button to restore the defaults.

26 - GPS CONNECTION CONFIG MENU

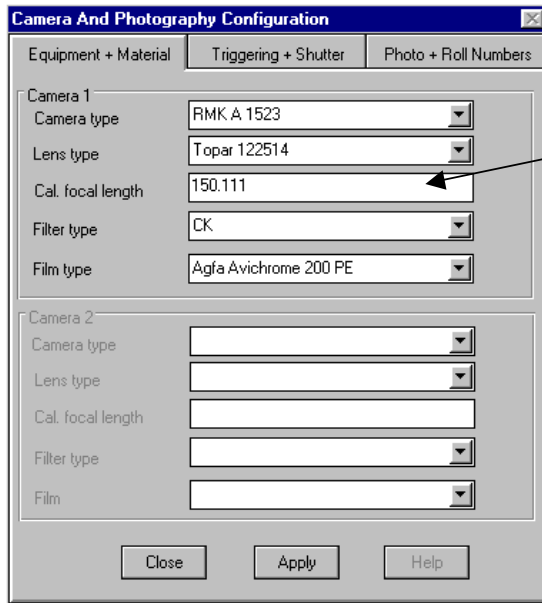


Select here whether the PC is directly connected to the GPS receiver.

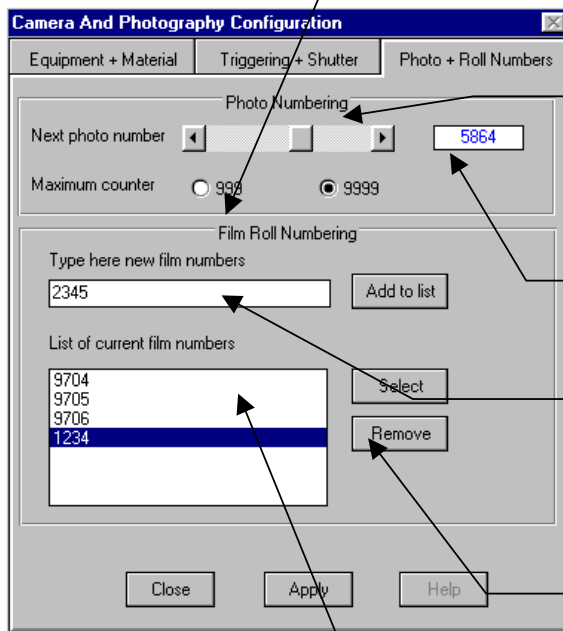
Remark: this function is used only for trouble shooting and is disabled in most system.

Select here whether Tracker triggers the camera.

27 - CAMERA AND PHOTOGRAPHY CONFIG MENU



Type here the details of the equipment and material used for the mission. This information will be used later to produce the reports and indices.



Set here the maximum value of the camera counter.

Set here the next camera photo number. As **snapSHOT** is not directly connected to the camera counter it is advisable to pay attention to the setting of the counter to avoid having to edit the photo numbers at a later stage.

Double click the label to reset the counter to 0.

To avoid having to type in the airplane you can prepare in advance the film numbers that will be used. To add a film number to the list, type it in this box and press **ADD NEW**.

To remove a number from the list, highlight it first in the list then press the **REMOVE** button.

To make a film number active, highlight it first, then press the **SELECT** button. After each film change or magazine change, repeat the operation. Make sure you always use the right film number to avoid unnecessary editing later.

TRIGGERING + SHUTTER

The main limiting factor in accurate camera triggering is the camera itself:

All cameras but the most recent cameras have unpredictable delays between the actual triggering pulse and the moment of the shutter opening. This delay is inherent to the design of the rotary shutter. The delay between the actual pulse and the opening of the shutter can vary randomly between 50 to 1500 milliseconds, depending on the rotation speed of the shutter blades (the shutter time). This delay is unpredictable and it affects the internal camera overlap system as well as all external triggering systems such as Tracker.

Snapshot tries to compensate for that by computing an average camera delay that it uses as a correction to fire the camera bin advance. The value of the measured delay as well as the value of the applied correction (offset) is displayed on the left panel of Tracker. This correction is only approximate.

In case the delay is known and constant (RMK top, Leica RC30), enter its value in the box below and check this box.

Set here the start-up correction. The value entered is used by the system at start-up and has only an influence on the first photos.

The correction is computed by measuring and averaging the delays between the required time of exposure and the actual time of exposure. If you wish, you may enter here how many measurements are used to compute the average delay. A large number will reduce the amplitude of the correction as well as its responsiveness, a small number will increase the responsiveness but also the irregularities. A good number is 10.

Enter here your average shutter speed if you want to display the image motion (**IMOT**) in the photo panel. This entry has no effect on the system.

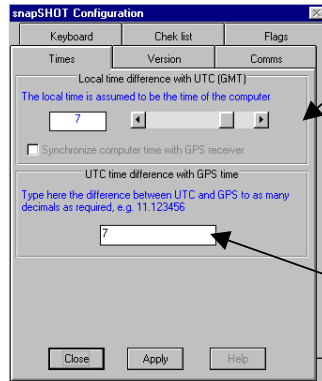
28 - SNAPSHOT CONFIG MENU

Last updated 23 August 1998

TIMES

snapSHOT is able to use and save different time system. To make use of this feature, you have to set the times parameters.

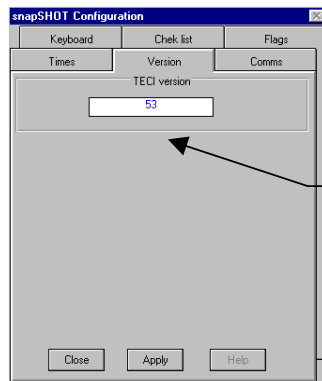
It is assumed that the computer running snapSHOT is set exactly at the local time.



Set here the difference between the local time (used by the computer) and the UTC time (former GMT time). This will allow the system to compute and display your ETA to the end of the run. This might be useful to inform ATC of your progress.

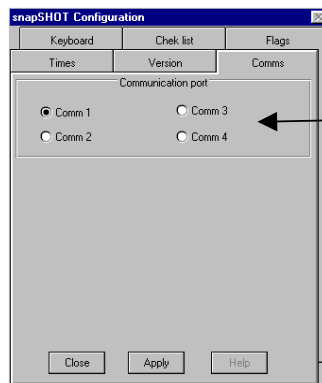
Set here the difference between the UTC time and GPS time. This information might be required to match the GPS photo times recorded in a GPS receiver because UTC and GPS time are not equal.

TECI VERSION



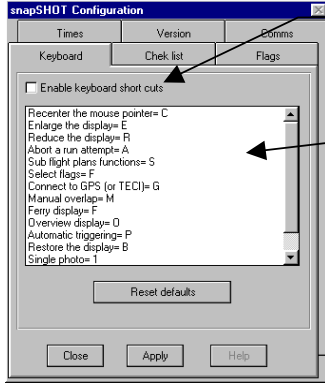
The current version number of the TECI software.

COM PORT



If required (multiple con port), check here the COM port that you wish to use to connect the GPS or TECI. This setting will be stored and used each time the system is activated.

KEYBOARD SHORTCUT



Check this box to enable keyboard shortcuts. If you do not use this feature it is advisable to keep this box unmarked.

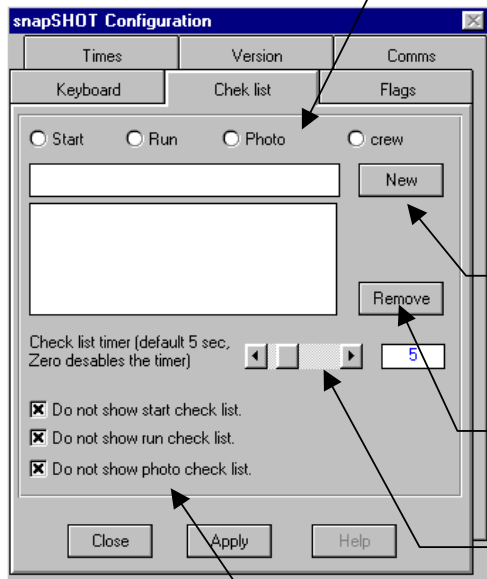
The available keyboard shortcuts are displayed in this list. To change a shortcut, highlight the item then press the key you want to use.

Note that only single digit numbers and alphabetical keys are accepted (no arrows, F keys, etc.).

Remark: The usefulness of this function is under evaluation. Your comments are most welcome.

CHECK LIST

Use this function to automatically display a check list or reminders at certain moments of the flight.



Select here the check-list you want to create or edit. There are 3 defaults and 1 custom check-lists:

The defaults check lists are displayed as follows:

- **Start:** When the program is started.
- **Run:** When a run is selected.
- **Photo:** When the plane is established on the run

The customs check list (crew) can be displayed by pressing the check-list button .

To add an item to the list, type it in this box and press **ADD NEW**.

To remove an item from the list, select it then press **REMOVE**.

Once displayed, the check list will automatically be hidden unless it is clicked. You can set the time in seconds (0 to 30) during which the list will remain visible. 0 (zero) seconds disables the timer and the check list stays on the screen until the user hides it.

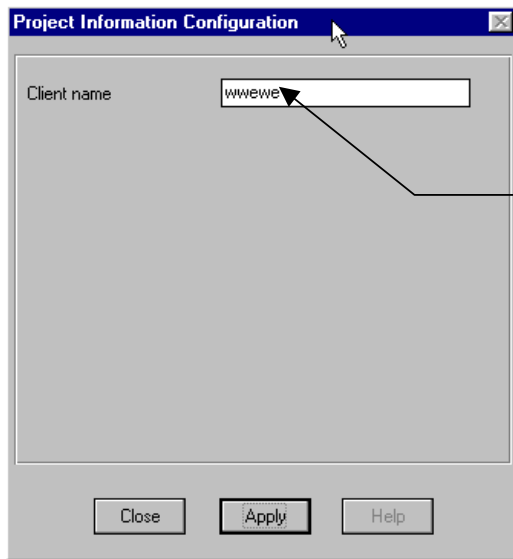
Check this option to disable the automatic display of check lists.

Remark: The usefulness of this function is under evaluation. Your comments are most welcome.

29 - PROJECT INFORMATION CONFIG MENU

Last updated 23 August 1998

This function will be later expanded.



The screenshot shows a dialog box titled "Project Information Configuration". It has a blue title bar with a close button (X) on the right. The main area is light gray and contains a label "Client name" on the left and a text input field on the right. The input field contains the text "wwwewe". A mouse cursor is positioned over the top right corner of the dialog box. At the bottom of the dialog box, there are three buttons: "Close", "Apply", and "Help".

Type here the project client name. This information will be used for producing reports and indices.

30 - MISSION INFORMATION MENU

This form shows all known information. You can check it, change it and confirm it.

Mission information

Project

Project name: airports

Project number: 001

Area name: runways

Client name: wwewe

Change

Camera

Camera type: 222

Lens type: Topar 122514

Filter type: 44444

Film: Agfa Avichrome 200 PE

Change

Airplane

Aircraft type:

Aircraft registration: N007

Pilot name: Tamboer

Navigator name: barriere

Change


Close Confirm Help

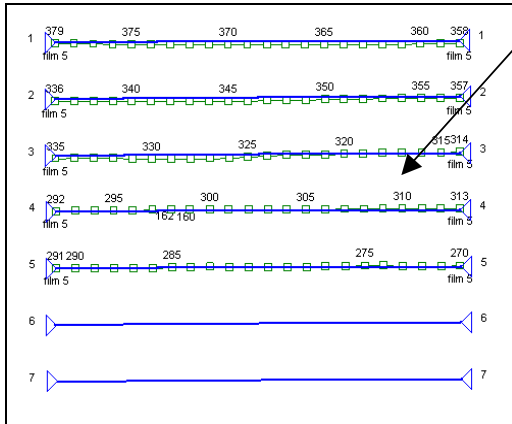
To change something, press the **change** button to display the corresponding dialogue

To save the above information, press the **confirm** button.

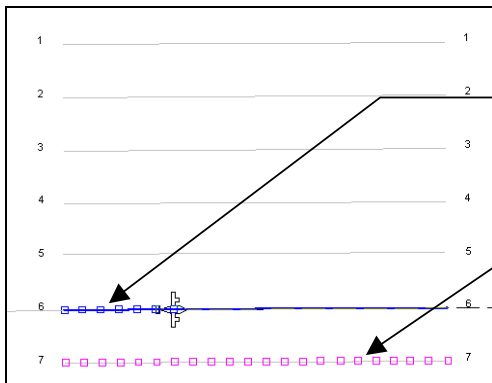
31 - PHOTO POSITIONS

The following describes the way photo positions are displayed during the mission.

Upon start up press the photo index button  to see the available photo coverage before the mission. During the photo run the photo index button will pop up to hide the index in order to economize on graphic resources.

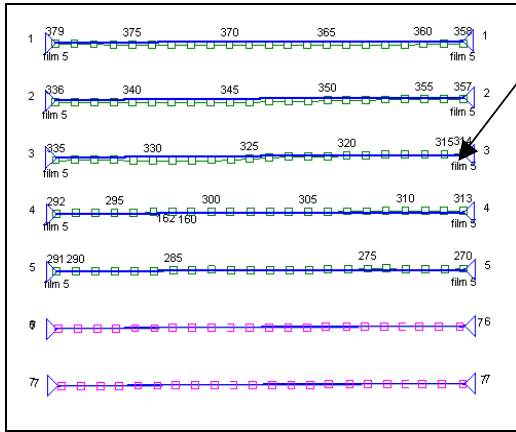


The existing photos are shown as green squares.



The photos are shown as blue squares while the airplane is on the run.

The new photography is shown in purple when it has been saved.



Press again the index button to see the complete coverage.

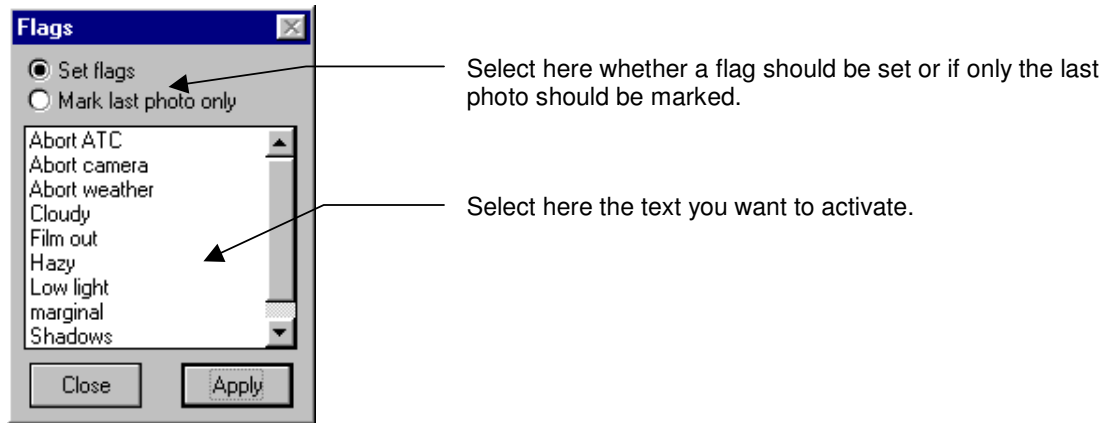
32 - FLAGS AND MARKS

Flags are small informative messages that can be activated and deactivated at will during the survey. While a flag is active, all the photos taken are marked. Photos stop being marked when the flag is deactivated. Several flags can be active at the same time. A flag can hold any kind of text (see the CONFIG menu how to create flags). A typical flag example would be "Cloud shadows" or "Bumpy".

Marks are similar to flags but are only attached to the previous photo. This allows the operator to add comments such as "airplane banked" or "marginal" to the last photo only.

The purpose of flags is to build the film report as well as to assist the operator to remember problems and events that occurred during the flight. In the next release it will be possible to show the flagged photography on the display.

During the survey, press the flag button  to pop up the flag window.




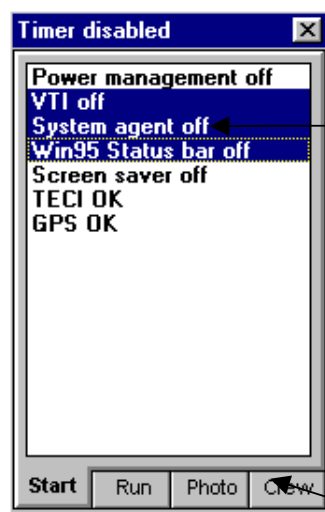
Cloudy
Hazy
marginal

33 - CHECK-LISTS

The check-list function allows the user to prepare 4 sets of check-lists:

1. **Start:** This list is displayed automatically each time the program is started.
2. **Run:** This list is displayed automatically each time a run is selected.
3. **Photo:** This list is displayed automatically each time the airplane is established on a photo run.
4. **Crew:** This list is displayed manually by the user.

- Normally, the checklist is displayed automatically at crucial moments of the flight.
- It can also be displayed by the user by pressing the check-list button .
- If required, the automatic display can be disabled (see the **NAVIGATION CONFIGURATION MENU**).
- All items in the lists can be edited and new items can be added by the user (see the **NAVIGATION CONFIGURATION MENU**).
- Click anywhere on the check-list to prevent it from hiding. Its caption will change to "Timer disable" and the list will remain visible until the user hides it.
- By default, the check-list has an internal timer that hides it after 5 seconds. This behavior can be changed in the **NAVIGATION CONFIGURATION MENU**. Setting the timer to 0 (zero) disables the timer and the list remains visible until the user hides it.
- To hide the check-list, simply click anywhere on the display or hit a key.



If you wish to have a visual reference on what you have checked, you can click on the list to highlight the items which have already been checked.


To hide the check list, click anywhere on the screen.

34 - CHARTS

Last updated 7 August 1998

The project named **CHARTS** is a special project that can contain graphics of general use such as aeronautical charts, international borders, danger areas, etc. The CHARTS project and its contents must be entirely drawn and maintained by the user. It is his responsibility to respect aeronautical and copyright regulations.

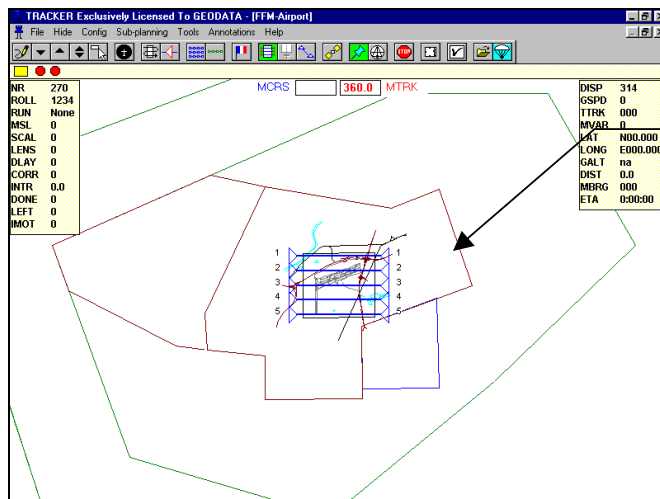
The graphics placed in CHARTS are a special case of background graphic files. The data can be digitized from a map in **snapLIM** or extracted from a text in the **snapXYZ**.

Charts can only be loaded into the FERRY  display which is a small scale map covering the complete country where you are operating. In this mode one can load large quantities of graphical information which do not affect the performance of the system. With too many background files loaded in the overview display, you run the risk to run out of computer resources.

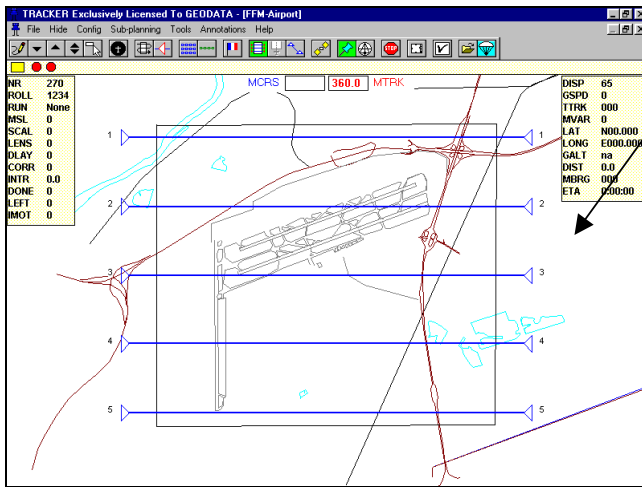
To load a chart, you must be in the FERRY mode. Click the **FILE > LOAD - UNLOAD CHARTS** menu to show the list of available charts having the same coordinates system as the current flight plan.



The highlighted items will be displayed. Set Yes in the Auto column if you want that the corresponding chart is automatically loaded each time snapSHOT is started.



For example, the Frankfurt airport and the various airspace around it.



More detailed example showing the airport area (FFM).

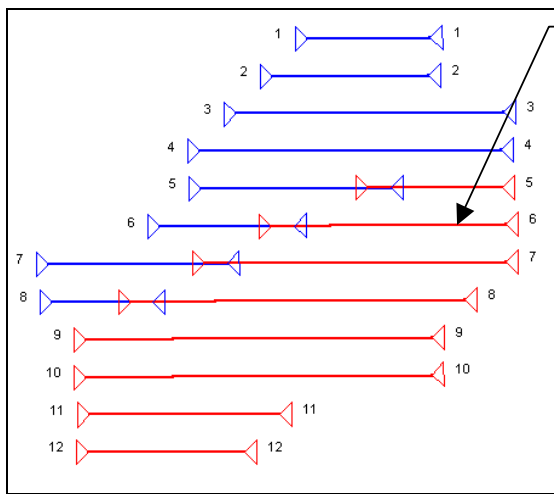
35 - PREPARING SUB FLIGHT PLANS

Also refer to snapSHOT chapter 44, How to re-fly part of a run.


Using the sliding ends of run markers it is possible to prepare several flight plans derived from the same original flight plan (in TRACKER, these flight plans are called sub flight plans).

Note that this feature is a powerful and versatile project management tool but its usefulness might not be obvious at first sight. If you are new to computer flight planning some of the following might seem confusing and should preferably be considered once you have become more familiar with the system.

THE SLIDING MARKERS



In **TRACKER**, the traditional arrows or triangles used to mark the start and finish of the runs can be moved along the run from one spot to another. This allows you to change the camera on and camera off locations at your convenience, even during the flight. To do this,

press the marker button , pick a marker around the tip of the triangle and drag it along the run with the mouse. When you release the mouse button, the marker will snap to the nearest photo position and remain there. From now on, only the part of the run that is between the markers is active.

USE

The first obvious utilization is to move the markers to fly only part of a run. For example when a run has to be interrupted and restarted in flight or if only part of a run has to be completed. One can use the photo index overview to see where the photography ends and move the sliders as required.

Further, In **snapBASE** or directly in **snapSHOT** it is possible to prepare several sub flight plans, save them and retrieve them when needed. This is very handy when it comes to the preparation of the daily photo missions during an ongoing project. For each mission one can easily prepare a new sub flight plan showing only the remaining photography.

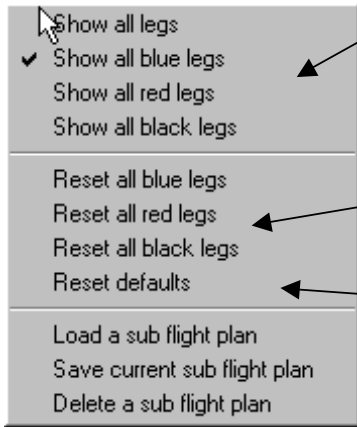
Other possible applications:

- Divide the project in various flight altitudes depending on the terrain height
- Exclude areas which should not be flown (lakes, prohibited photo areas, etc.)
- Distribute work between 2 or more planes flying the same project.
- Use colors to differentiate between areas of priority, etc.

PROCEDURE

The easiest way to learn how to use the markers is to experiment with them. Feel free to move, show, hide, save and load as many sub plans as need be. Whatever you do has no effect on the original flight plan.

Most sub planning functions are grouped in the **SUB PLANNING** menu.



A run segment can be divided into 3 sections. Each section has a color, blue, red or black (default blue). if you need to split a run into 2 legs, show the red markers, if you need 3 legs, show also the black markers.

Use these menus to bring the markers back to the actual ends of the runs.

Click this menu to reset the defaults.

To operate on the markers, click the marker button  and click the **right** mouse button on the run to be edited. The sub plan pop up menu will be displayed:



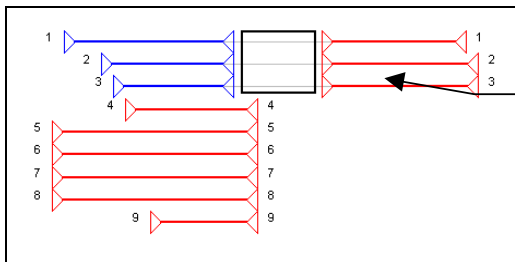
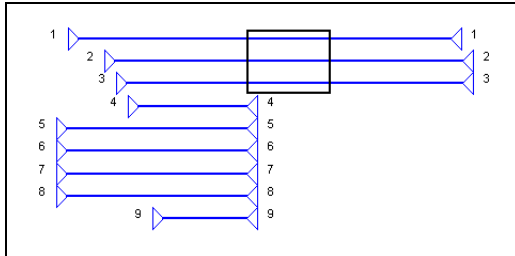
Click here to hide the selected leg (one leg must remain visible).

Use these to control the layering of the legs.

Use these to control which markers are visible.

EXAMPLE

The following exercise demonstrates how to use the sliding markers to prepare an alternative sub flight plan. In this case a block of photography covers a military training area which the crew might not be allowed to fly when the area is active. If this is the case, then the crew will select the sub plan to avoid flying into the area. During the digitizing, the operator has taken care to draw the outline of the military area. This line will be used to position the markers.

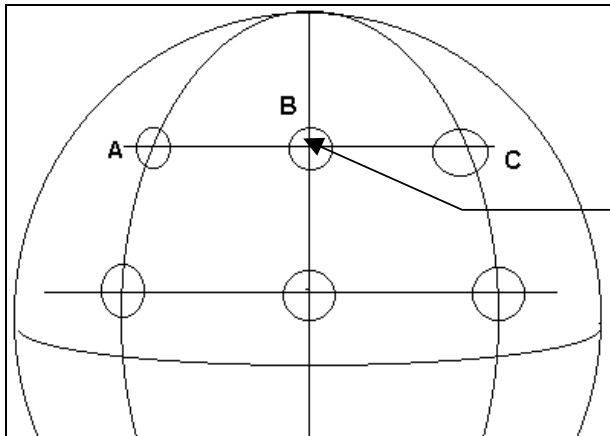


3) Now move the red markers so as to cover the Eastern part of the runs.

36 - ANGLES

In **snapSHOT**, angles conform to the following rules:

Unless the planning was carried out in pinpoint mode (grid or geographic), runs generated by **snapPLAN** and **snapXYZ** are computed as straight lines drawn on the map. Therefore the value of the course changes along the line in the case of Transverse Mercator. This can be seen in the MCRS window while the plane is progressing along a long run.



Angles A, B and C are different. This is why the required course will change along the run.

Geographic runs (pinpoints flight plans prepared in **snapPLAN**) are portions of great circle and have a constant course. The airplane either flies along a Meridian or Parallel. The resulting track is a curve when it is plotted on a map.

Note: great circle navigation will be available from version 2.0 onwards.

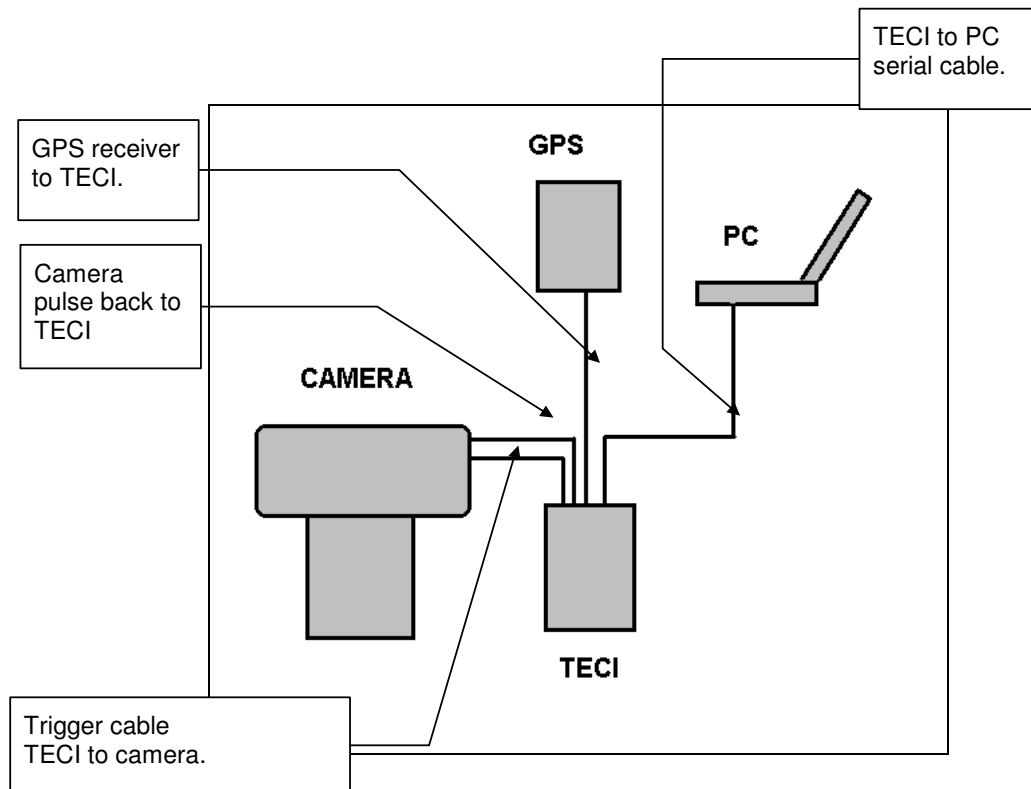
By default, all displayed angles are magnetic (if the variation is available).

37 - PRE-FLIGHT CHECK

Remarks: Please refer to the TECI manual for more detailed information.

CONNECTIONS




The following describes the system connections.



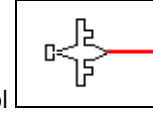
Remark: Your hardware might be slightly different from this description.

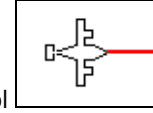

GETTING THE GPS SIGNAL

Once the TECI has been connected to the GPS and a position is available, perform the following check. All connectors must be firmly secured:

- Switch the TECI on.
- Start the **snapSHOT** program and load a local test job.
- Press  to open the communication port. The message "**Communication port successfully open**" should appear on the status bar.
- The **snapSHOT** GPS LED indicators  (left side of status bar) should flash.
- No flashing indicates a failure of the communication. Make sure the GPS receiver is connected, operating (avionics switched off?) and sending the right position message. Try to toggle on/off  one more time. Flashing LED's only indicates that the TECI box or the GPS receiver is sending data.

- If the data received is not usable, then the message "**GPS data corrupted**" will appear on the status bar. In this case an error log file is automatically created in \TRACKER\DATA\GPS.LOG.



- If the area loaded is in the vicinity of the airplane then the aircraft symbol  should be visible at the right position on the display. Before you commit yourself to go flying, press the small scale overview button . The small aircraft symbol should be visible on the display, correctly positioned with regard to the project area you selected. Using a chart of your country as background might be useful to detect problems early.
- Press the single release button to trigger a photo.
- No camera release indicates a failure of the triggering circuitry.
- The number should change **NR 254**.
- No change indicates a failure of the photo detection circuitry.

GPS MESSAGE EXAMPLE: TRIMBLE 2000 GPS RECEIVER

Set the receiver on 9600 baud, no parity, 8 bits, 1 stop bit.
Select the **X1** (X RAY ONE) output format.

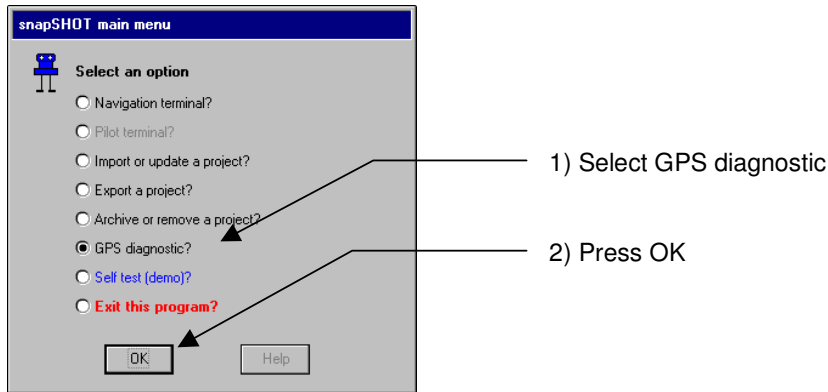
The displayed message should precisely match the format below, including a carriage return and line feed after each item:

```
□GDA
AN 49 5773
BE 008 3835
C352
D000
E000507
F----
GL0002
HL0002
I3303
J21
KEDDF
L3305
M 0
P000
QE000
c005
T-----
d---
e---
i15/04/94
j10:19:07
s020000
tA
kN 51 50.51227 W 003 37.31128 209.5
l18113.8 -----
m090.00 330.29 L 0.01573 L 0.18
n -0.0 -----
o 5.06587 330.468 --:--:--
p10:19:07.00 +1.0
qR000 0#
r10:19:07.564
u0 .565
zG GPS-3D:0 LOR:0
TGT7175578
```

38 - GPS DIAGNOSTIC MENU

The GPS diagnostic is a utility that allows the user to check whether the data sent by the GPS receiver is the right one.

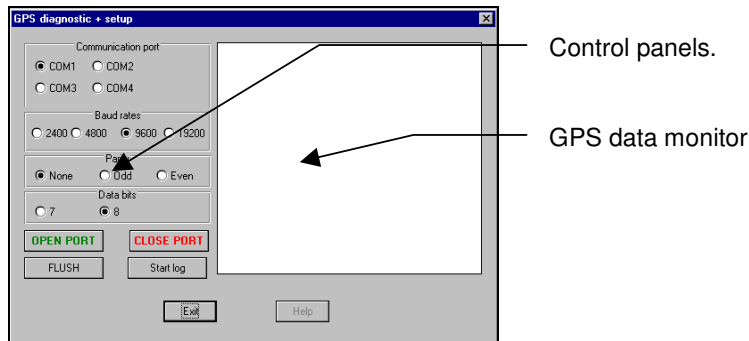
Note: To check and configure a receiver you must temporarily remove the **TECI** and directly connect the GPS to the computer, using the same cable.



1) Select GPS diagnostic

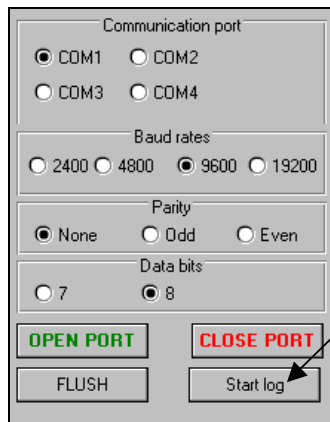
2) Press OK

The following dialogue will show up:



Control panels.

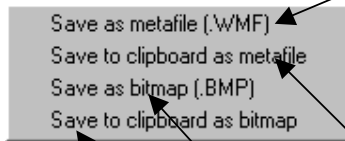
GPS data monitor



If data is coming but you can't get it right, then use the Start log button to save some data and send it to TRACK' AIR to be checked.

If the message seems to be OK, press the **EXIT** button on the control panel and return to the main menu.

39 - CAPTURE MENU



Select this menu to save the current display as a Windows **metafile**. A metafile is a Windows graphic file that can easily be imported into other applications. metafile can be scaled but cannot easily be edited.

Select this menu to place on the **clipboard** a copy of the current display in the Windows metafile format. A metafile is a Windows graphic file that can easily be imported into other applications. Metafiles can be scaled but cannot easily be edited.

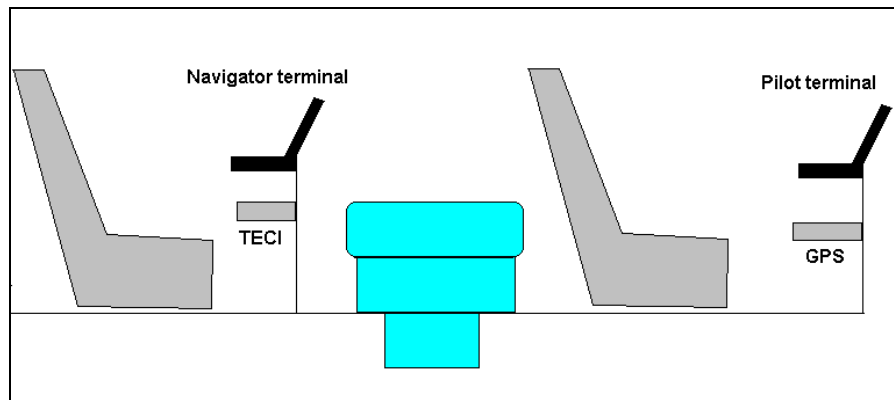
Select this menu to save the current display as a Windows **bitmap**. A bitmap is a Windows graphic file that can easily be imported into other applications. Bitmaps do not scale very well but can be easily edited in a bitmap editor such as Paintbrush.

Select this menu to place on the **clipboard** a copy of the current display in the Windows bitmap format. A bitmap is a Windows graphic file that can easily be imported into other applications. Bitmaps do not scale very well but can easily be edited in a bitmap editor such as Paintbrush..

40 - OPTION : TWO COMPUTERS OPERATION

In case the aircraft size or layout does not allow the Navigator and Pilot to share the same PC, it is possible to interface two computers that can be used independently by the Pilot and Navigator. In this configuration, the Pilot computer is slaved to the other computer and does not require any action from the Pilot.

- Both computers are connected to the TECI via a special cable that is part of the 2 computers kit.
- The pilot terminal does not need any action from the pilot.
- If required, both computers can be indifferently used to select a run.
- Both computers record simultaneously the photo positions (added data safety).



- The 2 computers kit includes the Pilot and Navigator terminal within the same program. Simply select the Pilot terminal module or the Navigator terminal from the main menu.

41 - LEICA RC30 FILM ANNOTATION

Modified 29 January 1999

The Tracker system supports film margin annotation for the Leica RC30.

OVERVIEW

The system was designed to provide maximum flexibility and ease of use:

- There is no special action to be taken to print the margin on the film, the system automatically communicates with the camera and instructs it to print the margin text.
- The text of the margin can contain plain text as well as data fields that are linked to the database. The value of these fields is automatically filled by the system.
- Different margin layouts can be prepared in advance with the help of the margin editor and selected at will before or during the flight.
- A standard default margin can be prepared once and for all. **snapSHOT** will automatically use the default margin if no other choice was made.
- All the variable parameters such as project name, time, run numbers, altitude, positions, etc, are automatically updated by **snapSHOT** when necessary.

HOW DO THE MARGINS WORK?

snapSHOT stores margin as a sort of template that uses a combination of plain text and place holders for the variable data (time, run numbers, altitude, etc).

The user types the plain text and the place holders are automatically filled by **snapSHOT**. For example, if you want to display the latitude, **snapSHOT** will automatically replace the latitude place holder NNNNNNNN by the actual value of the latitude.

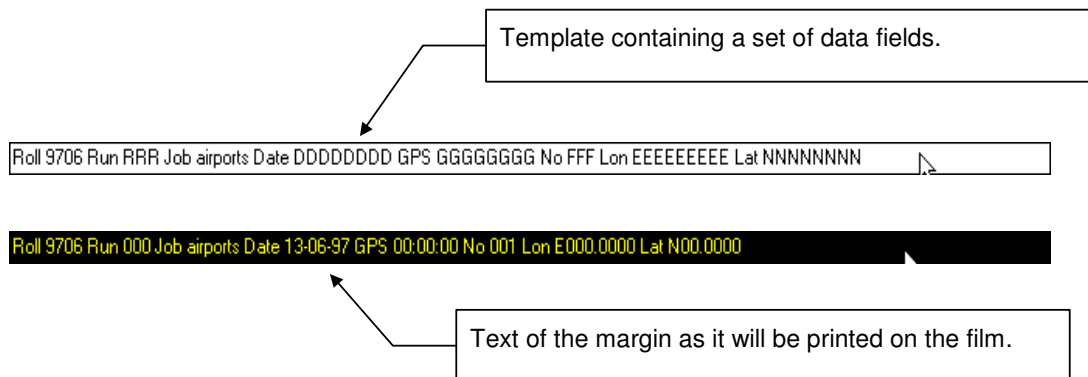
The margin is prepared by picking blocks of information from a list in the order you want them to appear on the film. Each information block contains an optional caption (plain text) and a data field (place holder) which is automatically filled by **snapSHOT**.

For example:

GPS time GGGGGGGG

will be replaced by:

GPS time 13:03:24



WHERE TO PREPARE THE MARGINS?

The margins can be prepared indifferently in **snapBASE** or in **snapSHOT**. In case the margin is prepared on a different computer than the one used during the mission, the margin will be automatically transferred along with the flight plan. The selected margin will be also automatically loaded and displayed in the camera. This allows the text of the margins to be prepared in advance in the office.

DEFINITION OF DATA FIELDS

The data fields are place holders (or templates) which are used by **snapSHOT** to recognize where the data has to be written. A data field is represented by one character repeated several times (HHHHHH).

There are 2 types of data fields:

Fixed length, such as the date or time.

Variable length, such as the project name or film roll number. The characters representing the variable length data fields are preceded by a @.

If you modify a data field in the editing window, it will loose its link to the database and will not work anymore.

DEFINITION OF FIELDS CAPTIONS

The data field caption is the title which proceeds the data, E.G. **JOB, TIME, FILM**, etc. You may edit the captions in the data fields caption panel. You can change the wording, the language or simply remove a caption that you do not want to display. The captions are stored in the database and are the same for all projects.

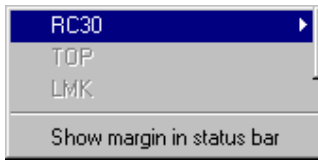
DEFINITION OF FREE FIELDS

Free fields are simply small strings of text which you can save to avoid retyping, E.G. **Copyright TRACK'AIR**

BEHAVIOR OF THE MARGIN

- There can be only one margin saved with each flight plan.
- If no margin has been saved then the system will automatically use the default margin.
- To disable sending the margin, deselect **Tracker sends data to right margin** on the EDI configuration panel.

PREPARING A NEW MARGIN.



Select the **Annotation** menu.
 Select your model of camera.
 Select the **Set margins** menu.

The margin editor will be displayed. It has 4 panels: **Prepare new margins, Data fields' captions, Free fields, and EDI configuration.**

Select the first panel **Prepare new margins** that is used to prepare, save and load the margin layouts.

RC30 EDI interface (BETA)

Prepare New Margins | Data Fields Captions | Free fields | EDI configuration

Select the data field in the left list, select the free fields from the right list, or type directly in the text window.

Select Data Fields		Select Free Fields	
Film identification :	@A	Roll Def	None
Run number :	BBB	Run	000
Project number :	@C	Project nr	cap 001
Project name :	@D	Project	airports
Area name :	@E	Area	3 strips
Client name :	@F	Client	Trackair
Date :	GGGGGGGG	Date	4/11/97
GPS Time :	HHHHHHHH	GPS	00:00:00
UTC Time :	IIIIIIII	UTC	00:00:00
Local time :	JJJJJJJJ	Time	00:00:00
Photo scale :	KKKKK	Scale	00000
Altitude :	LLLLL	Alt	0
		free1	
		free2	
		free3	
		free4	
		free5	
		hhhh	

Max 100 characters: **34** | Undo last | Clear margin | Test Margin | Load/Delete Margin | Apply

UTC:IIIIII Date:GGGGGGG Default
 UTC:00:00:00 Date:4/11/97 Default

Close | Help

Undo last:
Remove the last entry.

Clear margin:
Clear the editor window.

Test margin:
The layout is displayed in the editor window. Press the button to see the actual text of the margin in the preview window.

Apply:
Save the current margin with the flight plan

Load/Delete Margin:
Press to display the list of margin templates that you have saved.

Max 100 characters:
In the case of the RC30, this is the maximum number of characters accepted by the camera.

Preview window: Show the text of the margin as it will be displayed.

Editor window: You can use this window as a normal text editor and type directly in it or you can paste fields from the lists or combine both actions.
 If you paste a data field, do not alter the actual data template, e.g. **GGGGGGGG**, which is used by the program to recognize the type of information that has to be printed. You may change or remove all other text information (see also the configuration window later in this chapter).

If this is the first time that the margin is used, **snapSHOT** will display a default margin in the text editor:
 For example:
 Area @EEEE Date DDDDDDDD GPS GGGGGGGG Lat NNNNNNNN Lon EEEEEEEE Run RRR
 The @ characters represent variable length text, in this case the name of the area.
 The DDD, etc. represent fixed length text, such as the time or the date.

SAMPLE MARGIN

To create a new margin layout, clear the editor window.
 Follow this example:

First pick the Roll number in the data field list. The editor window will show:

Roll @AAAA

Add the run number:

Roll @AAAA Run RRR

Add the Job name:

Roll @AAAA Run RRR Job @DDDDDDDD

Add the time, lat, long, etc.

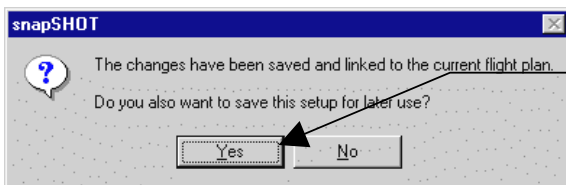
Roll @AAAA Run RRR Job @DDDDDDDD GPS GGGGGGGG

Roll @AAAA Run RRR Job @DDDDDDDD GPS GGGGGGGG Lat NNNNNNNN Lon EEEEEEEE

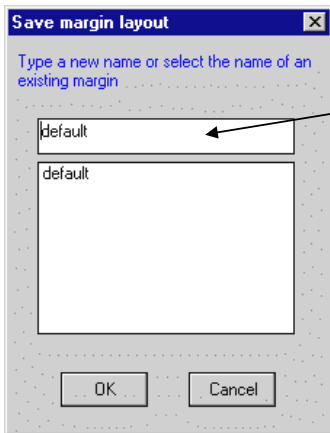
At any stage you can press the **Test** button to see the actual text:

Roll None Run 000 Job airports GPS 00:00:00 Lat N00.0000 Lon E000.0000

Once the margin is complete, press the apply button to make this margin the active one. You will be prompted to save the margin for later use:



This margin is now active and saved with the current flight plan. Press **YES** if you want to save this margin layout for later use.



Type a name and press **OK**. Note that if you give the name default to a margin, then it will be automatically loaded if no other margin is selected.

DATA FIELDS CAPTIONS PANEL

It is possible to change the titles that are automatically displayed in front of the data field. You can change the text, the language or remove the titles.

Undo Last: Undo the last action.

The caption is the text which is front of each entry, E.G. latitude etc.

You can change the text of each caption. Changing the text of captions will not affect the current margin unless change it yourself

Reset initial state: Undo all changes made.

Apply: Save the changes.

Total Reset: Return to the original default of TRACKER (English).

Field names	Field Captions
Film identification	Roll Def
Run number	Run
Project number	Project nr cap
Project name	Project
Area name	Area
Client name	Client
Date	Date
GPS Time	GPS
UTC Time	UTC
Local time	Time
Photo scale	Scale
Altitude	Alt
Ground track	Trk
Photo Sequence No	No
Film type	Film
Filter type	Filter
Air Operator	Ops
Crew members	Crew
Longitude	Lon
Latitude	Lat
airplane	Reg
Counter	Photo

FREE FIELDS PANEL

Free fields.
This is a simple text editor. Place on each line a block of text that you might use at a later stage to prepare a margin.

Free fields

```
free1
free2
free3
free4
free5
hhhh
```

Undo Last

Clear All

Apply

EDI CONFIGURATION PANEL (RC30 ONLY)

To configure the way the program interacts with the camera, select the last panel.

Tracker sends data to the right margin: When this check box is marked, Tracker will send the margin to the camera. **This is the default, do not change other than for testing purpose.**

Camera sends Margin data after each exposure: When checked, the RC30 will send data after each exposure. **This is the default, do not change other than for testing purpose.**

Camera prints internal data to the left margin: When checked, the RC30 will print its internal data to the left margin.

Camera sends line feed: When checked, the RC30 will send a line feed character after each line. **This is the default, do not change other than for testing purpose.**

The configuration panel contains the following checked options:

- Tracker Sends Data To Right Margin
- Camera Sends Margins Data After Each Photo
- Camera Prints Internal Data On Left Margin
- Camera Sends Line Feed After Each Line

Apply

CABLES CONNECTIONS (RC30)




42 - OPTION: LEICA PAV30 (SOFTWARE)

This section covers the following functions

- Recording of data from the mount.
- Automatic switching of the mount.
- Automatic drift setting.

IMPORTANT: The PAV must be manually set to AUTO MODE prior to connecting with snapSHOT.

PRESENTATION

If the PAV option is present, snapSHOT will automatically attempt to connect COM2 to the mount when the TECI/GPS button  is pressed. Unless otherwise configured, the operation relative to the mount are automatic and do not require the attention of the operator.

RECORDING OF DATA FROM THE MOUNT

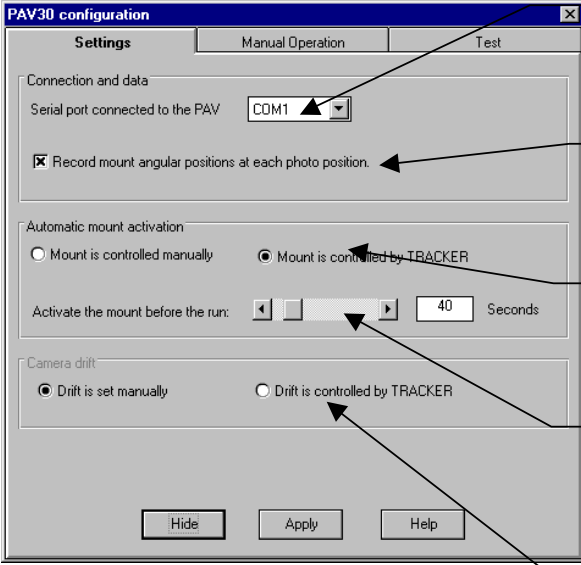
By default snapshot will attempt to record the message \$PAVSA,110 which describes the values of the inclinometers and gyros. The data is automatically saved in the database and can be retrieved in snapBASE.

AUTOMATIC SWITCHING OF THE MOUNT

By default snapSHOT will attempt to switch the PAV mount to Auto mode at least 20 seconds before the beginning of the run and to freeze the mount after the run has been completed or abandoned.

CONFIGURATION

The above settings can be configured in the menus CAMERAS > RC30 > SET PAV. This display the following dialogue box:



The screenshot shows the 'PAV30 configuration' dialog box with three tabs: 'Settings', 'Manual Operation', and 'Test'. The 'Settings' tab is active and contains the following sections:


- Connection and data:** A dropdown menu for 'Serial port connected to the PAV' is set to 'COM1'.
- Recording:** A checkbox labeled 'Record mount angular positions at each photo position.' is checked.
- Automatic mount activation:** Two radio buttons are present: 'Mount is controlled manually' (unselected) and 'Mount is controlled by TRACKER' (selected).
- Timing:** A slider and input field for 'Activate the mount before the run:' is set to '40' seconds.
- Camera drift:** Two radio buttons are present: 'Drift is set manually' (selected) and 'Drift is controlled by TRACKER' (unselected).

Annotations with arrows point to the following elements:

- The 'COM1' dropdown menu: Select the COM. By default, snapSHOT will use COM2.
- The 'Record mount angular positions at each photo position.' checkbox: Uncheck the box if you do not want recording.
- The 'Mount is controlled by TRACKER' radio button: Select this option if you do not want snapSHOT to control the mount.
- The '40' seconds input field: Set the time before the run when snapSHOT should unfreeze the mount.
- The 'Drift is set manually' radio button: Select this option if you want to set the drift manually.

TROUBLESHOOTING

In case the mount cannot be initialized or operated, a message indicating the error will be displayed.

- 1) Switch off the communications ports 
- 2) Select the menus CAMERAS > RC30 > SET PAV
- 3) Try to initialize the mount manually.
- 4) If the system is reporting errors, please contact TRACK'AIR for assistance.

If the system cannot be started with the PAV mount, you must disable both the PAV control and recording on the settings tab of this form to be able to use snapSHOT.

43 - HOW TO SUSPEND PHOTOGRAPHY

Last updated 19 February 1999


This section is common to snapBASE and snapSHOT.

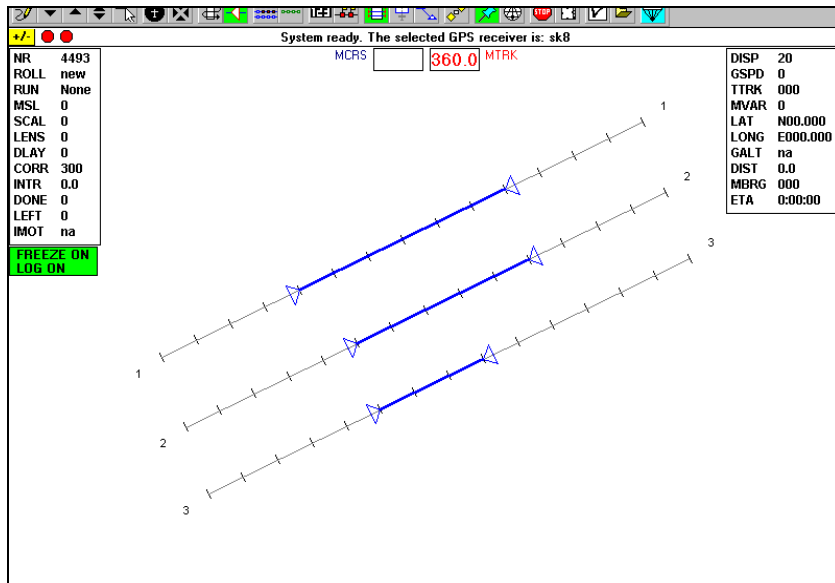
This section describe useful modifications which can be applied to a flight plan.

- Suspend photography.
- Skip each other photo.

Note: This functions make use of the sub flight plan functions.

SUSPEND PHOTOGRAPHY


- 1) In snapSHOT or snapBASE, press the sub plan button 
- 2) Move the sliding triangles around the area where photography is not required.



- 3) For each run, click on the solid blue section of the line with the RIGHT mouse button.

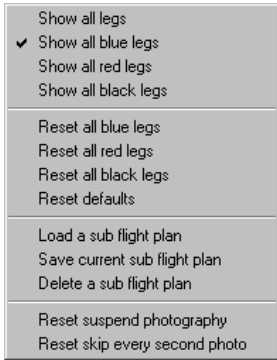


- 4) Select suspend photography. Repeat for each run.

- 5) When done, push back the sub plan button 

The triangles will return to the beginning and end of the lines.

6) To check visually, select the HIDE menu and uncheck the PHOTO POSITION TICKS.

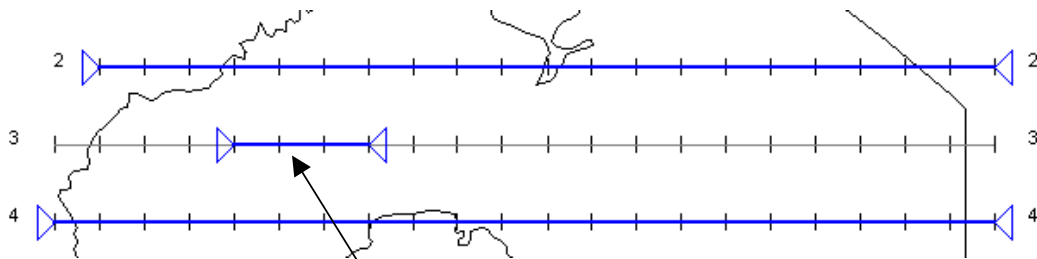


7) To reset, select the main menus SUB PLANNING and press the menu RESET SUSPEND PHOTOGRAPHY.

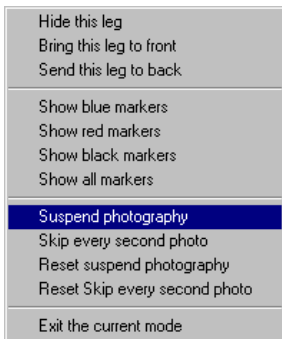
SUSPEND PHOTOGRAPHY SEVERAL TIMES ON A RUN

It is also possible to suspend the photography on several sections of a run (maximum 3 times). This function makes use of the colored sliding end marker of the runs.

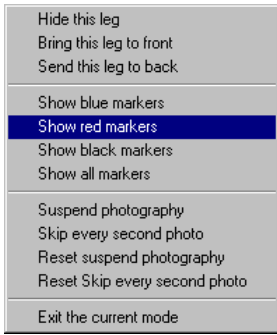
The following example will demonstrate how to create 3 separate areas where photography will be suspended.



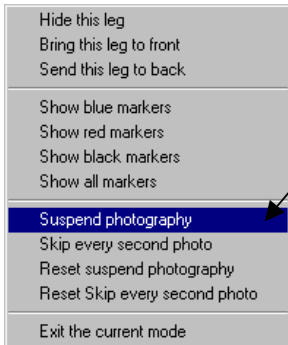
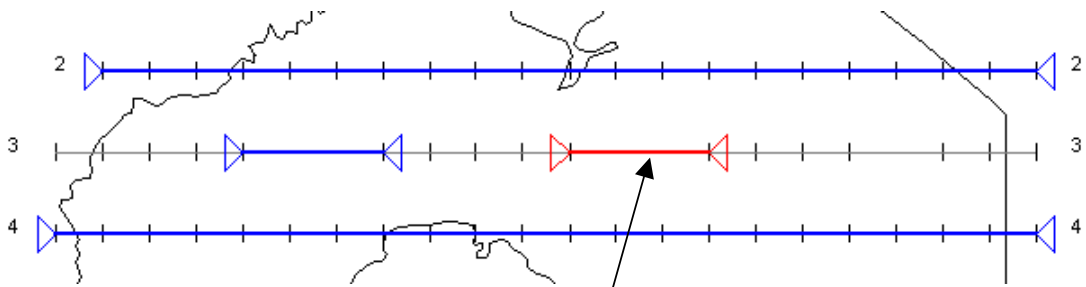
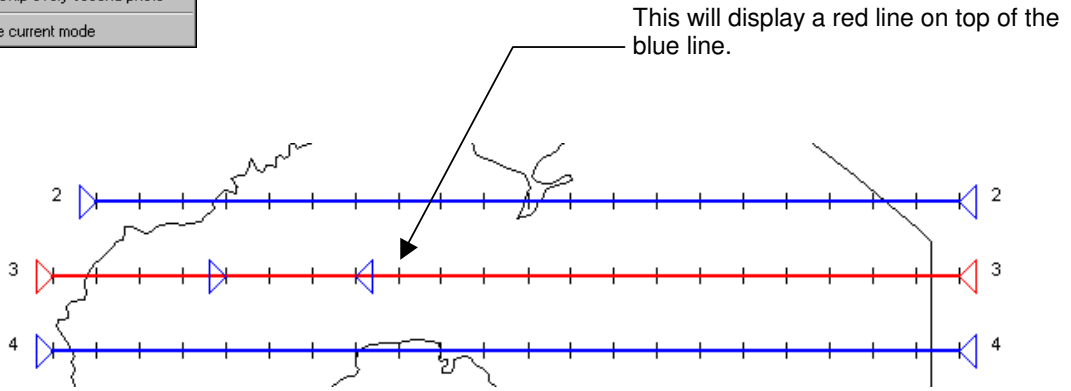
As described above, move the blue sliders around the section NOT to be photographed.



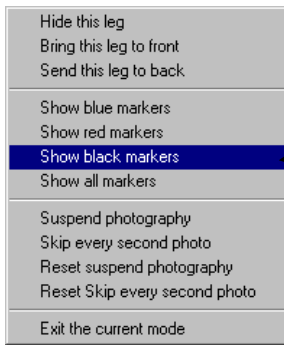
With the RIGHT mouse button, click on the solid blue section of the run and select the menu SUSPEND PHOTOGRAPHY.



With the RIGHT mouse button, click AGAIN on the solid blue section of the run and select the menu SHOW RED MARKERS.

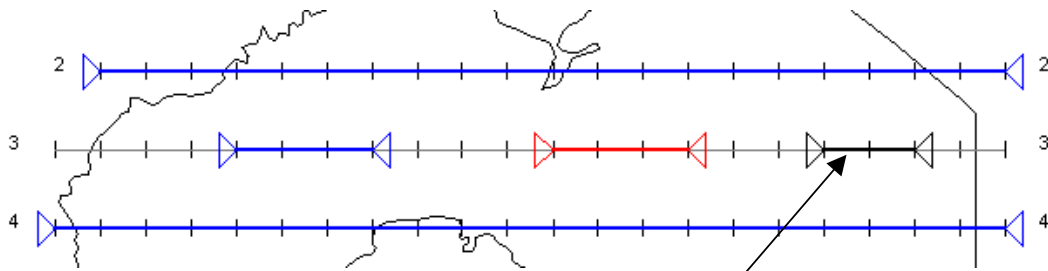
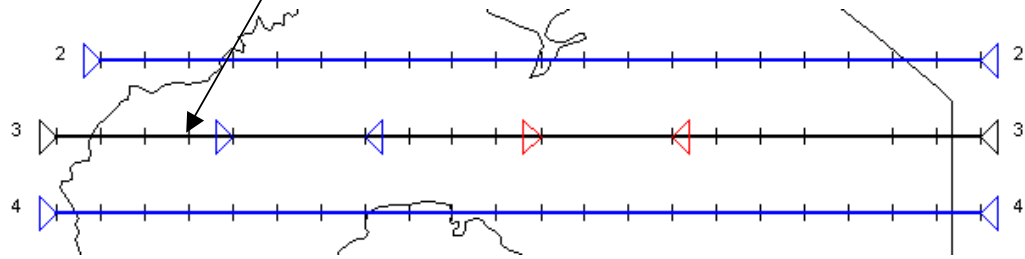


With the RIGHT mouse button, click on the solid red section of the run and select the menu SUSPEND PHOTOGRAPHY.

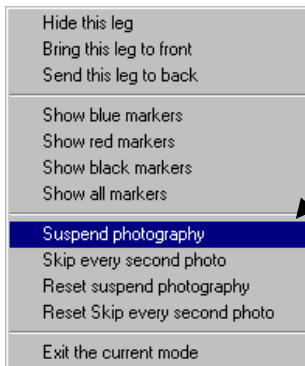


With the RIGHT mouse button, click AGAIN on the solid blue section of the RED run and select the menu SHOW BLACK MARKERS.

This will display a BLACK line on top of the blue line.

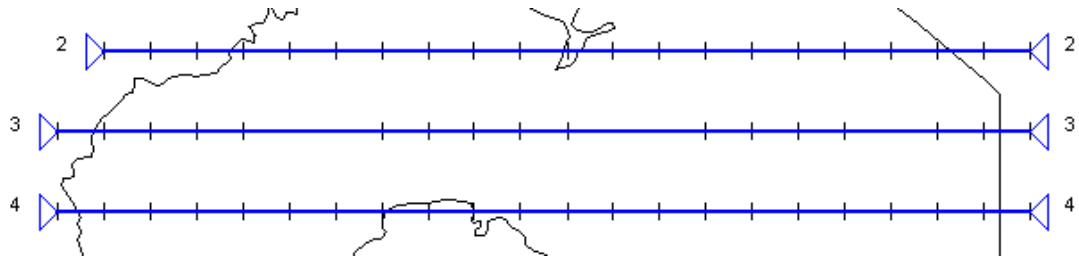


Pick the BLACK end of run sliders and move them around the third area NOT to be photographed.



With the RIGHT mouse button, click on the solid black section of the run and select the menu SUSPEND PHOTOGRAPHY.


Finally, press the slider mode button off. The sections between the blue, red and black sliders will automatically not be photographed.



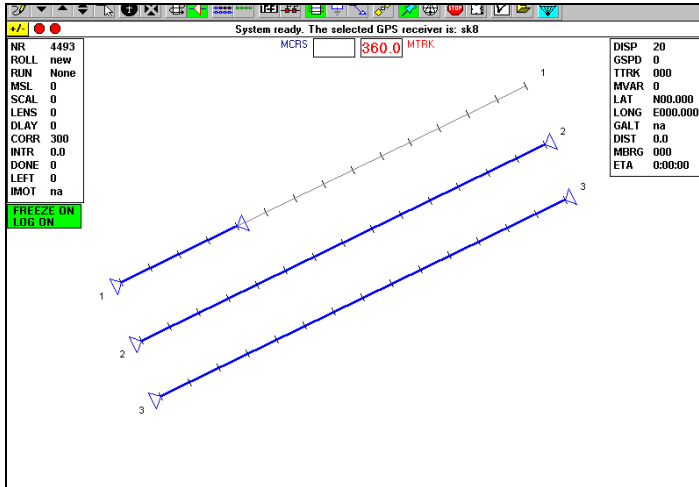
SKIP EACH OTHER PHOTO

This function allows you to skip each other photo, therefore changing the overlap within in a run, for example switching from 60 to 80% and back.

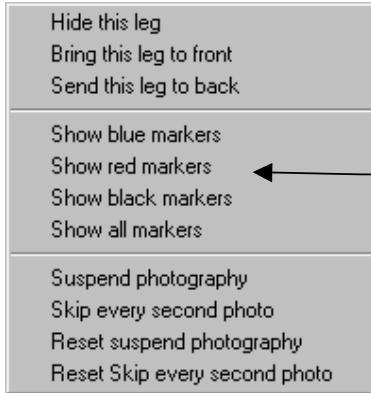
For this example, we start with flight plan with was designed with 80% forward overlap.

1) Click the sub plan button 

2) Move the triangle around the region which has to be flown at 60%

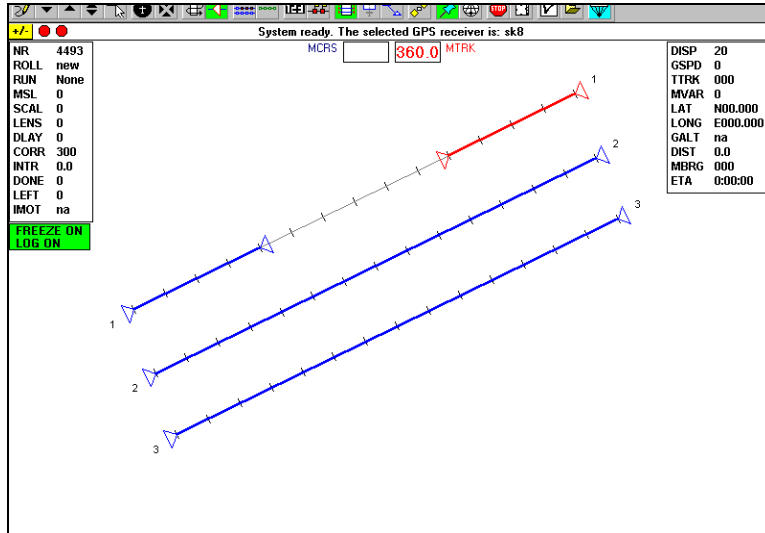


3) With the RIGHT button, click the blue part of the run

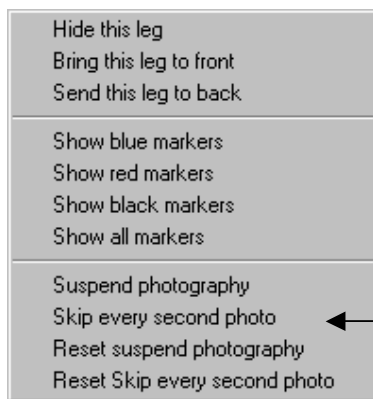


4) Select the SHOW RED MARKERS menu.


5) Slide the red triangles around the area to be flown at 60%



6) With RIGHT mouse button, click the blue part of the run



7) Select skip every second photo. Repeat for the red part, then for each run.

8) When done, push back the sub plan button  The triangles will return to the beginning and end of the lines.

9) To check visually, select the HIDE menu and uncheck the PHOTO POSITION TICKS.


10) To reset, select the menus SUB PLANNING > RESET SKIP PHOTOGRAPHY.

If needed, the black markers can also be used to define a third area where the photos have to be skipped.


44 - HOW TO RE-FLY PART OF A RUN

Also refer to chapter 35 SUB FLIGHT PLANS.

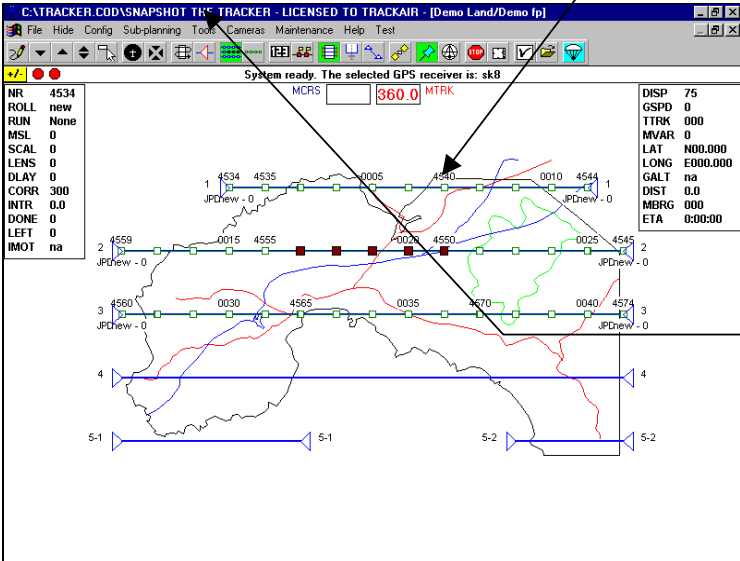
In **TRACKER**, the traditional arrows or triangles used to mark the start and finish of the runs can be moved along the run from one photo position to another. This allows you to change the camera ON and camera OFF locations at your convenience, even during the flight. To do this, press the marker

button , pick a triangle marker around the tip of the triangle and drag it along the run with the mouse. When you release the mouse button, the marker will snap to the nearest photo position and remain there. From now on, only the part of the run that is between the markers is active.


EXAMPLE.

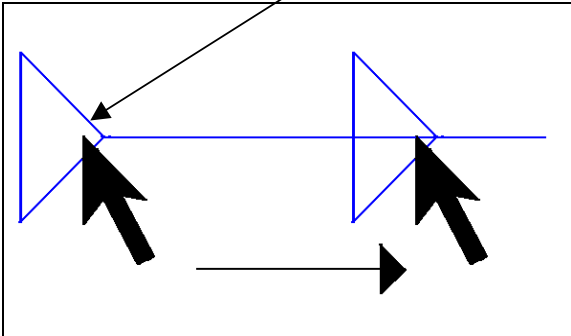
In this example, 5 photos have been flagged during the previous flight (with the flag button ).

To see the previous flight, press the photo index button .

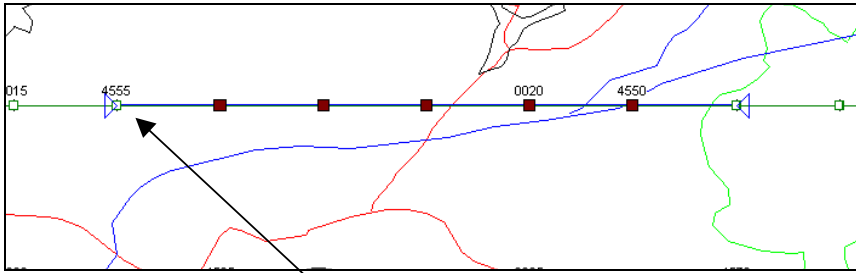


In this example, the 5 photos which have to be re-flown photos were flagged in red.

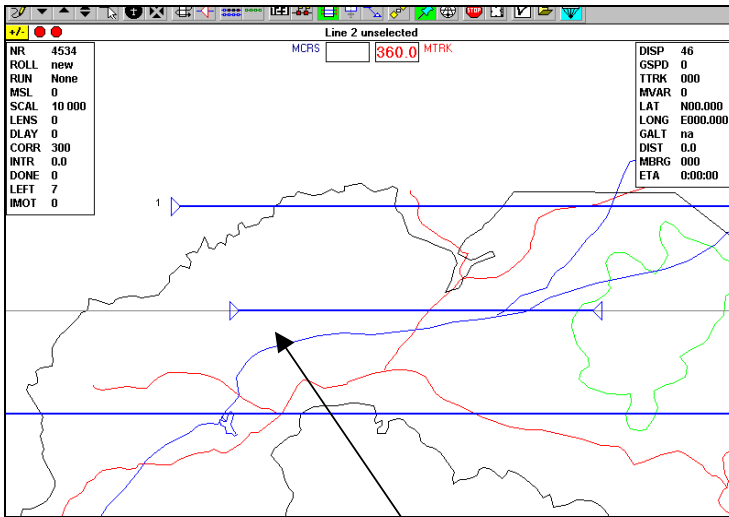
1) Press the sliding marker button .



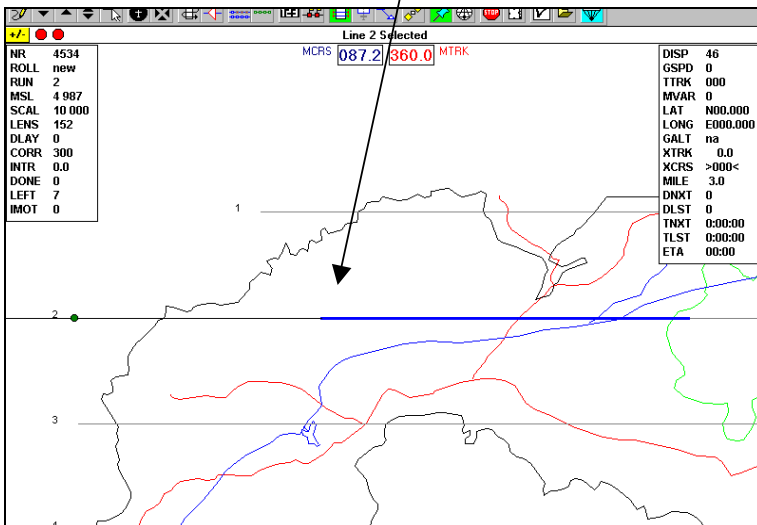
2) Pick the blue triangle with the mouse pointer and drag the triangle to the desired position. When the mouse button is released, the triangle will automatically position itself at the nearest photo.



3) Repeat the operation for both sides of the run. The section between the markers is now the new active run.

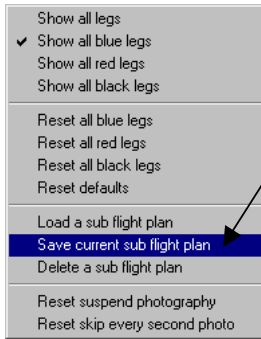


4) To select the run, you must click with the RIGHT mouse button on the section to be flown.

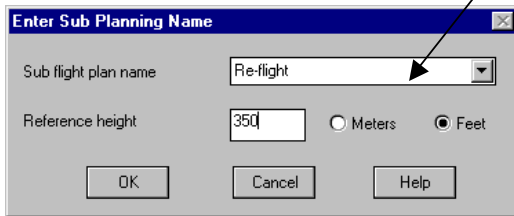


SAVING THE RE-FLIGHT

It is possible to save the re-flight so that it can be used at a later stage.

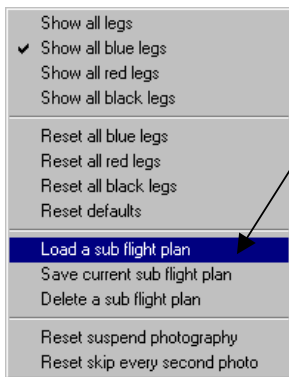


1) Select the menu SUB PLANNING, then select Save current sub flight plan.

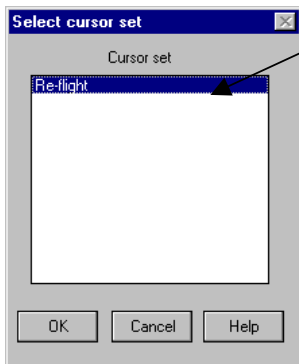


2) Give a name to the re-flight. You can also indicate the flying height.

RELOADING A RE-FLIGHT



1) Select the menu SUB PLANNING, then select Load a current sub flight plan.



2) Select the SUB PLANNING to reload, then press OK.

45 - BACKGROUNDS AND AREAS

Last updated 7 August 1998

TRACKER distinguishes between block areas and background drawings:

AREAS

We call block areas (or simply areas) a **closed** region which has to be covered by parallel runs of photography. Areas can be created with the digitizing utilities provided with the TRACKER system (**snapLIM**, **snapXYZ**). The main characteristic of a block area is that it has to be a **closed** shape so that the automatic planner of snapPLAN can do its job.

BACKGROUNDS

We call background a file containing any kind of digitized cartographic details (closed or not closed shapes). Its primary use is to provide the background required to plan single strips of photography (road, rivers, etc.). Additionally, background files can be also used to add useful information to a flight plan (restricted airspace, international borders, etc.). Contour lines can also be digitized as background.

The above distinction is arbitrary and only reflects the way the data is internally saved and organized by the **TRACKER** system.

PROJECTS AND BACKGROUNDS

Normally a background is associated to a particular project. In snapBASE, it is possible to associate a background drawing to several projects.

COORDINATES AND CLIPPING

Loading a background in snapSHOT is only possible if it was saved in the same coordinates system as the flight plan which is loaded. The background will be clipped to fit the extent of the flight plan.

46 - MAIN MENU

Last updated 7 August 1998

1) Navigation terminal
This is the default and normal operating mode of the snapSHOT program.
Refer to chapter 11 NORMAL OPERATION

2) Pilot terminal
Only select this option for the second computer, in case you are using 2 computers.
Refer to chapter 40 OPTION : TWO COMPUTERS OPERATION

3) Import or update projects?
Select this option to import or update a project from an other computer. The project file should be located in the IMPORT folder or on a floppy disk.
Refer to chapter 19 IMPORT PROCEDURE

4) Export projects or flight plans?
Select this option to export a project to an other computer. The file will be exported to the EXPORT folder or to a floppy.
Refer to chapter 18 EXPORT PROCEDURE

5) Archive or remove a project?
Select this option if you want to create an archive (a copy) of a project. Archiving also gives you the possibility to remove a finished project from your active database.
Refer to chapter 20 ARCHIVING

6) GPS diagnostic?
Select this option if you need to check your GPS. Refer to the GPS diagnostic chapter for more information.
Refer to chapter 38 GPS DIAGNOSTIC MENU

7) Self test (demo)?
Select this option to run the built in demo.
Refer to chapter 4 QUICK DEMO

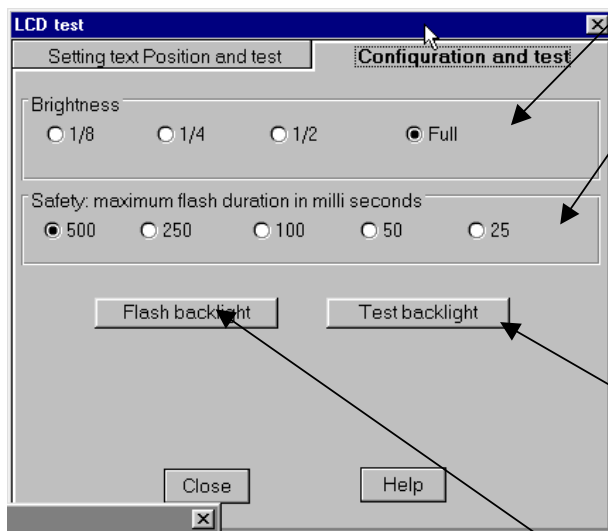
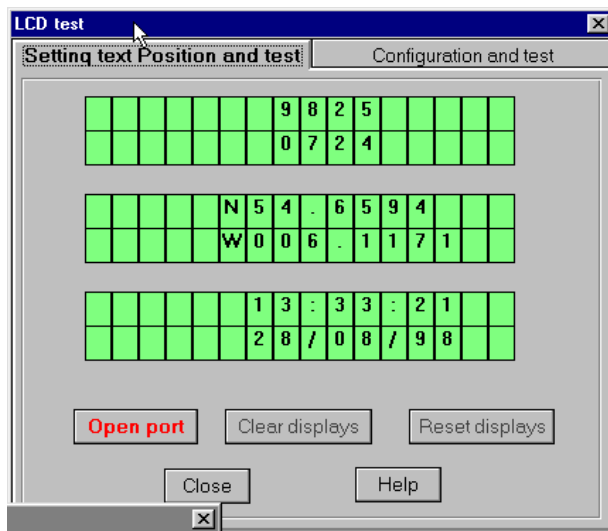
47 - LMK REPLACEMENT DISPLAY

TESTING THE DISPLAY

- Remove the display from the camera.
- Connect it to the TECI expansion port.
- Do NOT start the GPS.
- Start snapSHOT.
- Select the Camera/LMK menu.

The display backlight is automatically turned on when the existing camera lights are switched on. This is achieved with the help of a light sensor placed on the front of the display.

Testing of the system consists of opening the COM port with the red button. The LCD displays should be operating immediately. Mask the small light sensor on the front of the display with a finger, then remove the finger, the display should flash.



Brightness: 4 settings available. Correct value to be determined by tests.

Safety. The illumination of the backlight is controlled by the existing instrument lamps.

To prevent accidental film fogging, the backlight is automatically switched off after a fixed time. For normal aerial survey mapping camera, the default is 500 ms.

This check function turns on the backlight at full intensity for 5 seconds (independently of the light sensor system).

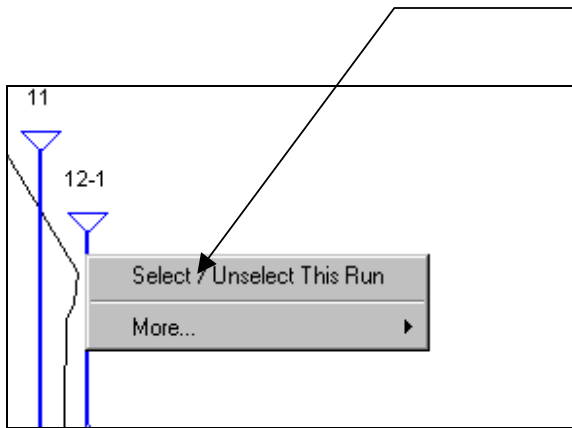
This check function is used to test the actual flash of the backlight. The sensor should be in the dark (covered by a finger tip).

48 - HOW TO SELECT RUNS

Last updated 12 October 1998


After version 195, please go to chapter 57

POINT AND CLICK SELECTION



To select a run, click a run anywhere with the **RIGHT** mouse button on the side you want to start the run from (for example, left half = from left, right half = from right, etc.). A popup menu will be displayed from which you will be able to confirm the selection. .

SELECT RUNS FROM A LIST

- Click the  run list button or select the RUNS > SELECT RUN FROM LIST button
- Click the run number on the list to select it, click again the list to select it from the other side.
- Click Deselect on the top of the list to deselect the current run selection.

Note: The runs numbers have 3 parts, for example 4,2,3

- First, the run number itself, here run 4.
- Second, the number of the section (a run can have 7 sections), here section 2.
- Third the leg number, (a run section can have 3 different legs), here leg 3.

Most generally both the section and the leg will be equal to 1.

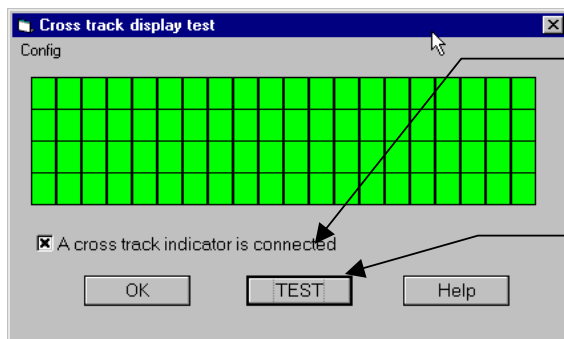
49 - PILOT CROSS TRACK INDICATOR

Last updated 28 January 1999

The system is delivered with a small CDI display. This display is not considered being an ideal solution as the system was designed to be used with a full graphic display.

To connect the display, simply attach it to the EXPANSION port of the TECI box.

Suggestions regarding what the display should show are most welcome.



A cross track indicator is connected

Check this box if you want to send data to the LCD display, uncheck it if you do not use the display anymore.

TEST

If a GPS is not connected but you have a TECI, press this button to simulate a flight and send the data to the display.

Config menu.

Note: Clicking these menus will add or remove the check marks in front of the menus.

Show cross track in nautical miles: Check this if you want the cross track in decimal nautical miles instead of meters (below 1 mile)

Reverse direction of indicator: Check this if you prefer that the indicator works the other way.

Set the cross track range: You can select here the width of the cross track display, therefore its sensitivity. 1 unit = 1 black rectangle. There are 20 rectangles, so if you choose unit = 20, the width of the cross track will be 400 meters.

NO RUN SELECTED

N	O	R	U	N		M	T	R	K	=	0	9	0	.	0

Current magnetic track as reported by the GPS.

RUN SELECTED, APPROACHING

C	0	7	2	.	4		T	0	3	3	.	9	3	8	.	5	>	
													<	1	1	4	5	m
F	I	R	S	T		2	.	3	n	m		0	0	:	5	4		

Magnetic course (C) of the selected run.

Current magnetic track (T) as reported by the GPS.

Difference between the required course and the track. In this case, turning right 38.5 degrees will parallel the run.

Actual cross track error (meter = 1 yard) and side indicator. In this case the plane is 1145 meters to the right of the line.

When the cross track exceeds 1852 meters, it is displayed in nautical miles.

Distance and time to first photo (beginning of the run): In this case 2.3 nautical miles and 54 seconds.

ON LINE

C	0	7	2	.	4		T	0	7	0	.	6	1	.	8	>	
>	>	>	>	>	>												
L	A	S	T		6	1	3	m		0	0	:	0	8			

Same line as in approach mode.

Cross track indicator. The bar represents the on track position. Black square represents the distance off track.

Photo indicator. The line fills up until the photo is fired.

Distance and time to the last photo (end of the run): In this case 613 meters (yards) and 8 seconds.

50 - RMK TOP FILM ANNOTATION

Last updated 26 April 2000

This function is still in beta stage. Please report any problem.

Note: Tracker uses indifferently the words annotation (Zeiss) or film margin (Leica) to describe the data exposed on film by the camera.

OVERVIEW OF THE DATA ANNOTATION SYSTEM

The system was designed to provide maximum flexibility and ease of use:

- There is no special action to be taken to print the margin on the film, the system automatically communicates with the camera and instructs it to print the margin text.
- The text of the margin can contain plain text as well as data fields that are linked to the database. The value of these fields is automatically filled by the system.
- Different margin layouts can be prepared in advance with the help of the margin editor and selected at will before or during the flight.
- A standard default margin can be prepared once and for all. **snapSHOT** will automatically use the default margin if no other choice was made.
- All the variable parameters such as project name, time, run numbers, altitude, positions, etc, are automatically updated by **snapSHOT** when necessary.

PRESENTATION

This function allows the user to prepare the annotation formats used by the RMK TOP to expose data on the film. The camera can expose its own internal data such as the shutter speed as well as external data generated by a third party system such as the snapSHOT. The camera requires pre-defined format layouts that can be prepared either by the TTL or with some restriction by snapSHOT. The camera will only accept external data if the corresponding format layout was activated via the TTL computer.

LIMITATIONS

The TOP data annotation system was designed to work well with the TTL computer but lacks flexibility when used in conjunction with the TRACKER. Because the system uses predetermined positions for each data field, it is difficult to take full advantage of a powerful computerized system such as TRACKER. With other cameras such as the Leica RC30, the user can make changes to the margin annotation during the flight in a few seconds. But with the TOP camera, be warned that if the annotation format snapSHOT is sending is not exactly the one expected by the TTL, you will receive an error from the TTL each time you trigger a photo! To circumvent this problem, we have created a special mode (Free line method) that emulates the way snapSHOT works with the Leica RC30. This method allows the user to create a "fit all" default annotation string that does not require making changes in the TTL.

METHODS

The Tracker software allows the user to prepare interactively the data annotation in 3 different ways:

1. Free line method
2. External data method
3. FMT file method.

OVERVIEW OF FREE LINE METHOD (OR ONE LINE METHOD)

TRACKER allows preparing a "universal" format that works for all flight plans and does not require changing the format file in the TTL. With this method the camera internal data must be grouped together on one line and the snapSHOT external data on the other. We recommend using this format as this will simplify the operation of the camera and will allow you to change the data annotation on the fly without fuss directly from snapSHOT without editing the TTL, even during a photo line! The only restriction is that the total length of the external data generated by snapSHOT should not exceed 48 characters.

The method works as follows: The complete annotation string generated by snapSHOT is split into 3 external data fields of each 16 characters in length.

Da = 16 characters, Db = 16 characters, Dc = 16 characters
 Da + Db + Dc = 48 characters

The corresponding external data fields are also defined in the TTL

Da = AAAAAAAAAAAAAAAAAA
 Db = BBBBBBBBBBBBBBBBBB
 Dc = CCCCCCCCCCCCCCCC

And will be displayed one after the other as one line.

AAAAAAAAAAAAAAAAAABBBBBBBBBBBBBBBBBBCCCCCCCCCCCCCCCC

Regardless of the actual length of the string, it is formatted into 3 parts of 16 characters each by adding spaces when required.

COLOR 1:5000 26/04/00 15:05:12 11400 FEET
 For example, the above annotation with 42 characters will be split as follows:

Da = COLOR 1:5000 26/
 Db = 04/00 15:05:12 1
 Dc = 1400 FEET + 7 spaces

← snapSHOT generates a list of the external data fields that you have selected and you have to copy these manually into the external data table of the TTL.

Even if the length of the string varies, the result will still be OK, for example, if the next project is called COLOR 1:60000. Just keep the actual annotation string shorter than 48 characters to allow for variation in length.

OVERVIEW OF EXTERNAL DATA METHOD

This is the method for which the TTL was actually designed to work. Unfortunately, this method requires that the data fields length is predetermined and unchanging. For example, if you want snapSHOT to send the project name, then you must absolutely make sure that the length of the project name is ALWAYS the same, otherwise you will receive an error from the TTL.

Da	LAT N55 0249	(12)
Db	LONG W001.2979	(14)
Dc	000	(3)
Dd	4232	(4)

The margins must be prepared in **snapSHOT (nor anymore in snapBASE!)**. In case the margin is prepared on a different computer than the one used during the mission, the margin will be automatically transferred along with the flight plan. The selected margin will be also automatically loaded and displayed in the camera. This allows the text of the margins to be prepared in advance in the office.

DEFINITION OF DATA FIELDS

The data fields are placeholders (or templates) which are used by **snapSHOT** to recognize where the data has to be written. A data field is represented by one character repeated several times (HHHHHH).

There are 2 types of data fields:

Fixed length, such as the date or time.

Variable length, such as the project name or film rolls number. The characters representing the variable length data fields are preceded by a @.

If you modify a data field in the editing window, it will lose its link to the database and will not work anymore.

DEFINITION OF FIELDS CAPTIONS

The data field caption is the title which proceeds the data, E.G. **JOB, TIME, FILM**, etc. You may edit the captions in the data fields caption panel. You can change the wording, the language or simply remove a caption that you do not want to display. *The captions are stored in the database and are the same for all projects.*

DEFINITION OF FREE FIELDS

Free fields are simply small strings of text which you can save to avoid retyping, E.G. **Copyright TRACK'AIR**

BEHAVIOR OF THE MARGIN

- There can be only one margin saved with each flight plan.
- ***If no margin has been saved then the system will automatically use the default margin.***
- To disable sending the margin, deselect **Tracker sends data to margin** on the camera configuration panel.

PREPARING A NEW MARGIN.

1. Select the **Equipment** menu.
2. Select your model of camera.
3. Select the **configure film annotation** menu

The TOP margin editor will be displayed. It has 8 panels: **Annotation editor, Method, Captions, Affix, Free fields, Camera configuration, Format and TTL data length**

The first panel **Annotation editor** is used to prepare, save and load the margin layouts.

The screenshot shows the 'RMK TOP film annotation interface (BETA)' with several callout boxes:

- Load or delete Margin:** Press to display the list of margin templates that you have saved.
- Clear all:** Clear the editor window.
- Undo last:** Remove the last entry.
- Apply:** Save the current margin with the flight plan
- Max 96 characters:** This is the maximum number of characters accepted by the camera.
- Preview window:** Show the text of the film margin, as it will be displayed.
- Editor window:** You can use this window as a normal text editor and type directly in it or you can paste fields from the lists or combine both actions. If you paste a data field, do not alter the actual data template, e.g. **GGGGGGGG**, which is used by the program to recognize the type of information that has to be printed. You may change or remove all other text information (see also the configuration window later in this chapter).

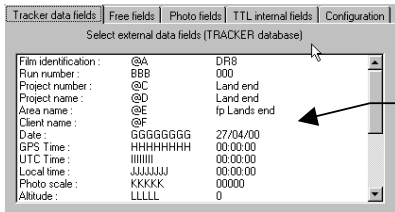
If this is the first time that the margin is used, **snapSHOT** will display a default margin in the text editor:

For example:

Area @EEEE Date DDDDDDD GPS GGGGGGGG Lat NNNNNNNN Lon EEEEEEEE Run RRR
 The @ characters represent variable length text, in this case the name of the area.
 The DDD, etc. represent fixed length text, such as the time or the date.

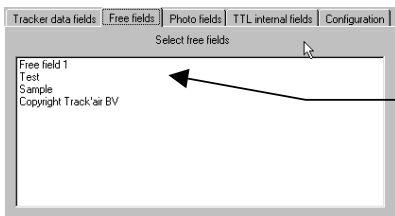
DATA FIELD PANELS

The Editor panel has several lists of data fields organized into a tab panel.

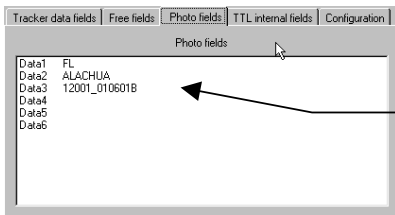


This list contains all the data available in the Tracker database. The data is automatically updated as required.

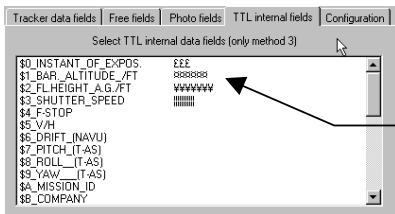
Warning. With the FMT method you must insure that all selected fields have fixed length.



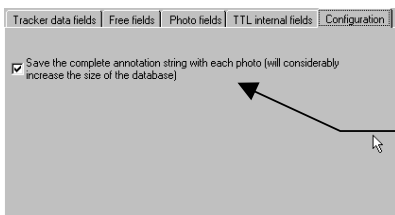
This list contains all the free data fields as they have been saved in the Tracker database. See the free fields' section to find out how to create these fields.



This list contains all the individual photo fields as they have been saved in the Tracker database by the snapXYZ. See the free photo field chapter to find out how to create these fields.



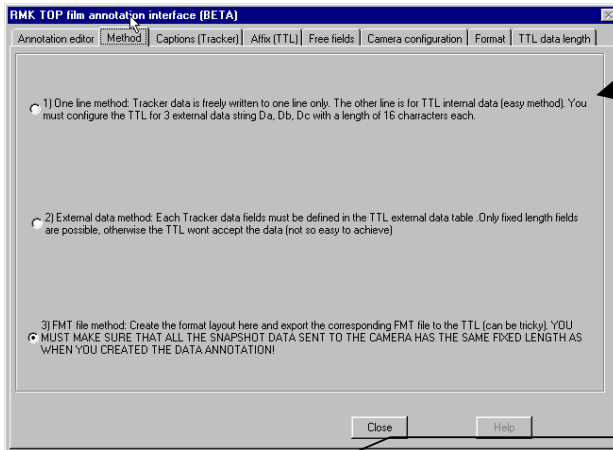
This list contains all the internal data fields of the TTL. See later in this chapter how to define the length of these fields.



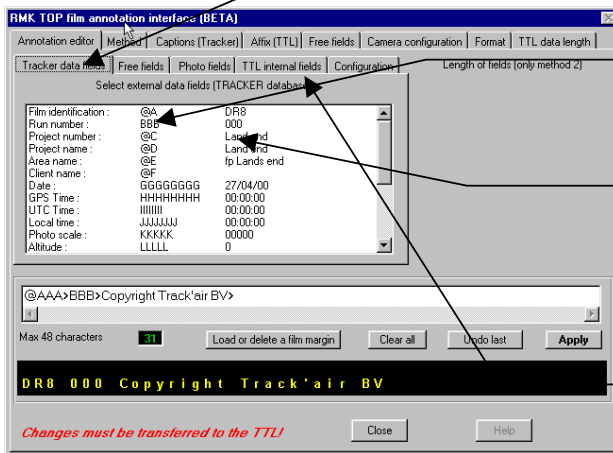
This options allows the user to save each annotation in the database each time a photo is fired. As is mentioned, the amount of data generated will be significant.

how to make a “one line” annotation string

To create a new “ONE LINE” margin layout, follow this example



Select the tab method and select 1) one line method



On the Tracker data fields list, pick the items you want to display

You can also pick item from the free fields' list (if they have been prepared)

Ignore the photo fields list unless you have saved information for each photo in snapXYZ (see the chapter printing different information for each photo)

The TTL internal data list is not available for this method.

For example, First pick the Roll number in the data field list. The editor window will show:

Roll @AAAA

Add the run number:

Roll @AAAA Run RRR

Add the Job name:

Roll @AAAA Run RRR Job @DDDDDDDD

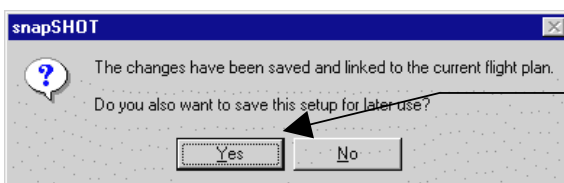
Add the time, lat, long, etc.

Roll @AAAA Run RRR Job @DDDDDDDD GPS GGGGGGGG

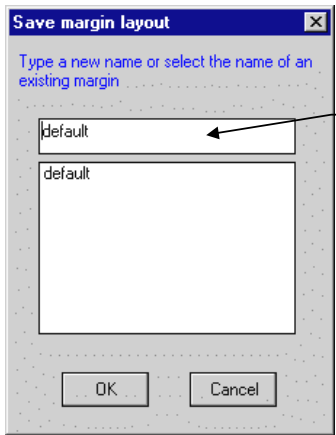
Roll @AAAA Run RRR Job @DDDDDDDD GPS GGGGGGGG Lat NNNNNNNN Lon EEEEEEEEE

You will not be allowed to exceed 48 characters.

Once the margin is complete, press the apply button to make this margin the active one. You will be prompted to save the margin for later use:



This margin is now active and saved with the current flight plan. Press **YES** if you want to save this margin layout for later use.



Type a name and press **OK**.
 Note that if you give the name default to a margin, then it will be automatically loaded if no other margin is selected such when a new flight plan is loaded.

Then close the annotation editor and start the TTL.

From now on, the annotation string will be sent by snapSHOT to the camera. You must now configure the TTL to accept the data:

Start the TTL and select Data annotation

- | | |
|----------|-------------------------------|
| 1 | System Configuration |
| 2 | Operating Modes |
| 3 | Data Annotation Format |
| 4 | Mission Parameters |
| 5 | Ground Test |
| 6 | In-flight Check |
| 7 | Photoflight |
| 8 | PC Communications |

Select the menu specify external data

- | | |
|----------|------------------------------|
| 1 | Specify external data |
| 2 | Edit format |
| 3 | Clear format |
| 4 | Display data lines |
| 5 | Save format to file |
| 6 | Load format from file |
| 7 | Delete format file |

Define the external data as follows and press ENTER to save.

<u>External data</u>	
Da	= part1
Db	= part2
Dc	= part3
Dd	=
De	=
Df	=
Dg	=

Press first the menu 3 to clear the current format, then the menu 2 Edit format

- | | |
|---|-----------------------|
| 1 | Specify external data |
| 2 | Edit format |
| 3 | Clear format |
| 4 | Display data lines |
| 5 | Save format to file |
| 6 | Load format from file |
| 7 | Delete format file |

Select the internal data fields as required but make sure all internal field are on one of the 2 lines. Then move to the end of the list to EXTERNAL DATA and set Da to length 16, Db to length 16 and Dc to length 16. Make sure that the 3 external data fields are contiguous and are occupying a complete line.

AAAAAAAAAAAAAAAABBBBBBBBBBBBBBBBBBBBCCCCCCCCCCCCCCCC
--

Press ENTER to leave the menu and check the result with the menu 4 display data line.

TIP. After setting the length of a field, DO NOT PRESS ENTER (this would kick you out of the current menu), simply press the down arrow ↓, this will move the cursor to the data annotation layout at the bottom of the screen. After adjusting the position of the field, pressing ENTER will move the cursor back to the format list and allows you to carry on.

HOW TO USE THE EXTERNAL DATA METHOD TO SEND LAT/LONG TO THE RMK TOP

OBJECTIVE

Configure snapSHOT and the TTL to send the longitude and latitude to the camera.

TTL

Prepare the data annotation as usual.

The latitude and longitude are referred to as external data by the TOP system. You must specify the external data in the external data table of the TTL: as per chapter 7.6.1. of the TOP manual. This is what the TOP manual says:

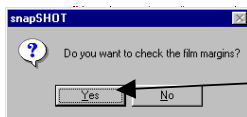
...External data can only be used for data annotation if it has been specified in the external data table. All external data must be identified by a label in the range Da .. Do, which precedes the actual information. The user must know the labels used by the external system. After entering the logical definition of the labels to be used, e.g. Da = Longitude, Db = Latitude, the data is appended to the formatting table (see 7.6.2) and become accessible for specifying the required format. Any text, including German umlauts and ß (see 6.2.4.1) up to 17 characters may be entered for the external data specification.

All external data specified here is included when saving the format to a file, even if data is not actually used in the format. The complete external data table can therefore be re-established with each format loaded from file. This capacity should be carefully used in order to not exceed the maximum of 20 data items (15 prior to TOPsoft Ver. 3.3) per format file...

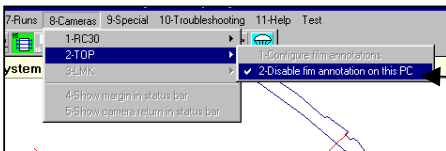
In the external data table, add the longitude and latitude. The length of the longitude sent by snapSHOT is 9 characters, the length of the latitude is 8 characters.

SNAPSHOT

Start the program.

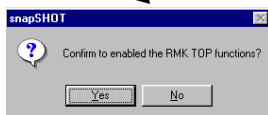


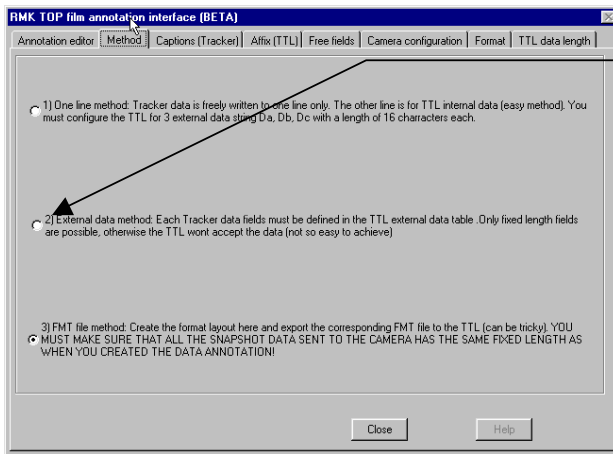
If the following dialog appears then press Yes.



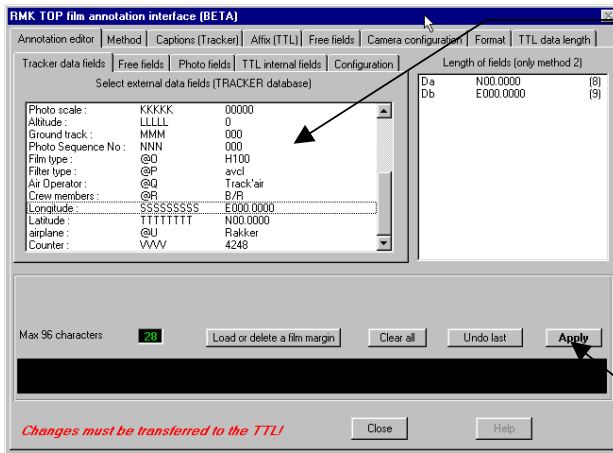
Otherwise, If the film annotation has been disabled, re-enable the film annotation by un-checking the menu **disable film annotation**, then press Yes to the above dialog box

Press Yes to re-enable the data annotation.





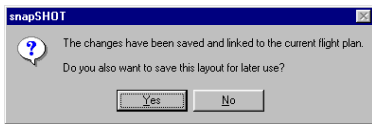
Select Method 2 External data method.



Select latitude, then longitude from the list on the left. The 2 fields will be displayed on the right list.

You can also select other data fields, free fields or photo fields (when available)

Press Apply



Press Yes and give a name to this annotation format, for example: LATLONG.

From now on, the latitude and longitude will be sent by snapSHOT to the camera. You must now configure the TTL to accept the data:

Start the TTL and select Data annotation

1	System Configuration
2	Operating Modes
▶ 3	Data Annotation Format
4	Mission Parameters
5	Ground Test
6	In-flight Check
7	Photoflight
8	PC Communications

Select the menu specify external data

▶ 1	Specify external data
2	Edit format
3	Clear format
4	Display data lines
5	Save format to file
6	Load format from file
7	Delete format file

Define the external data (snapSHOT lat and long) as follows and press ENTER to save.

	<u>External data</u>
Da	= latitude
Db	= longitude
Dc	=
Dd	=
De	=
Df	=
Dg	=

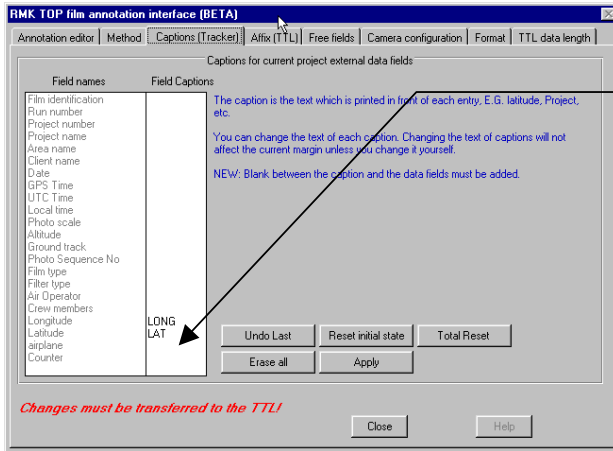
Press first the menu 3 to clear the current format, then the menu 2 Edit format

1	Specify external data
▶ 2	Edit format
3	Clear format
4	Display data lines
5	Save format to file
6	Load format from file
7	Delete format file

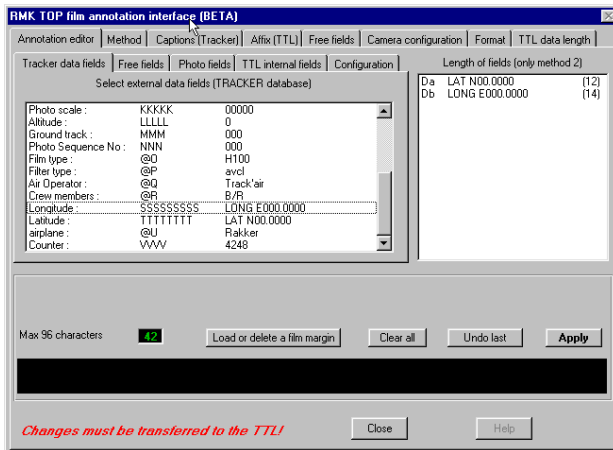
Select the internal data fields as required, to select the lat and long field, move to the end of the list to EXTERNAL DATA. Set the latitude to length 8 and the longitude to length 9.

TIP. After setting the length of a field, DO NOT PRESS ENTER (this would kick you out of the current menu), simply press the down arrow ↓, this will move the cursor to the data annotation layout at the bottom of the screen. After adjusting the position of the field, pressing ENTER will move the cursor back to the format list and allows you to carry on.

Note: It is not possible to add an affix to external data via the TTL. If you wish to display a caption such as LAT or LONG before the actual latitude and longitude, this must be done in snapSHOT as follows:



Type the caption you want to add. Add also a space at the end if you want a space between the caption and the data field.



Clear the annotation and reselect the latitude and longitude from the left list. Note that the lengths of the field Da and Db now includes the captions.

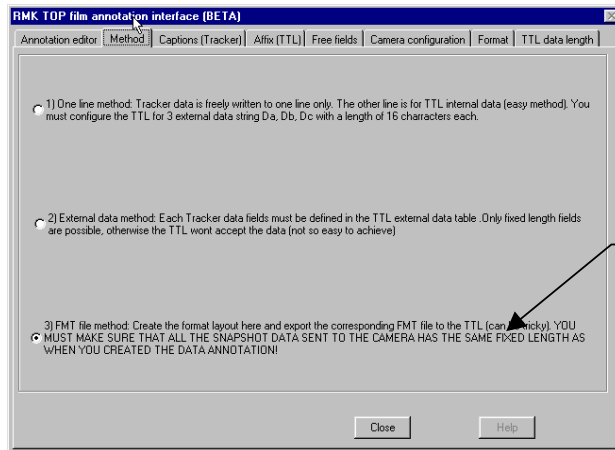
THESE LENGTHS MUST NOW BE MANUALLY TRANSFERRED TO THE TTL!

HOW TO CREATE FMT FILES

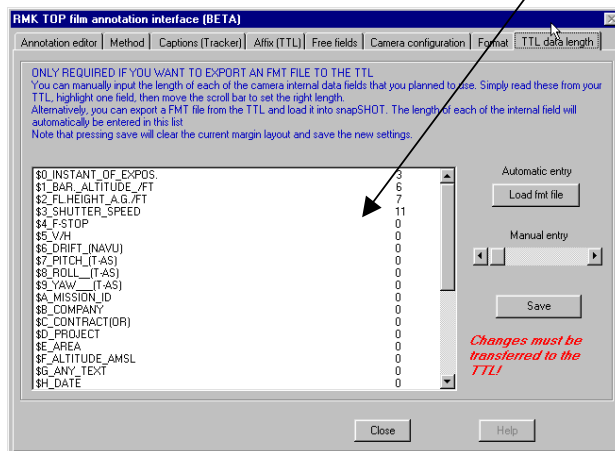
You can use an FMT file to export the annotation format from snapSHOT to the TTL.

Warnings

- You have to use the Zeiss communication software to upload the FMT file to the TTL. Please refer to your camera manual. This procedure is not explained here.
- All changes must be concurrently made in snapSHOT and in the TTL.
- All data field selected in snapSHOT MUST have a fixed length.



Select the FMT file method.



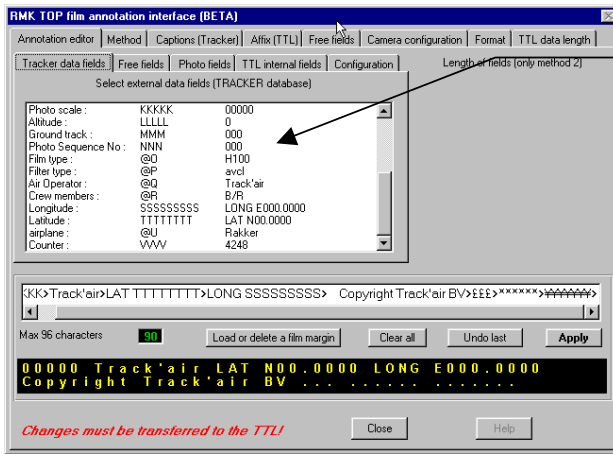
If you plan to use any of the internal data fields defined in the TTL, you must specify here what is the length of each field.

You can do that manually by copying the TTL or you export from the TTL a FMT file containing the required field and import this file into snapSHOT. This will automatically filled the length of the fields.

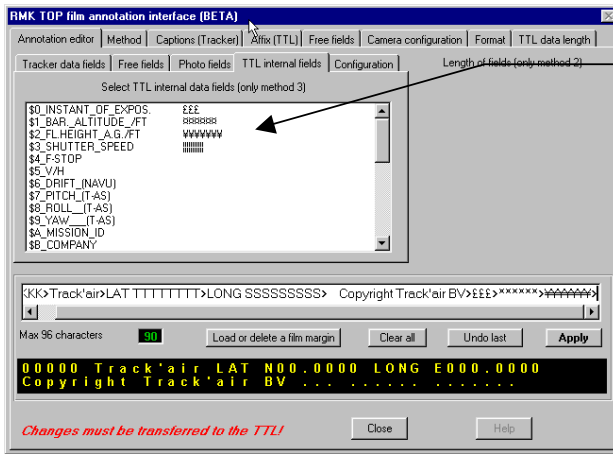
Changing the length of the fields in the TTL obliges you to change the entire annotation formats that have been saved in snapSHOT.

Once the length of the TTL internal data fields has been entered in the TTL data length tab, you can prepare the 2 lines annotation string:

As required, select external data fields from the top left list, free fields from the bottom left list or TTL internal data fields from the right list.



Only select external data for which you are sure that the length will not change!
For example, the name of the project will vary in length if you do not take care to use names having always the same length.



TTL internal fields are all shown but only the ones that display a placeholder on the right can be selected.

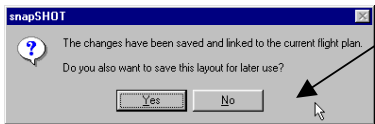
The upper window displays the formatted margin with the placeholders.



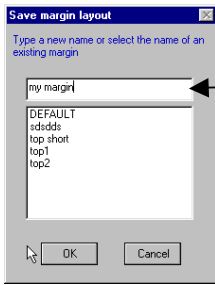
The lower window displays the margin as it will be displayed, using sample data. The dots represent the TTL internal data fields that snapSHOT cannot display because they are not known. The camera will replace these dots by the corresponding data fields.



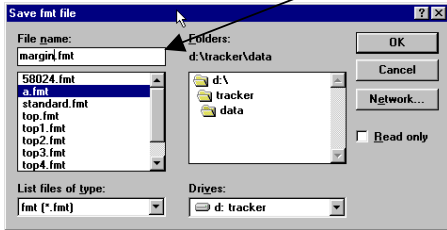
Once the string is complete, press Apply



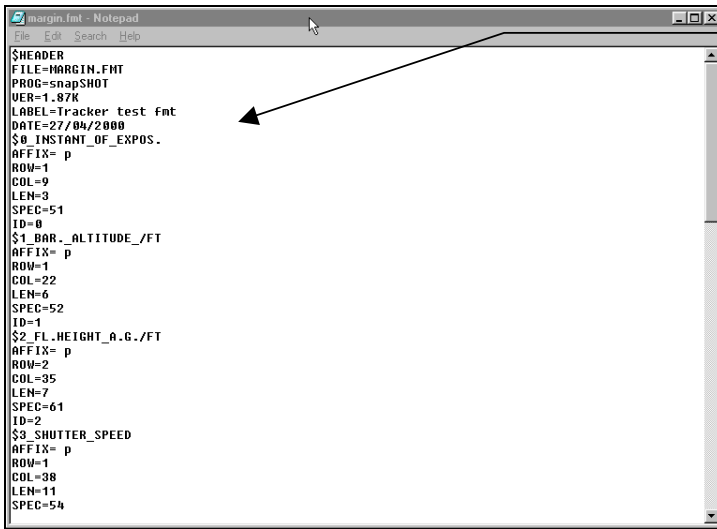
Press Yes to save this format so that it can be reused with other flight plans.



Give it a name to the annotation format and press OK



Give it a name to the FMT file and press OK



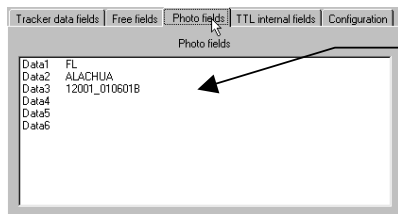
The FMT file will be displayed in notepad. You can close notepad when you are finished checking or printing the text.

The FMT file is saved in the sub folder TRACKER\DATA.

You have to use the Zeiss communication software to upload the FMT file to the TTL. Please refer to your camera manual.

HOW TO PRINT DIFFERENT ANNOTATIONS FOR EACH PHOTO FRAME

Providing information has been saved for individual photo frames (refer to the corresponding chapter in the snapXYZ manual), snapSHOT will manage the annotation string so that it is updated as required for each new photo. snapSHOT supports up to 6 different fields for each photo. The fields are named data1 to data 6. If a field is selected, snapshot will insure that the data corresponding to each photo is displayed automatically.

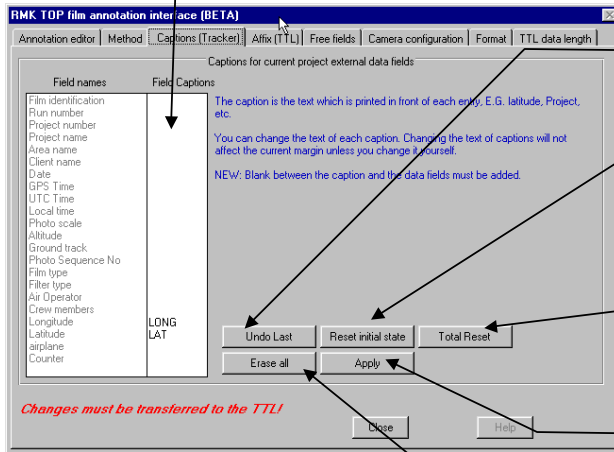


When preparing you annotation margin, select one or more photo fields.

The photo fields can be used with all the 3 methods of sending data annotation to the camera.

CAPTIONS PANEL

It is possible to change the titles that are automatically displayed in front of the external data field. You can change the text, the language or remove the titles. Type the caption you want to add. Add also a space at the end if you want a space between the caption and the data field.



Undo Last:
Undo the last action.

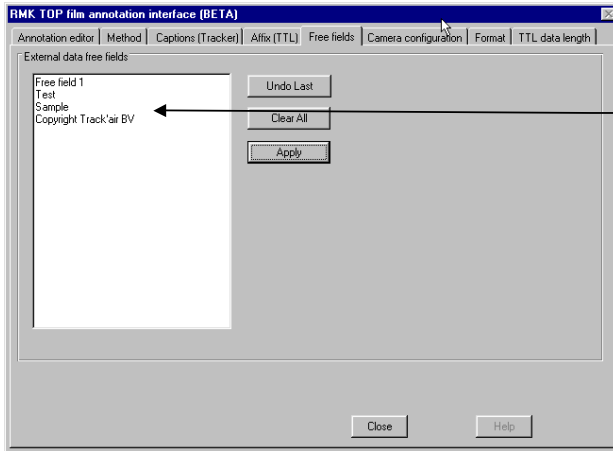
Reset initial state:
Undo all changes made in this session.

Total Reset:
Return to the original default of TRACKER (English).

Apply:
Save the changes.

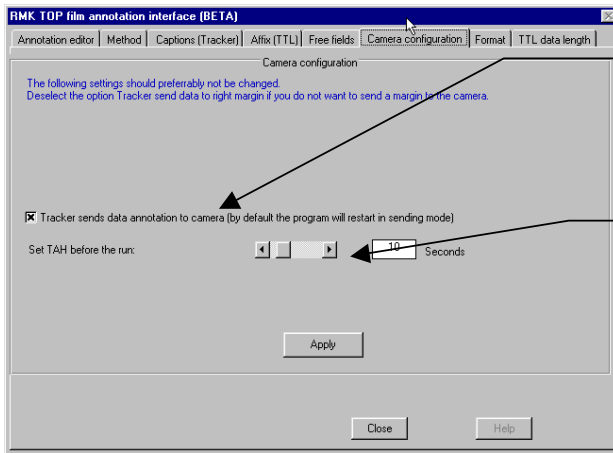
Erase all:
Clear all entries.

FREE FIELDS PANEL



Free fields.
This is a simple text editor. Place on each line a block of text that you might use at a later stage to prepare a margin.

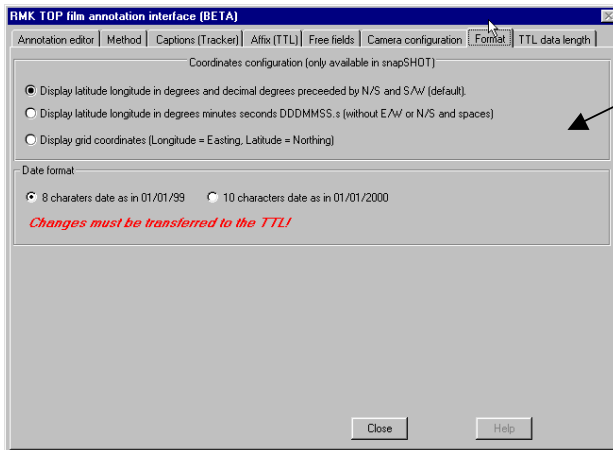
CAMERA CONFIGURATION



Use this option to temporarily suspend the sending of data to the camera.

Set here when the TAH trigger auxiliary high signal is to be sent.

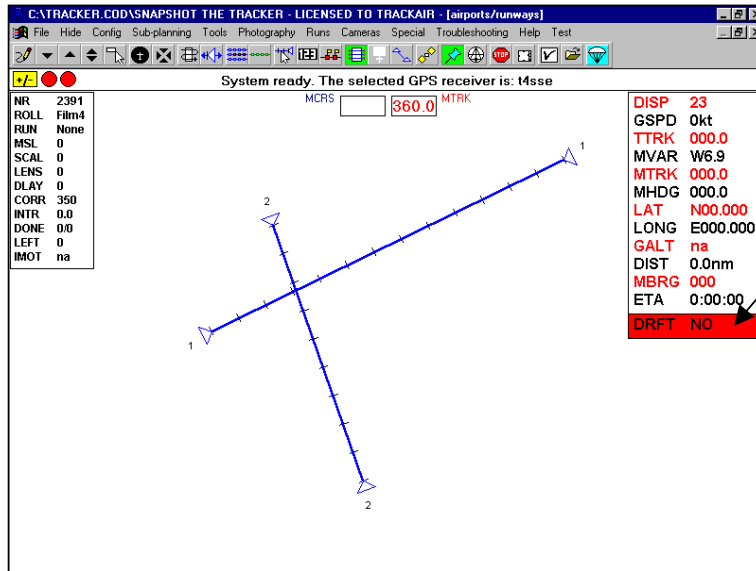
FORMAT PANEL



Use these options to change the way the coordinates and dates are displayed

51 - DRIFT (OPTION)

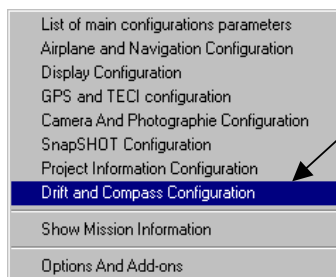
The drift option allows the user to read the current drift value from the snapSHOT screen. The option includes the COMPI hardware interface to the airplane compass system and the software drift option. The drift option can be completed by further options which allows the snapSHOT to interface with the camera mount to automatically turn it at the right angle.



When the drift option is active, the display shows an additional drift box below the navigation panel. When the drift is not valid, the box background is RED.

COMPASS DEVIATIONS

The first time the system is used and after every compass calibration, it is necessary to copy the compass deviation table in snapSHOT.



Open the menu CONFIG and DRIFT AND COMPASS CALIBRATION.

The screenshot shows the 'Compass configuration' dialog box with the following sections and callouts:

- Aircraft compass deviation table (30 degrees interval):** A list box containing:

For heading 360	Steer 360
For heading 030	Steer 030
For heading 060	Steer 060
For heading 090	Steer 090
For heading 120	Steer 120
For heading 150	Steer 150
For heading 180	Steer 180

 A callout box points to this list: "Simply copy the deviation table in this text box."
- Drift software configuration (do not change):**
 - Maximum deviation from run (1-5 deg): 4
 - Maximum drift spread (1.0-3.0 deg): 2
 - Drift averaging (5-120): 20
 - Offset from compass (+/- 180 degs): 0.0
 A callout box points to these four settings: "Do not change these 4 settings unless you are told to do so."
- Drift rounding options:**
 - Do not round drift
 - Round drift to nearest 1/2 degree
 - Round drift to nearest 1 degree
 A callout box points to these options: "You can change here how the drift should be displayed:
Not rounded = with one decimal.
Rounded to 1/2 degree = 5, 5.5, 6, 6.5, etc..
Rounded to 1 degree = 5,6,7,8, etc."

Buttons at the bottom: Close, Apply, Help. A 'Reset all dev's to zero' button is also present in the deviation table section.

OPERATION

There is no special action to be taken. The system will automatically activate the drift interface. One can see that the compass is transmitting data if the heading is displayed in the right hand navigation panel after MHDG (Magnetic heading). If the MHDG = 999, then the system does not receive heading data.

The drift is only computed when a run is selected and when the airplane is established within the strip width, flying approximately parallel to the run direction. By default it should take approximately 5 to 10 seconds to get a valid drift.

RED, GREEN, YELLOW BACKGROUND

- When the drift is valid, the background color of the drift box becomes green.
- If any of the conditions are changing (airspeed, track, wind, etc.), the background color will become yellow and still display the previous valid drift. This does not mean that the drift is not valid, only that the conditions are changing and that a new drift will be computed when the conditions are stable again. The new drift could be the same as the previous one.
- In all other cases, the background will turn to red and the drift value will be 0. This does not mean that the drift is ZERO but that drift is NOT available at this moment.

52 - AUTOMATIC IN-FLIGHT PLANNING (OPTION)

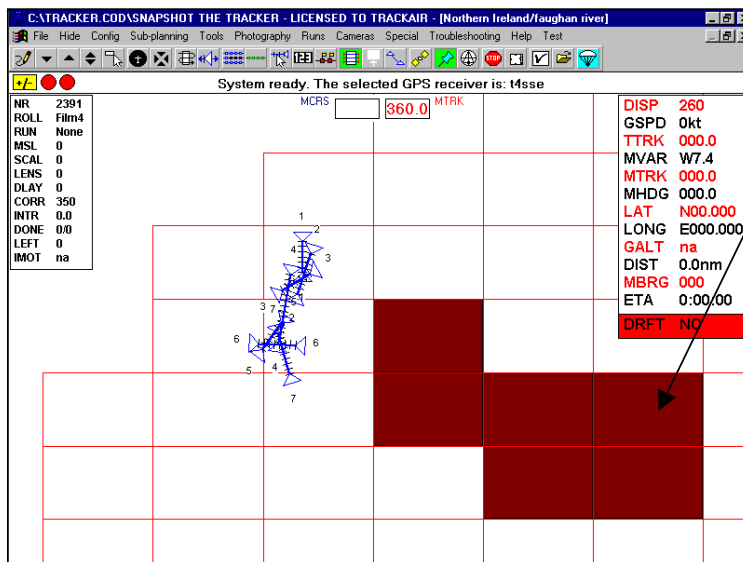
The automatic planning was developed for the Northern Ireland Ordnance Survey. The concept can be extended to other users, please contact Track'air if such a feature would be of interest to your organization.

OVERVIEW

The system only applies to 10,000 map sheets revision planning. It automatically generates parallel runs and cross strips. This feature allows the user to create a new flight area during the flight and to automatically generate the corresponding flight plan. This gives the possibility to work exactly where a weather window is available.

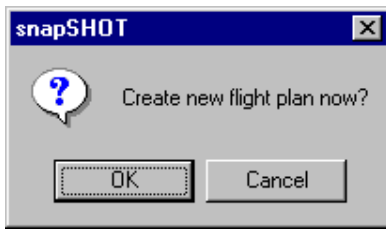
OPERATION

While the airplane is flying in Northern Ireland and the crew finds a suitable weather area which could be flown, click the menus SPECIAL, then OSNI (1 time). This will display the 10,000 Sheetcut background (if it was not displayed before).



Click the sheets which should be flown with the RIGHT mouse button. Only select adjacent sheets, do not attempt to create separate areas. A maximum of 12 sheets can be selected. If your flight plan is larger, use the snapPLAN program.

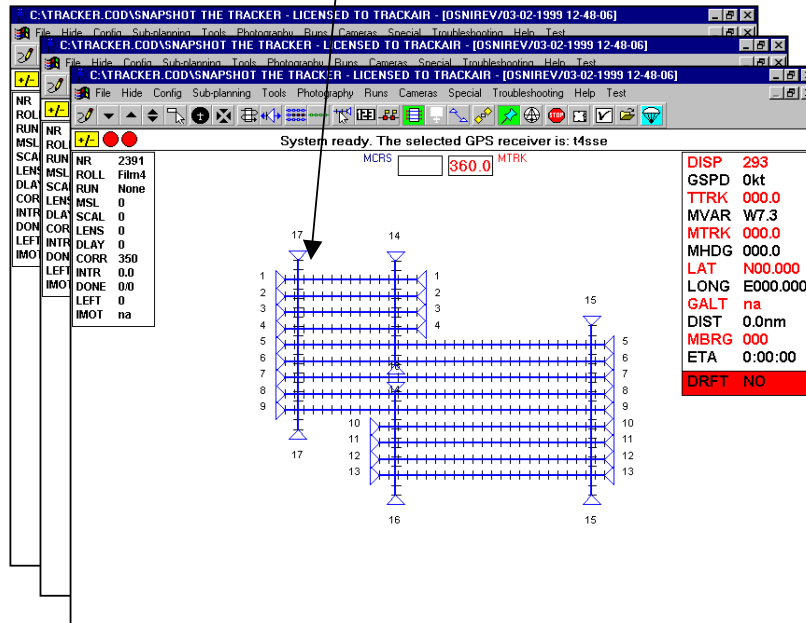
The LEFT mouse button can be used to pan and move the drawing.



When finished, click a second time the menus SPECIAL then OSNI.
 When this message box is displayed, press OK, then WAIT until the flight plan was created and loaded in snapSHOT.

Note: During the creation of the flight plan, the screen will display several windows. Do not intervene until the flight plan is finally reloaded in snapSHOT.

The new flight plan will automatically be named with the current date and time it was created and saved in the folder OSNIREV



OSNIREV OVERVIEW FLIGHT PLAN

To simplify the management of the project, all photos made on any flight plan belonging to the OSNIREV project will also be automatically copied to a general flight plan overview call OSNIREV. For the system to operate properly, the project OSNIREV and flight plan OSNIREV must be present in the database.

Note: The OSNIREV flight plan excludes the 3 sheets which are drawn on a different grid than the others. These sheets should be flown separately.

53 - MAIN TOOLBAR (NEW)

Last updated 5 April 2000



Starting with version 195, the toolbar was modified and shortened to fit in a VGA screen. To facilitate customer support over the phone, each button has a number.



6-"HIS" MODE

While in the overview mode, toggling this button will keep the small aircraft in the center of the display so that it remains always visible. In this case, the background drawings and runs will appear to be moving and the small airplane will appear to be fixed at the screen center.



7-AUTO TRACK

- When **the HIS mode is selected**, this button will activate the "all in view" function: The display will be automatically zoomed to keep the entire project within the edges of the display area. This function is not very useful with large blocks but it comes handy with large scale single runs.
- When **the HIS mode is not selected**, then this button will activate the auto-track function: When the airplane leaves the display area, the display will automatically re-center on the small plane.



8-MANUAL PRE-SELECT

Run the automatic pre-selection which allow runs to be automatically selected. Refer to the pre-selection chapter.



9-AUTOMATIC PRE-SELECT

Press this button several time to change the preselection of runs from one side to the other. Refer to the pre-selection chapter.



10-SELECT RUN FROM A LIST

Click this button to display a list of the runs from which the active run can be selected.



11-ABORT

In case a run attempt has to be aborted before the end this button must be pushed and one should wait until READY is displayed on the status bar.



12-END OF RUN SLIDERS

Press this button to move the end of run triangle markers. Refer to the sub-plan chapter.



13-INDEX

Display an index of the photographic coverage as it is when the program is started. Marked photos will also be displayed.



14-SET CAMERA COUNTER NUMBER OR FILM NUMBER

This is a short cut to get into the camera and film number dialogue box to set the film number of camera counter number.

**15-MARK PHOTOS**

When this button is pressed, the photo positions are colored in red so that they can be easily distinguished from other photos. Marked photos are saved so that they can be found later, for example if they need to be repeated.

**16-OVERVIEW MODE**

This is the default display showing all the runs. You must return to this display to select runs, use the sliders, etc.

**17-TRACK-UP MODE**

When on line, switch to this mode to rotate the run so that the small plane appears to move upward on the laptop display.

**18-FERRY MODE**

Use this mode as a large scale map to travel to and from the photo site.

**19-OPEN SERIAL PORT**

Toggle this button to connect the laptop to the TECI external interface box via a serial port or to see the small airplane during a simulation.

**20-AUTOMATIC TRIGGERRING ON (PINPOINT MODE)**

This is the default. In this mode snapSHOT automatically triggers the camera via the TECI box. If this button is toggled up then the system becomes passive and expects the camera to be triggered on its own.

**21-AUTOMATIC TRIGGERRING OFF (MANUAL OVERLAP MODE)**

Pressing this button allows the camera to be operated on its own via the overlap regulator. In this case, the photo positions are also being recorded.

**22-SINGLE SHOT**

Press this button to trigger a single shot.

**23-SELECT NEW PROJECT OR FLIGHT PLAN**

Press this button to leave the current flight plan and return directly to the project selection dialogue box.

54 - CHAINING RUNS AND STRIPS


Last updated 5 April 2000

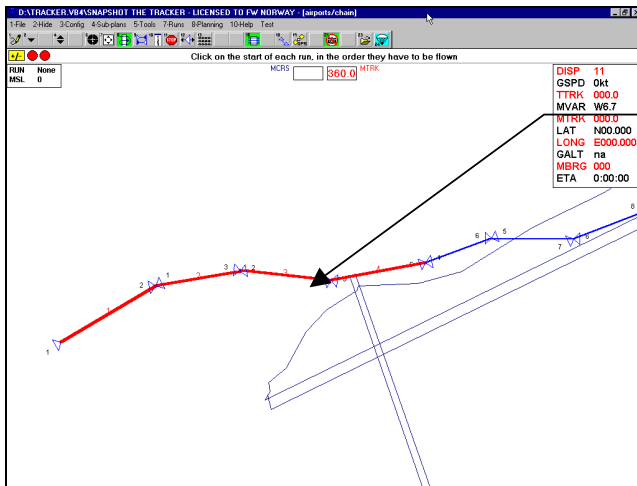
Starting with version 195, it is possible to “chain” several runs and fly them one after the other. This function is temporarily restricted to line scanner flight plan but will be extended to photography as well.

If your flight was prepared with the line scanner option, then click the menu chain the runs one after the other (the menu will become checked).

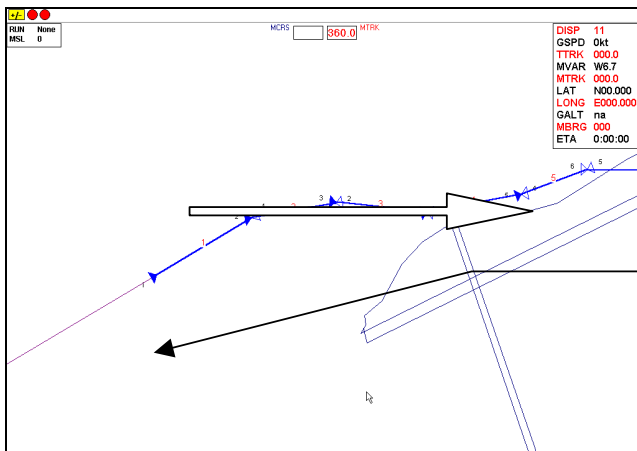
- 1-Select a run from the run list
- 2-Deactivate currently selected run
- 3-Preselect all the runs
- 4-Cancel the preselection
- 5-Alternate selection
- 6-Chain the runs one after the other

Once this menu has been checked, if one uses the preselection functions, then the runs will become selected one after the other and the system will remain in the trackup mode, allowing to fly directly to the next run.


To preselect the order you want to fly the runs you can press the manual selection button  and click each run in the order they must be flown. It is not important which side of the run is clicked, the system will automatically work out the side of the run which must be flown first so that all runs are flown one after each other.

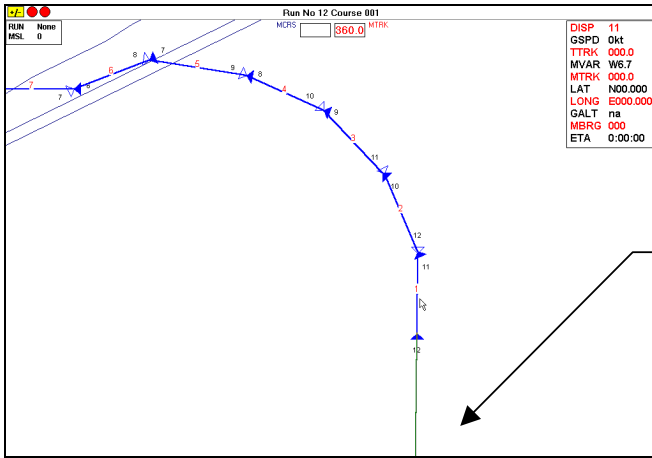


Click each run one after the other until all runs have been clicked or press the RIGHT mouse button to interrupt the selection.



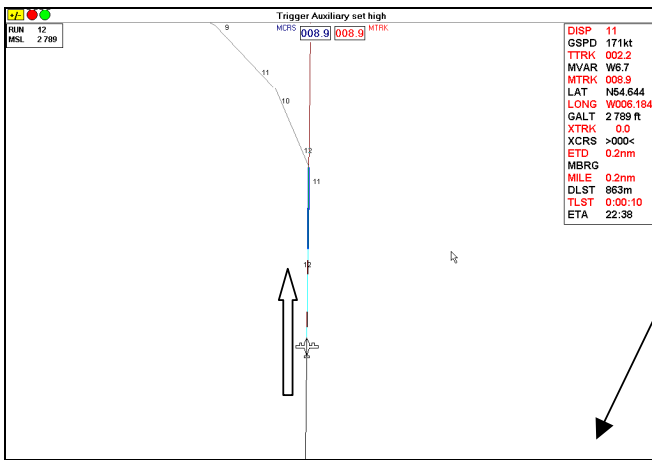
All the runs that have been clicked will be selected in the right order and so that they can be flown consecutively. The first run selected has a purple leader on its beginning side.

Alternatively it is possible to click the automatic preselection button . All runs will automatically preselected from one side. To select all the runs starting at the other side, click the button again, to deselect click the button a third time.



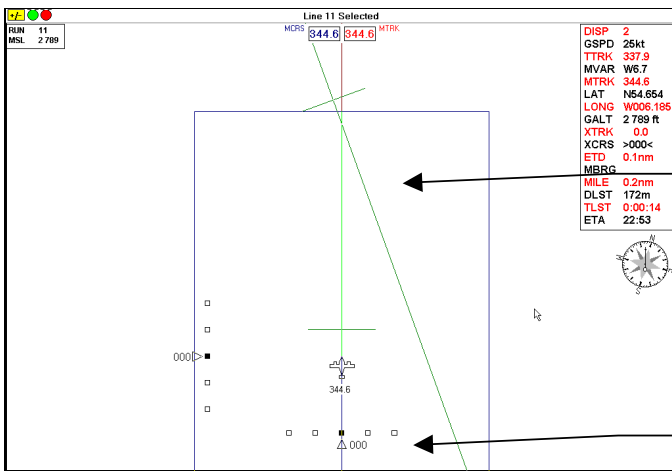
Here, the runs are selected from the other side. To start, select the first run in the planned direction. Starting with version 195, the run will be highlighted (green leader) when the mouse passes on it.

To select the run, click with the RIGHT mouse button when the run is highlighted. To unselected, click again with the left button and pick the deselect menu.



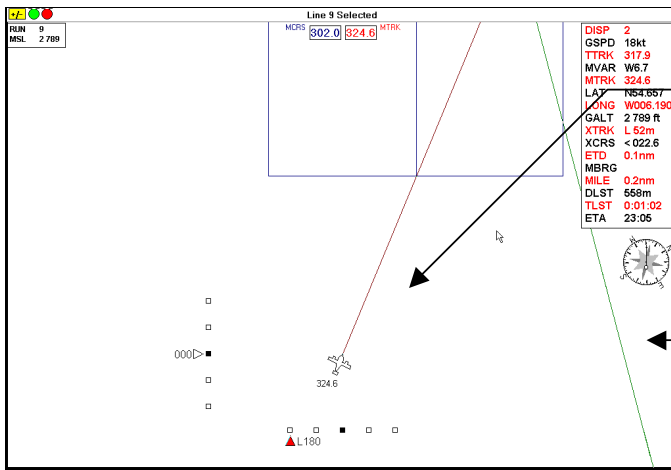
Then start the flight as usual by selecting the first run, in the planned direction.

Approach the run as usual, respecting the hot zone limitations (do not enter the line too short).




In the trackup mode, the next line is displayed in green. The short bar across represents the start of the next line

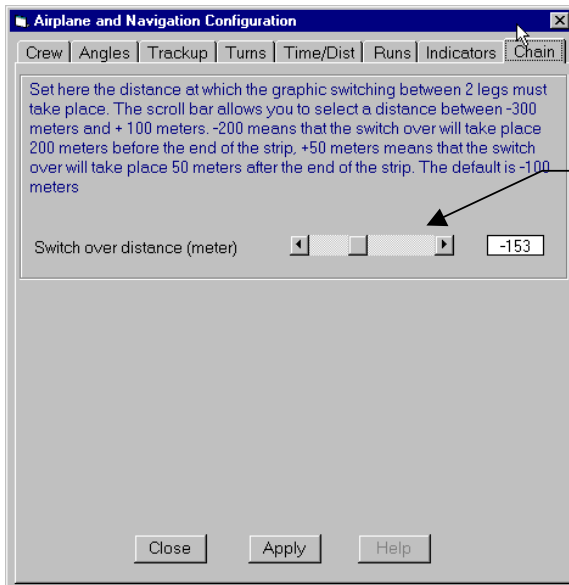
The bar across the current line represents the position at which the system will automatically switch to the next line. This distance from the end of the run is configurable. See the end of this chapter.



As soon as the plane crosses the horizontal bar, the next line is automatically activated.

This is the track of the next line.

To abort, press the STOP button , otherwise carry on until all lines have been flown.

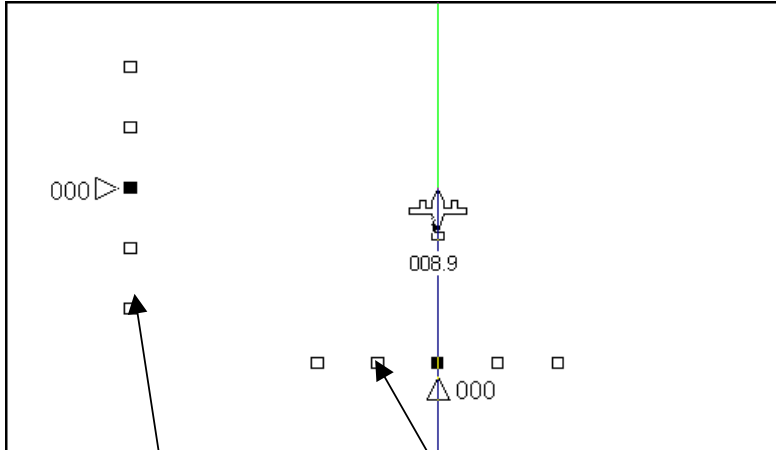


To set the distance, at which the switch over between strips will take place, open the airplane and navigation configuration menu, select the tab Chain and set the distance.

55 - DEVIATION INDICATORS

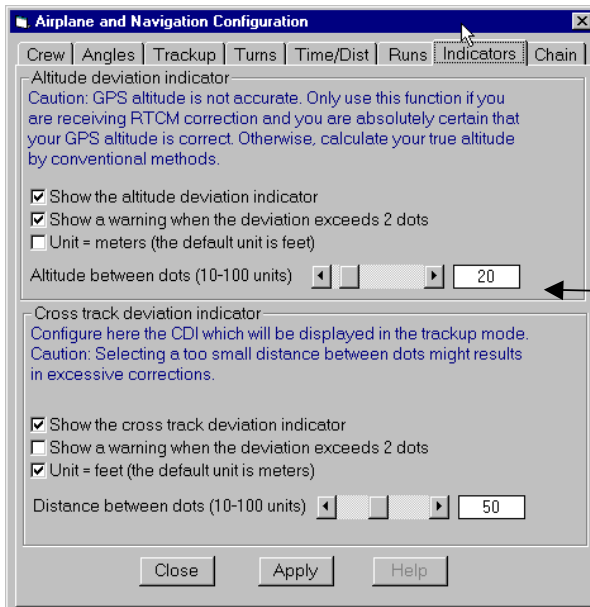
Last updated 5 April 2000

Starting with version 195, 2 deviation indicators have been added. A CDI cross track deviation indicator and an altitude deviation indicator.



CDI.
The range of the indicator can be configured in the Airplane and navigation configuration.

Altitude deviation indicator.
The range of the indicator can be configured in the Airplane and navigation configuration.
Please take into consideration that non-differential GPS altitude is generally NOT accurate enough for aerial survey requirements. Use ONLY this indicator if you are receiving RTCM correction.



Show the indicator.
Select this option to hide or show the indicator.

Show a warning. A red flashing warning will be displayed in the status bar.

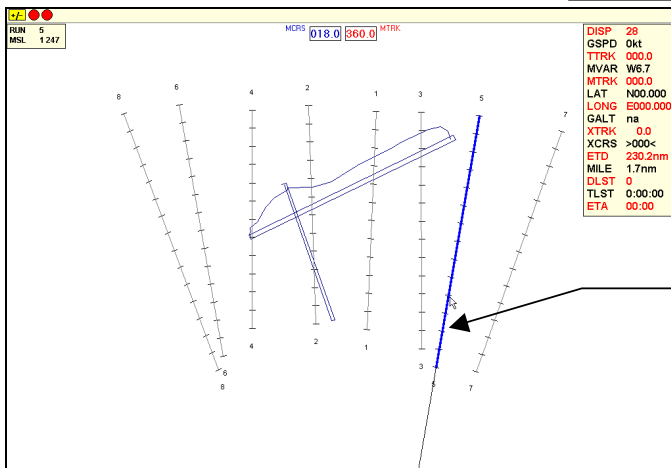
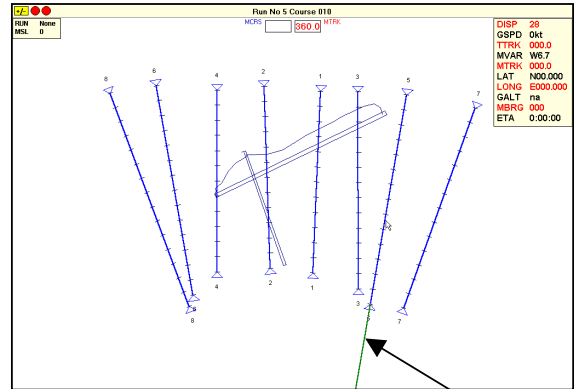
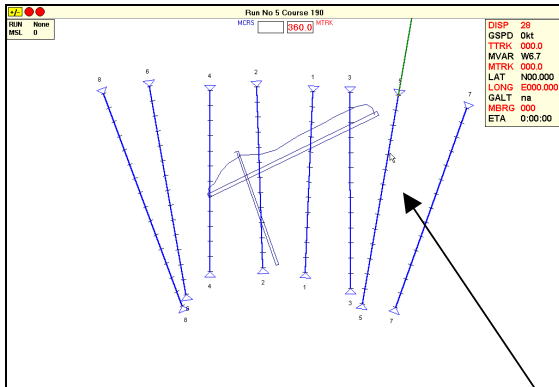
Unit: Choose between feet and meters (approx. = 1 yard)

Range: 10 to 100 meter (10 to 100 feet) between each dot.

56 - SELECTION OF RUNS (NEW)

Last updated 5 April 2000

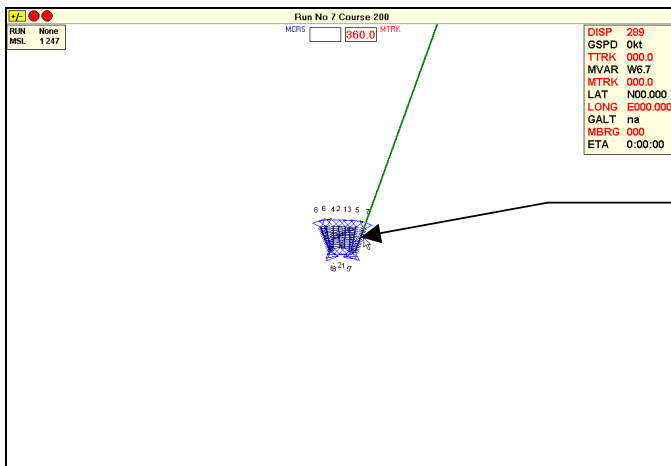
Starting with version 195, the selection of run in snapSHOT has been changed. The runs are now hypergraphics and will "sense" the movement of the mouse cursor. When the mouse is over a run, the run is automatically highlighted and the run number and direction are shown in the information bar.



Moving the pointer toward one end of the run will highlight this end.

Moving the pointer toward the other end of the run will highlight this end.

To select the run, simply click with RIGHT mouse button when the required run is highlighted.
To unselected, click the run again and hit the deselect menu.



As the run number and direction is displayed in the info bar, it possible to select a run without having to zoom in.

57 - WARNING: GPS RECEIVERS AND WGS84 ISSUE**WARNING:**

- . ALWAYS CONFIGURE YOUR GPS TO SEND COORDINATES BASED ON THE WGS84 ELLIPSOID.**
- . SNAPSHOT EXPECTS TO RECEIVE GPS COORDINATES IN WGS84 ONLY!**
- . SOME GPS RECEIVER ARE ABLE TO OUPUT COORDINATES BASED ON LOCAL ELIPSOIDS, USING THESE ELIPSOIDS WILL RESULT IN A SHIFTED PHOTO FLIGHT!**

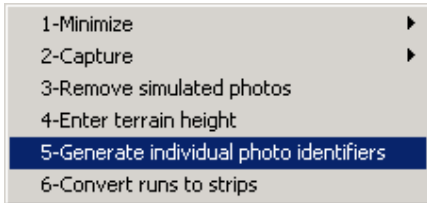
58 - PHOTO IDENTIFIERS

Last updated 11 February 2002

Photo-identifiers are free text fields that can be saved with each photo (**this feature is ONLY useful for cameras that can print data annotation information on the film**). This allows you to attach any kind of text to a photo and to let snapSHOT print it on film when the photo is taken.

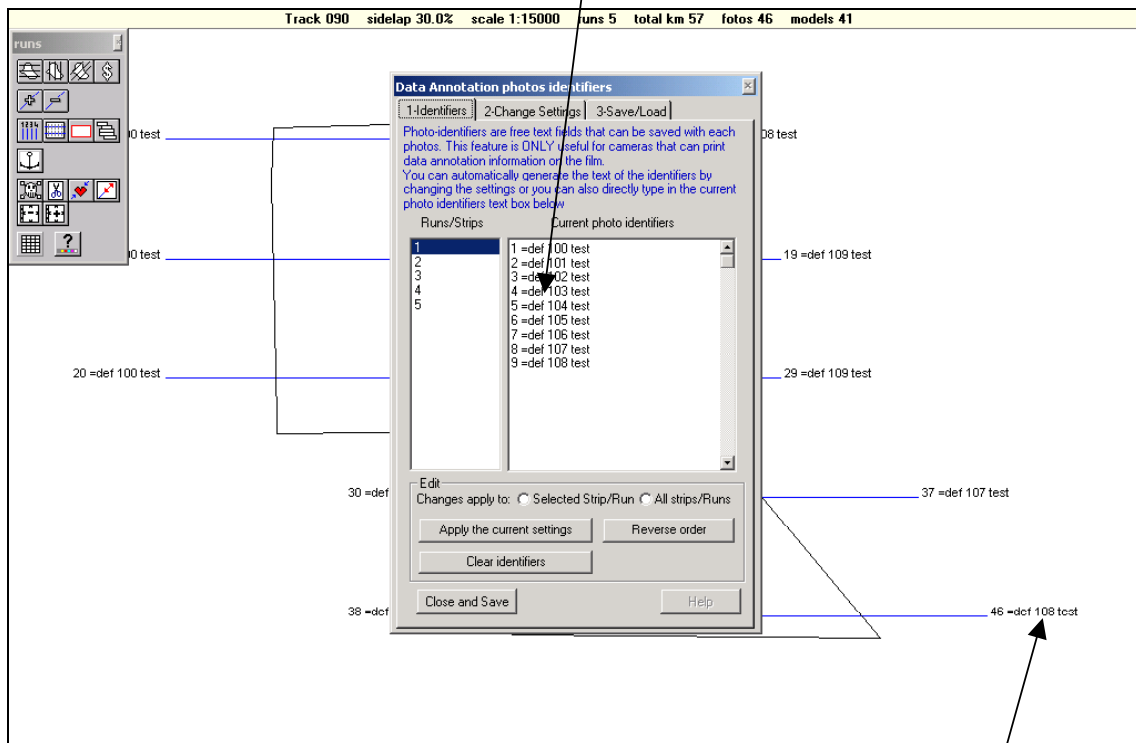
You can automatically generate the text of the identifiers by changing some settings or you can also manually type the text you want.

Make the flight plan before opening the identifier menu from the 5-tools menu.



The following form will be displayed:

Each photo of each run or strip will be allocated an identifier based on the current default layout.



“def 108 test” is the identifier associated with photo No 46. In this sample layout, the photo numbering starts at 100, the photo number is preceded by def and followed by test.

If the default is the appropriate, simply close the form and the identifiers will be saved with the flight plan. If you want an other default or layout, proceed as follows:

The image shows two screenshots of the 'Data Annotation photos identifiers' dialog box. The first screenshot shows the 'Change Settings' tab with various options for photo numbering and text formatting. The second screenshot shows the 'Save/Load' tab with a list of runs and their corresponding identifiers, along with buttons to apply, reverse, or clear settings.

Here is the name of the setting layout currently in use.

Select if you want the photo number. In this case select if you want to have the numbers sequentially (1, 2, 3, 4, etc) or if you want to restart the numbering for each run

Select at which number you want the numbering to start and if the number should be padded with leading zeros, i.e. 0025

Select if you want the run number to be displayed in front of the photo number and if this number should be padded with leading zeros, i.e. 013

You can type here any character string that should be added in front of behind the photo number. Spaces will be respected.

Here is a preview of what the identifier will look like. Press Apply when finished to secure the changes. If you wish to keep this layout for future use, you have to go to page 3-Load/Save. Otherwise you can simply return to the first page and apply your changes to the current flight plan.

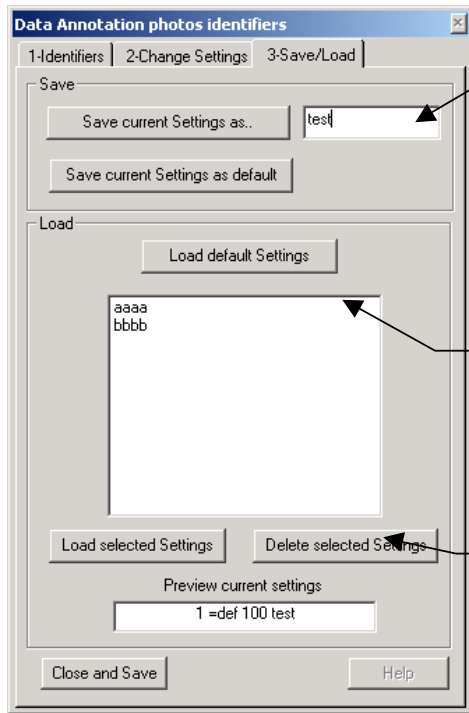
Choose here whether the changes you made on page 2 apply to the selected run or if all runs are to be affected. Then press Apply the current settings to trigger the changes.

Reverse order allows you to reverse the order the photos are numbered

This feature is used to remove all or part of the identifiers from a flight plan.

Closing this form will automatically assign each identifiers with the corresponding photo. When you save the flight plan, all the identifiers will be saved and will become available in snapSHOT.

If you want to save the settings for an other time, go to page 3-Load/Save



Give here a name to your layout and press the button Save as..
If you wish to save the layout as the default (automatically loaded when the form is open), press save as default.
You can save as many layout as you wish.

To reload the current default, click Load default Settings
To reload a layout that was previously saved, select it from the list and press Load selected setting.
A preview of the selected settings is displayed below.

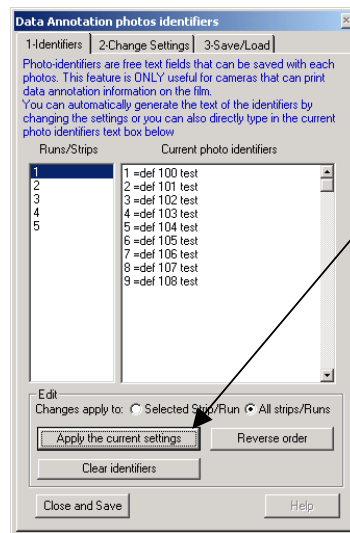
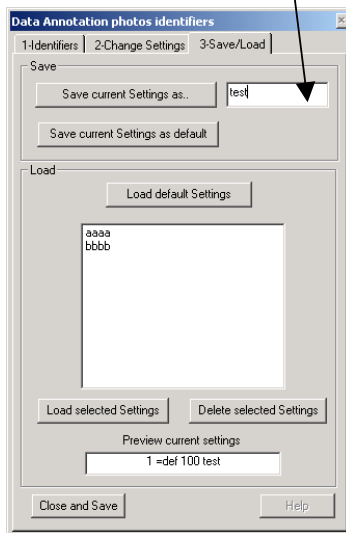
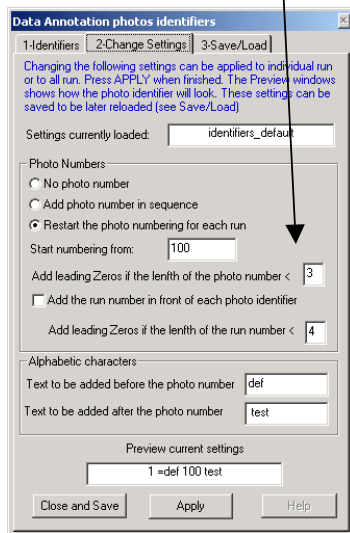
To delete a layout that was previously saved, select it from the list and press Delete selected setting. If the current is deleted, then the default will automatically be loaded.

To sum up

1) Define your settings in page 2 and press **Apply** to save them as current settings

2) If required, use page 3 to save your settings as default or as something else

3) Press **Apply current settings** to apply the current setting to either a single run or to all



59 - RMK TOP TTL CONFIGURATION

Last updated 12 June 2002

- 1) Start the camera

```

Camera (15) not operational:
- Switch OFF T-CU or main power,
- Check error situation:
#1: T-CU switched OFF/ not connected
#2: T-CU switched OFF/ not connected
After all checks, switch ON the T-CU.

Press any key to continue, or >Quit<
  
```

- 2) Select system configuration

```

▶ 1 System Configuration
  2 Operating Modes
  3 Data Annotation Format
  4 Mission Parameters
  5 Ground Test
  6 In-flight Check
  7 Photo Flight
  8 PC Communications
                                Quit ↓
  
```

- 3) Select External interface

```

# System Configuration
1 Non-standard filters RMK TOP 15
2 Non-standard filters RMK TOP 30
3 Film data reference table
▶ 4 External interface
5 Date format
6 Test procedures and calibration
7 Language
                                Quit ↓
  
```

- 4) Configure as follow (RS232 must be selected)

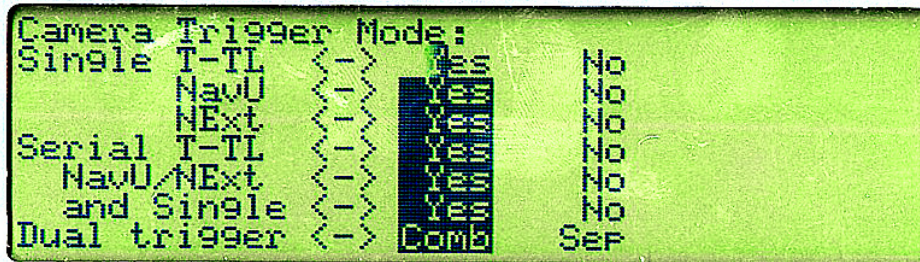
```

Set External Interface:
Interface type <-> None  RS232  ARINC  GP
ARINC type      <-> 419   429
Baud rate       <-> 9600  4800  2400  120
Parity          <-> Even  Odd
  
```

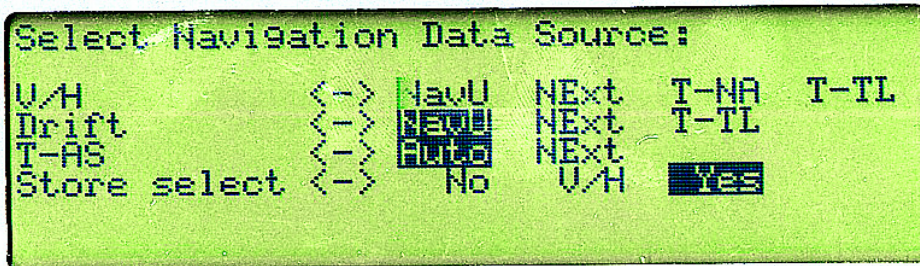
5) Select operating mode menu then select :

- 1 General operating mode**
- > 2 Camera trigger mode**
- 3 Function key mode**
- 4 Navigation data source**
- 5 Exposure profile RMK TOP 15**
- 6 Exposure profile RMK TOP 30**

6) Select Camera Trigger mode and configure as follows (Single TTL YES)



7) Select Navigation data source and configure as follows (V/H should be NavU)



60 - NOTES