ROBIN
DR400-140

aerosoft ™

CONTENTS

INTRODUCTION

The Robin DR400 is an aircraft that will be familiar to many pilots as it is one of the most used trainers. Conceived in the early 70's by Pierre Robin and Jean Délémontez. It flew for the first time in 1972 and at least 1300 were build. In any sense of the word it is a successful aircraft.

The wooden structure and the characteristic 'cranked wing' make it seem an older aircraft then is actually was actually rather modern and highly efficient. It's light and the fabric covered wings and fuselage have low drag compared to a metal aircraft with hundreds of rivets. It's also easy to fly at any speed so flight schools loved it. It can pull gliders, carry 4 persons and has proven to be very reliable.

In FSX and Prepar3D it is an ideal aircraft for beginners as you can cruise around without much hassle. But experts will like the very advanced flight characteristics that are truly highly accurate. In some of the models they are so accurate that even they idiosyncrasy of an older aircraft are included. For example the D-EVEM model that is flown by the main developer has a rather serious tendency to turn left. On most models this is countered by a trim tab but it was not on this model till very recent. So this is one model that is not easy to fly without rudder pedals. Some other models in this product are better balanced and easier to fly. But it shows how detailed the actual aircrafts are modelled.

SYSTEM REQUIREMENTS

- Windows XP, Vista, 7, 8 (fully updated)
- Microsoft Flight Simulator FSX (with SP2 or Acceleration Pack) or Prepar3D
- Dual Core CPU
- 2 GB RAM internal memory
- 512 MB graphic card
- Adobe Acrobat® Reader 8 minimal to read and print the manual ([1])

([1]) Available for free, download at: http://www.adobe.com/prodindex/acrobat/readstep.html

CREDITS

Concept:	Joachim Schweigler (specific - 3d - design)
Models/Textures:	Joachim Schweigler (specific - 3d - design)
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Flight mechanics proving:	Joachim Schweigler (specific - 3d - design)
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Manual, documentation:	Mathijs Kok (Aerosoft)
Sounds:	Joachim Schweigler (specific - 3d - design)
Installer:	Andreas Mügge (Aerosoft)
Testing:	Several good folks who will all be getting a free copy

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CONTACT SUPPORT

Support for this product is offered by Aerosoft. We prefer to have a support forum for the simple reason that it is fast and efficient because customers help customers when we are sleeping.
http://forum.aerosoft.com/index.php/forum

If you prefer email support use this: https://aerosoft.zendesk.com/anonymous_requests/new, do not forget to add screenshots if they are needed to explain the issue.

We feel strongly about support. Buying one of our products gives you the right to waste our time with questions you feel might be silly. They are not.

THE MANUALS

This English manual you are now reading should be considered the main manual. But for German users we have a complete actual manual of the D-EVEM as a separate file as well!

FLYING THE ROBIN

The Robin DR400 is an easy aircraft to fly. It's one of those aircraft that people start to love after getting acquainted with the few faults it has. It's stable, reliable and predictable. Predictable even in its 'problems', for example it has a tendency (some even a strong tendency) to want to go left. You sure learn to use the rudder in this aircraft! The engine is more than powerful enough for the 1000 Kg even though some are 35 years old. As the fuselage is made of wood it does not have rivets to cause drag and the whole aircraft is very smooth. The shape of the wing with the characteristic bend halfway helps you to stay out of problems. . In FSX this is an ideal aircraft for people who want to learn to fly better and to take some trips to scout the virtual landscape

But it is also an ideal trainer as it needs the pilot to fly it all the time, when you look around at the scenery (you have wonderful visibility in the Robin) it tends to wonder off, no matter how much you trim, it will always find one direction it wants to go for some reason. So while it may not be the ideal aircraft for long distance travel it will get you to where you want to do without trying to kill you the way some aircraft seem to want to do. Keep your energy up, stay ahead of the aircraft and you'll be fine.

There is one thing you should not do however and that's slip while pulling the nose up. The fuselage will block airflow over the most effective part of the wing and things can get exciting rather fast.

As said flying the Robin is not hard, here is a highly condensed version of the normal procedures:

- Take off from asphalt: *flaps in, full throttle, rotate around 100, take of at 120, climb at 150* (or with an even easier method: *flaps in, full throttle, rotate at 130, climb at 150*)
- Take off from grass or short take off: *flaps 1, full throttle, pull to unload the nose wheel, lift off, accelerate, climb with 130*
- Cruise flight: *RPM as needed (max 75% power), lean mixture!*
- Landing: *flaps full, aproach speed 130-140, after touch down 'plant' the nose wheel down (to unlock it).*

Some peculiarities:

- RPM indicator in the D-EVEM shows red line @ 2500. This was the actual situation when the sim model was released. It is due to noise reduction in the Netherlands (where it was registered as PH-SRW) and has nothing to do with the engines limits
- Fuel gauge reads 0 when fuel tank is 100% full. Something weird on some Robins. When fuel level sinks, the gauge begins to work.

THE ROBIN DR400 IN FSX

There are three different Robin DR400 included in this package (different cockpit layouts) and seven different liveries. You will find them all under Aircraft manufacturer Avions Pierre Robin.

There are a few settings that are very important for this project, they are shown in red in the images below:
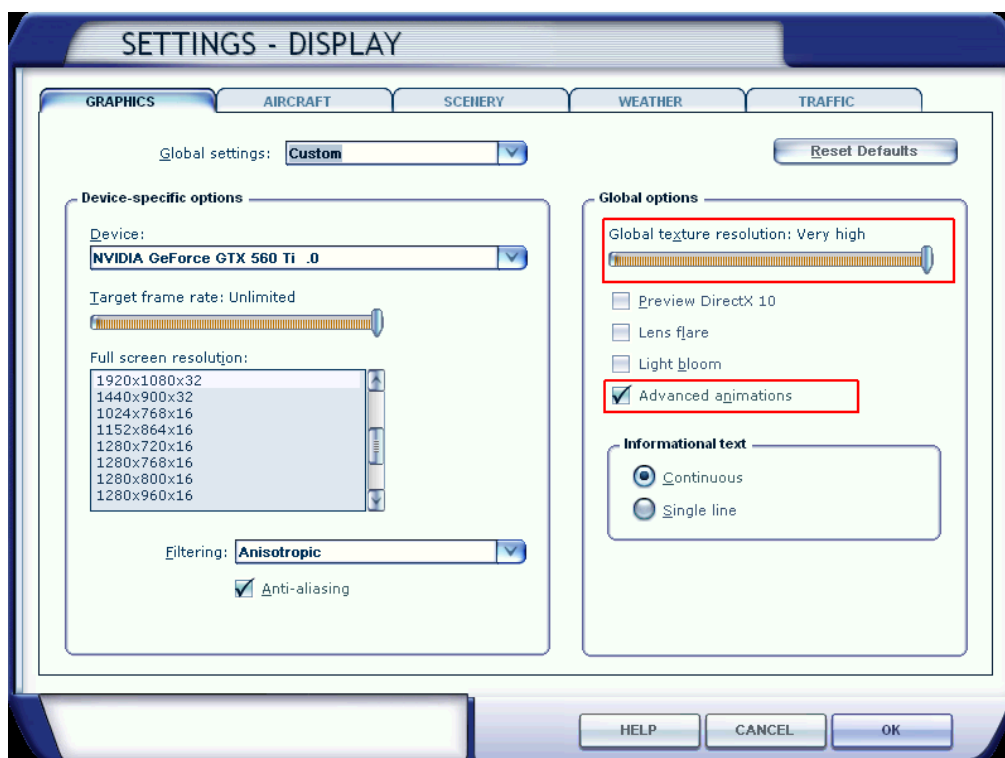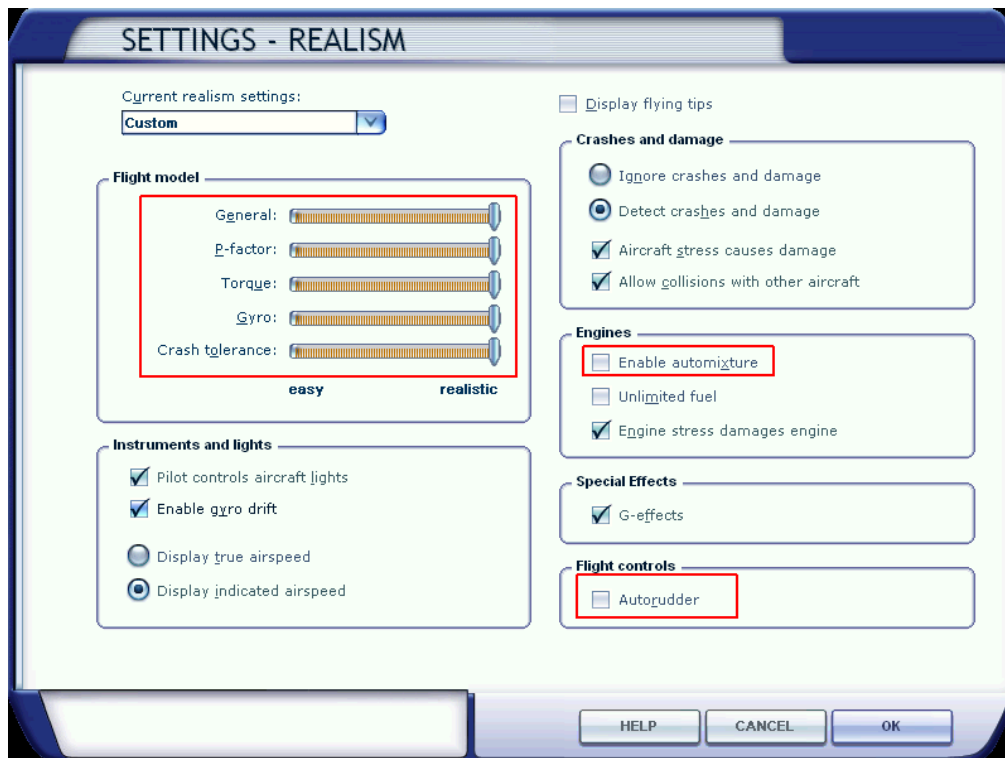
THE AIRCRAFT

GENERAL

- Wingspan (m)   8,72
- Length (m)   6.96
- Height (m)   2.23

FLAPS

The flaps (0.669 m2) are controlled with a lever between the two front seats and can be set in three (locked) stages;

- 0°
- 15° (intended for short take offs)
- 60° (intended for landing)

ELEVATOR

The balanced elevator (2.88 m2) is controlled by cables and includes Anti-Balance-Trim-Tabs that can be used as trim surfaces by means of a control wheel between the two front seats.

RUDDER

The conventional rudder (0.63 m2) is controlled via pedals and cable

GEAR

The fixed three wheel gear consists of three identical wheels and uses an oleo pneumatic suspension with long travel. The Robin can be flown with the wheel covers removed but this dramatically increases drag. The nose wheel is steerable using the rudder pedals but locked in central position in flight.

BRAKES

The two main wheels use independent brake circuits for controlling via rudder pedals (last 10% of travel). The hand/parking-brake brakes both main gear wheels.

ENGINE / OIL

- Engine: Lycoming 4 cylinder air cooled boxer engine (type 0-320-D)
- Max RPM: 2700
- Compression: 8.5/1
- Highest Cylinder Head Temp: 260°
- Highest Cylinder Temp: 160°
- Rotation: Clockwise
- Ignition Order: 1-3-2-4
- Oil Pressure Idle: 1,75 bar
- Oil Pressure Normal: 4,2 <> 6,3 bar
- Max Oil Temp: 118°

ELECTRICITY

An engine driven generator provides 12 volts for the aircraft systems and charges the 12 volt battery.

FUEL

- Fuel Pressure Maximal: 0,560 bar
- Fuel Pressure Optimal: 0,210 bar
- Fuel Pressure Minimal: 0,035 bar
- Tank: 110 L (last 10 L only usable in level flight)

Fuel is fed from the aft tank with an electrical fuel pump to an engine driven fuel pump to provide correct fuel pressure during all flight conditions.

MAXIMUM SPEEDS

- Vne (Maximum Speed): 308 km/h
- Vno (Max Speed in rough air): 260 km/h
- Vc (Maximum Manoeuvre Speed): 215 km/h
- Vfe (Maximum Speed Flaps): 170 km/h

MAXIMUM WEIGHTS

- Take off: 1000 kg
- Landing: 1000 kg
- Luggage Compartment: 40 kg

ALLOWED MANOEUVRES

These manoeuvres were allowed when the aircraft were younger but these days only stalls are possible. In FSX you can take a little risk! As long as the aft seats are not used and the entry and exit speeds are within maximum allowed limits you should be fine.

- Steep turns
- Lazy Eights
- Chandelles
- Stalls

Spins are not allowed!

MAXIMUM CROSS WIND

Maximum demonstrated cross wind 40 km/h (25 mph/22kts)

STALL SPEEDS

IAS in km/h

Bank Angle	0°	30°	60°
Flaps in	99	106	140
Flaps setting 1	93	99	131
Flaps setting 2	87	93	123

EMERGENCY PROCEDURES

ENGINE FIRE IN FLIGHT

- Close fuel selector
- Use remaining fuel (full throttle)
- Ignition off
- Before landing Master off and Generator off
  Note that stall warning will not function

ENGINE FIRE ON GROUND

- Do not open engine cover
- Use fire extinguisher through exhaust and air inlet

GENERATOR FAILURE

When the Ampere indicator shows discharging (The engine will continue to work):

- Check generator circuit breaker
- Reduce use of anything that uses electricity

ICING

When RPM drops unexpectedly:

- Carburettor heat to full
- Full throttle
- Seek for non-icing conditions (descend into warmer air)

Expect RPM to drop by 150 RPM and an increase of fuel use.

EMERGENCY LANDING

- Check safety belts
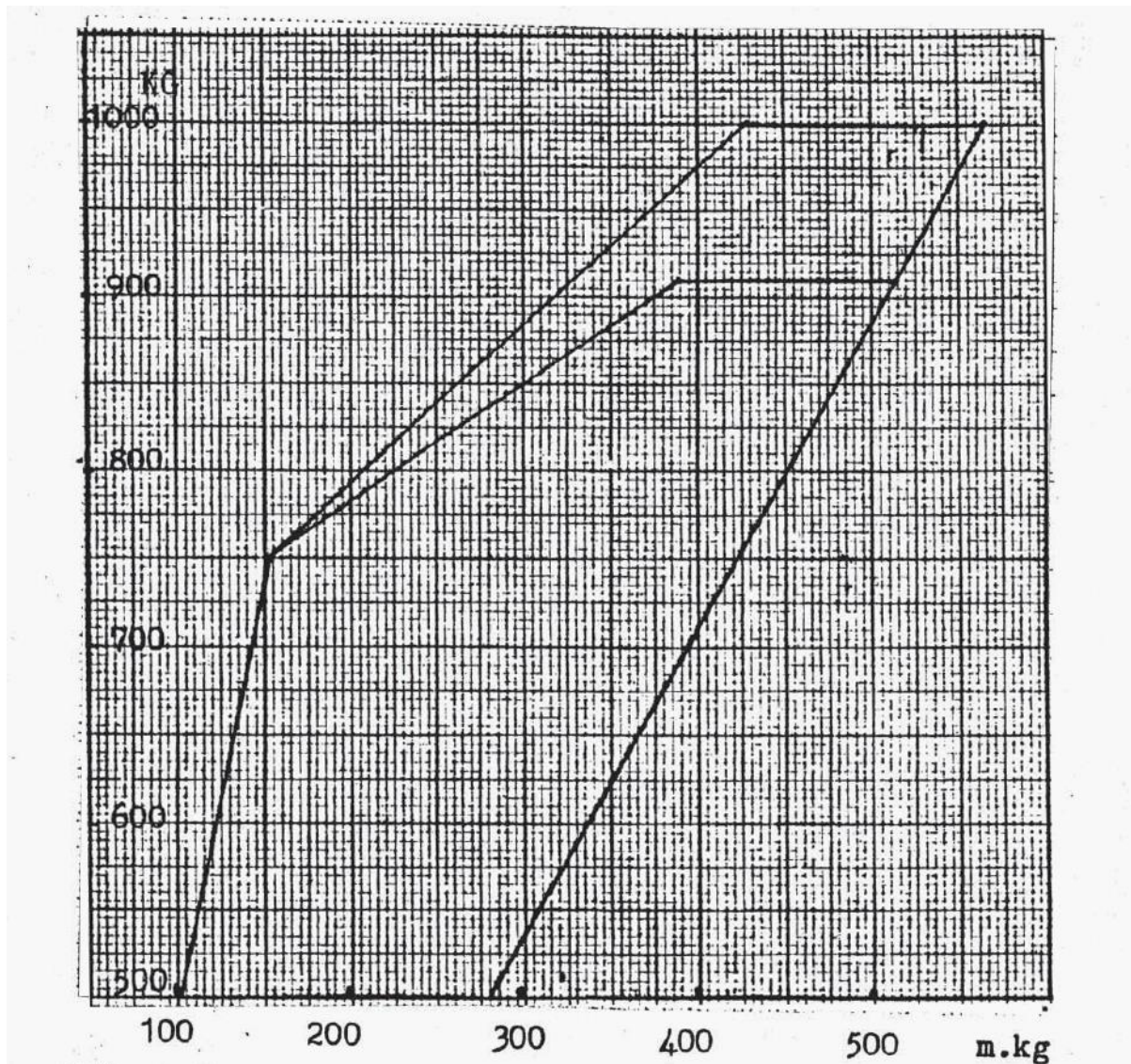- Close fuel selector to reduce fire risk

IN CASE OF INVOLUNTARY SPIN

- Elevator and Aileron to neutral
- Rudder opposite spin direction
- Flaps in

NORMAL FLIGHT PROCEDURES

FLIGHT PREPARATION

1. Before flight check that all weight and balance are within allowed limits.
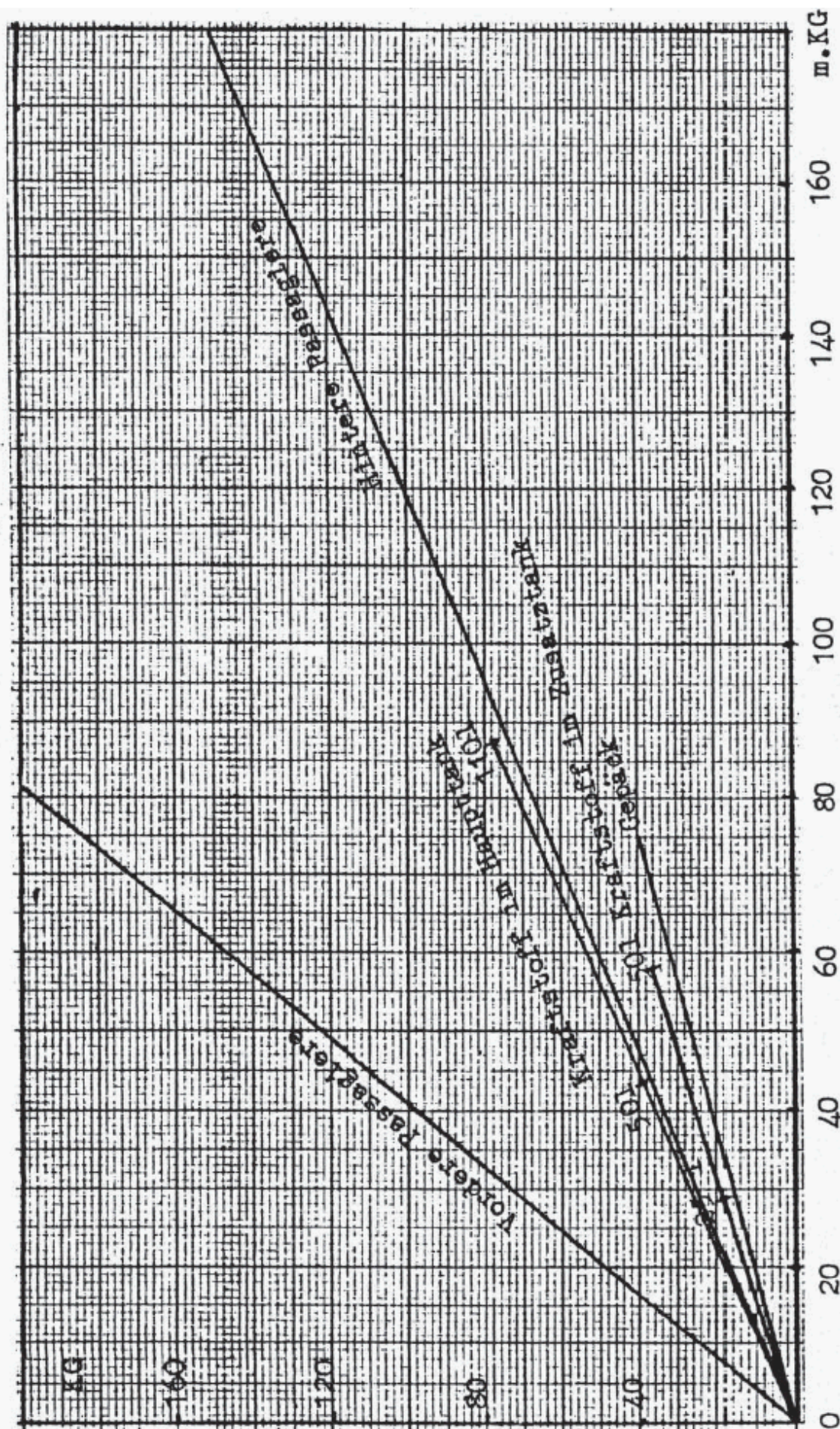
BEFORE FLIGHT CHECKS

1. Master switch on
2. Check fuel quantity
3. Master off
4. Ignition off
5. Fuel selector on
6. Mixture full lean (pulled)

BEFORE ENGINE START

1. Adjust seat and seatbelt
2. Cabin closed and locked
3. Check rudder travel
4. Parking brakes on
5. Master switch on
6. Trim neutral
7. Mixture full rich (pushed)
8. Carburettor heat off (pushed)
9. Fuel selector open
10. Flaps extend

ENGINE START

1. Electrical pump on
2. Generator on
3. Ignition to both
4. Start engine
5. Ignition to both
6. Keep RPM as low as possible but increase till engines runs smooth

TAXI

1. Lock brakes and open throttle to see if the nose moves up and down
2. Release parking brakes
3. Avoid riding the brakes and sudden turns
4. Normal RPM for taxi 1200 RPM
5. Avoid overheating the engine

BEFORE START

1. When needed (winter) warm up engine at 1200 RPM
2. Do not use full power
3. Check magneto's at 1800 RPM, maximum 125 RPM between sides.
4. Switch ignition momentarily off at 1000 RPM to check functionality
5. Check instruments and radio

START

1. Carburettor heat off
2. Mixture full rich (pushed)
3. Slow increase throttle to full
4. Check RPM (2200) and abort when RPM too low
5. Keep pressure on nose wheel to allow directional control
6. Lift off at 100 km/h
7. Increase speed
8. Climb at 120 km/h

START IN CROSSWIND

1. Use rudder to compensate for wind
2. Use higher speed for lift off
3. Avoid ground contact after lift off
4. Steer into wind to counter drift

CLIMB

Obstacle avoidance: climb at 130 km/h with first stage flaps

1. Flaps in
2. Full throttle
3. Maintain 150 km/h
4. Set trim
5. Electrical pump off

Avoid extended maximum climb angle to avoid overheating

CRUISE

1. Use throttle to set engine output
2. Set trim
3. Decrease mixture till engine sound rough then increase to smooth
4. Set mixture after each altitude or RPM change

DESCENT

1. Carburettor heat on
2. Decrease engine RPM
3. Decrease airspeed
4. Electrical pump on
5. Mixture full rich
6. Under 170 km/h use flaps when needed
7. Set trim

When in a long descent use short bursts of throttle to avoid the engine cooling down too much.

LANDING

1. Approach speed: Vi = 1,3 x stall speed (example 115 km/h at 1000 kg)
2. Carburettor heat full
3. Mixture full rich
4. In strong winds control speed carefully

ABORTED LANDING

1. Full throttle
2. Carburettor heat off
3. Flaps to start setting as soon as possible

LANDING IN CROSSWIND

1. Lower upwind wing
2. Level wings just before landing
3. Use pedals to control direction

AFTER LANDING
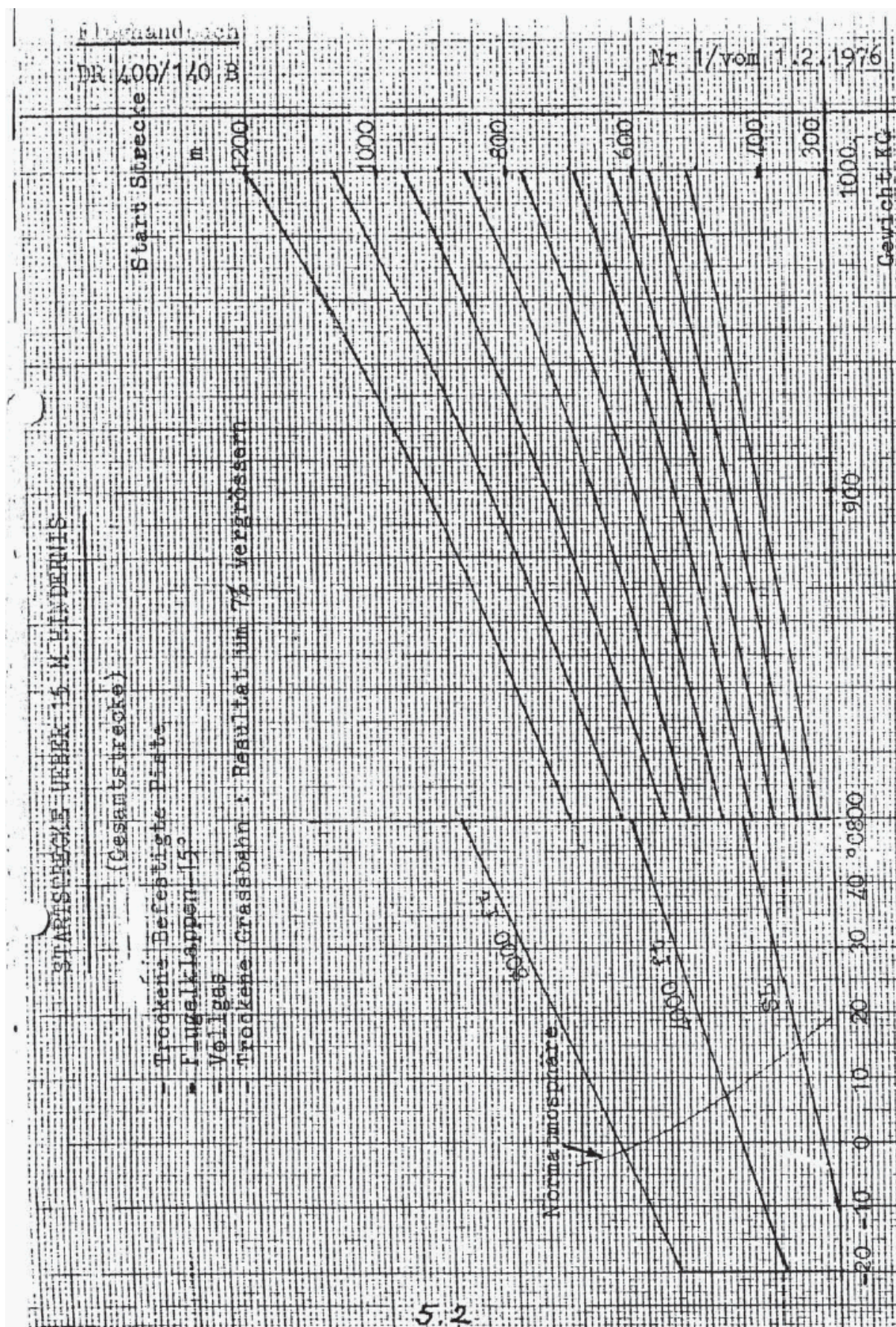
- Retract flaps during taxi
- Extend flap on parking to avoid damage
- Set parking brake
- 1200 RPM
- Check both magnetos
- Mixture to full lean to stop engine
- Master switch off
- Fuel selector off

PERFORMANCE CHARTS
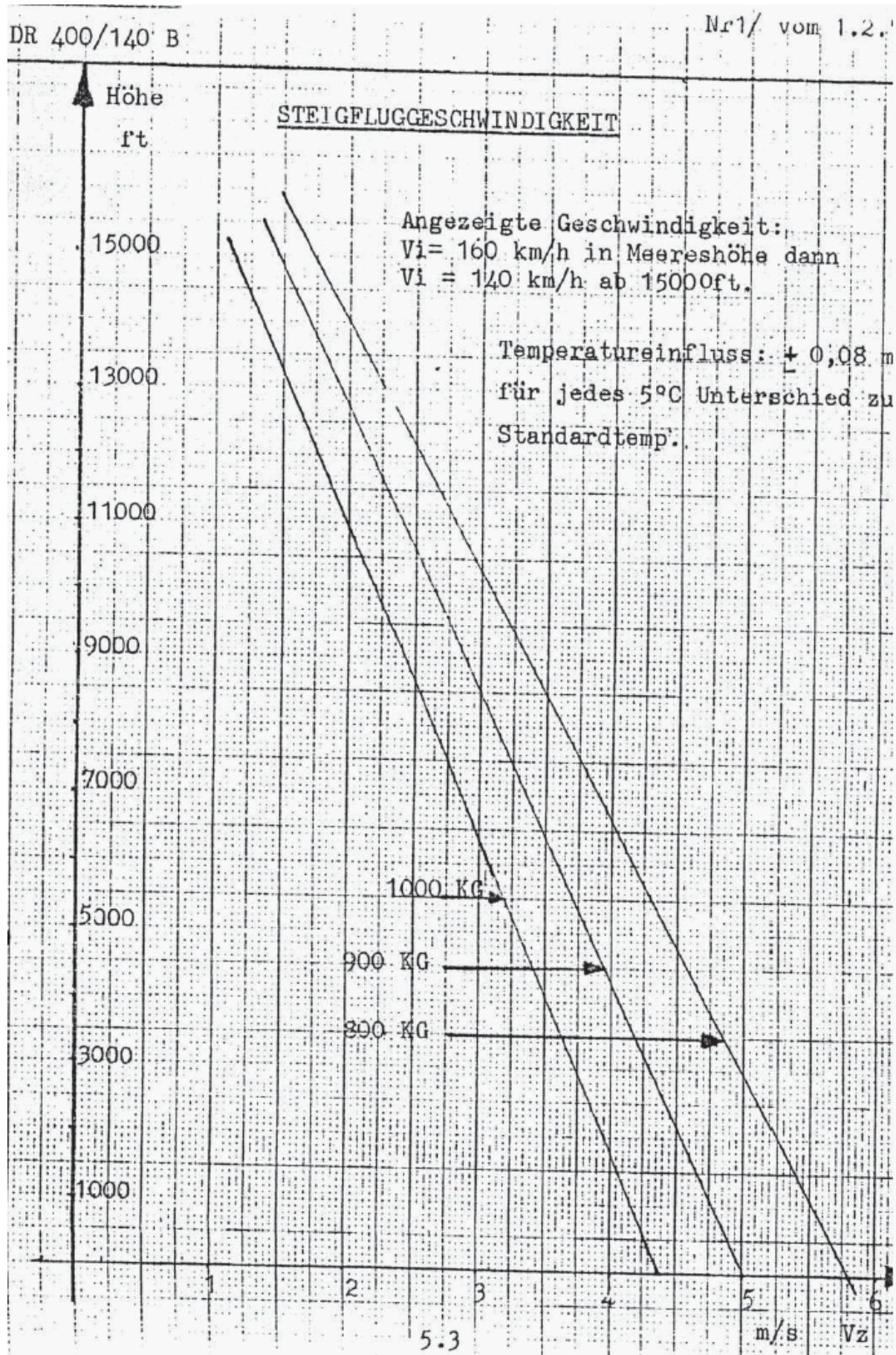
The following pages include the performance charts as they are provided for the German Robin DR400 we used as the base for the simulated aircraft. The charts are in German but should be usable if you do not read that language. Or as the developer told me, "it's not like the real aircraft cares a lot about these charts."

Do not get too focussed on performance charts, the DR400 will tell you what it can do, just fly it and listen to what it tells you.

DR 400/140 B

Nr 1/ vom 1.2.

Höhe ft

STEIGFLUGGESCHWINDIGKEIT

Angezeigte Geschwindigkeit:
Vi = 160 km/h in Meereshöhe dann
Vi = 140 km/h ab 15000ft.

Temperatureinfluss: ± 0,08 m
für jedes 5°C Unterschied zu
Standardtemp.

15000

13000

11000

9000

7000

5000

1000 KG

900 KG

800 KG

3000

1000

1   2   3   4   5   6

5.3

m/s   Vz

R 400/140 B

Höhe
ft

REISELEISTUNG

15000

Gewicht : 1000 kg
Mixture : voll reich

Drehzahl	Benzinverbrauch 75%	65%
2700	39,3L/H	34,7
2600	38,3	33,8
2500	37,8	33

10000

5000

150

200

250

km/

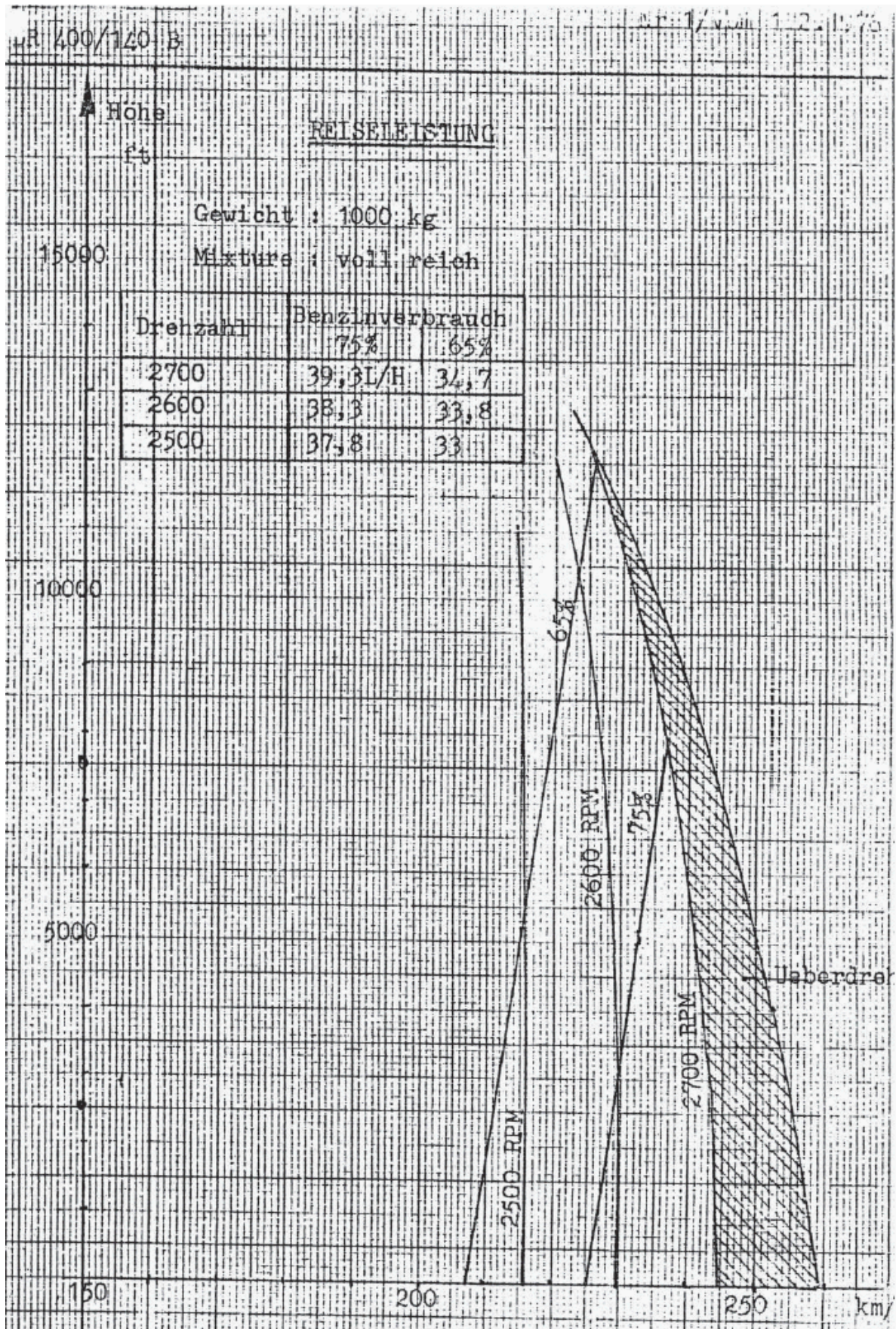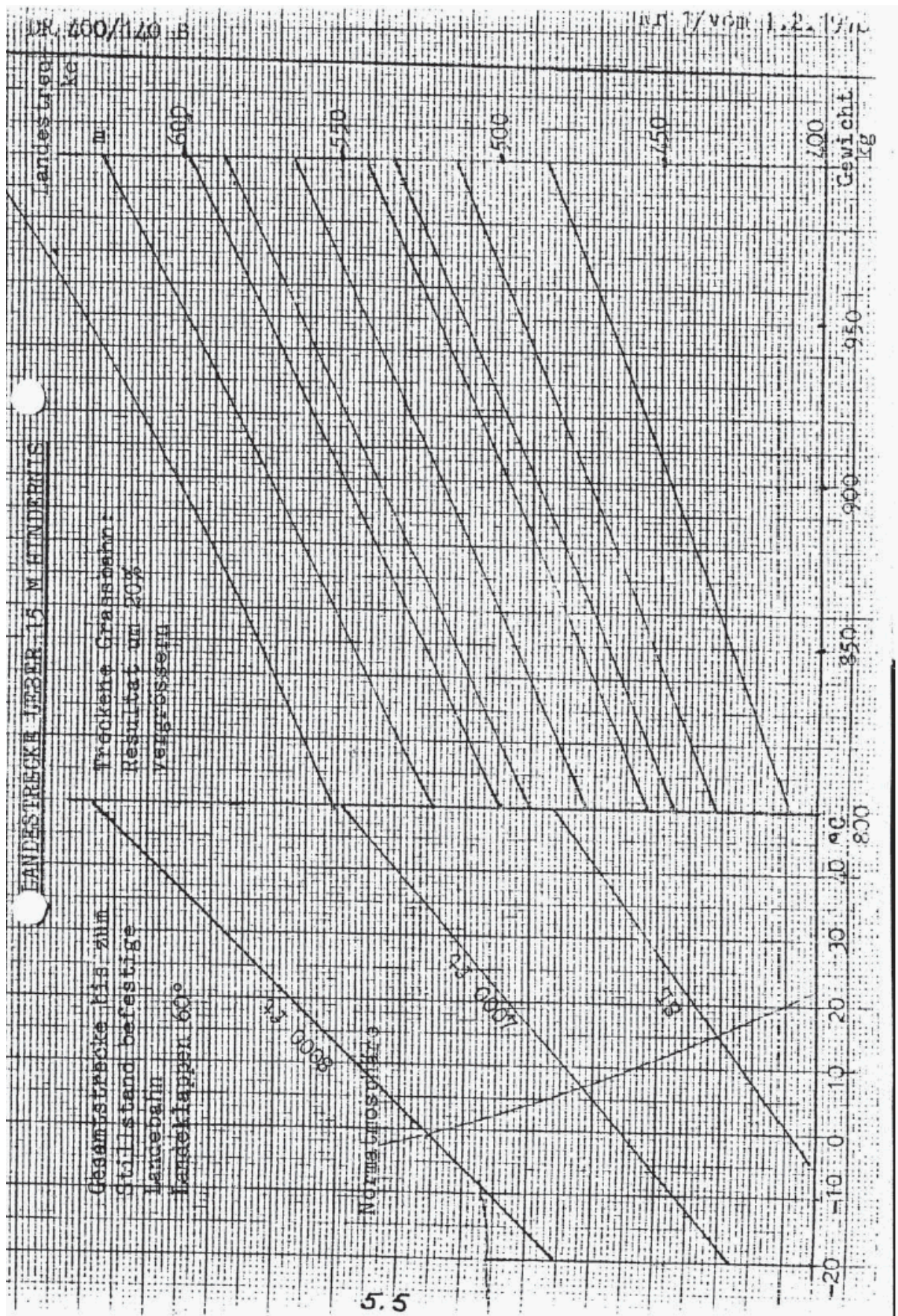## PANELS LAYOUT

Although all three panels differ slightly the same element can be found in all the cockpits.

1	Throttle	20	Ignition
2	Airspeed indicator	21	Starter
3	Artificial Horizon	22	Battery switch
4	Altimeter	23	Generator switch
5	ADF gauge	24	Mixture control
6	Turn and bank indicator	25	Heating control
7	Gyro	26	Heating for/aft
8	Vertical Speed Indicator	27	Defroster
9	VOR gauge	28	Carburettor heat
10	Suction Indicator	29	Fuel pump
11	GPS	30	Nav / Beacon Light
12	Com-Nav	31	Panel Light
13	Transponder	32	Trim indication
14	RPM indicator	33	Parking brake
15	Cylinder Head Temp	34	Fuel selector
16	Fuel Quantity	35	Stabilizer trim
17	Oil Temperature	36	Checklist / State select
18	Ampere indicator	37	Flaps lever
19	Landing Lights		

When clicked the checklist will move to your left hand. When you right click on the opened checklist it will flip and you can use the left mouse button to select a ready to fly configuration or a cold and dark configuration. A right mouse click will flip the page again.

Note that two of the models have an ADF receiver where the model shown above has the GPS device.
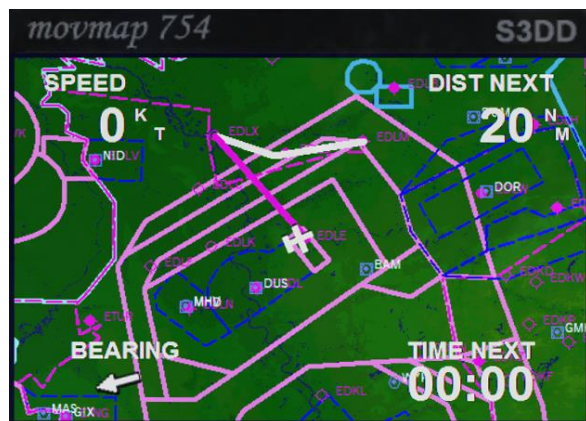
AVIONICS

MOVMAP 754 GPS UNIT

Several of the cockpits are equipped with a GPS that is modelled on well-known GPS devices. The GPS instrument has its own internal battery so it can be used when the Master switch is still off. It's charged by the Primary DC electrical bus when the Battery master switch is on. To turn the GPS on, press the button with the red logo and the start-up screen will be displayed.

> CAUTION: The framerate of the sim is affected by the amount of details shown!

MAP MODE

After initialization the GPS will be in Map Mode showing an aircraft symbol in the centre of a map. North is always up. In the four corners of the display, current ground speed, distance to next waypoint, estimated time to next waypoint and a pointer depicting relative bearing to the next waypoint are shown. If the pointer points up, the aircraft is heading straight towards the next waypoint. Use the IN / OUT buttons to zoom the map in or out. The GPS can show Airports, VOR's, NDB's, Intersections and Airspace boundaries. To toggle the display of these items press the MENU button and use the UP / DOWN cursor key (the large button) to highlight the Class (Airport, VORs, NDBs, Intersection or Airspace). Use the LEFT / RIGHT cursor key to toggle the display of these items. Use the QUIT button to return to the MAP page.

Standard FSX flight plans can be loaded via the normal FSX dialog and will be automatically displayed on the MAP page.

DIRECT TO MODE

Using the GOTO button will allow the input of a DIRECT TO location. Use the UP / DOWN cursor keys to change the character on the blinking field. Use the LEFT / RIGHT cursor key to move to the next or previous field. Enter an ICAO identifier for airport, VOR or NDB.

NOTE: Intersections are not supported in the GOTO mode.

Once an identifier is recognized, it will show facility name and nearby city – if possible. Press ENTER and the GPS will return to the Map mode with the flight plan leg from the current aircraft position to the selected identifier. As everywhere using the QUIT button will halt the action and return to the MAP screen.
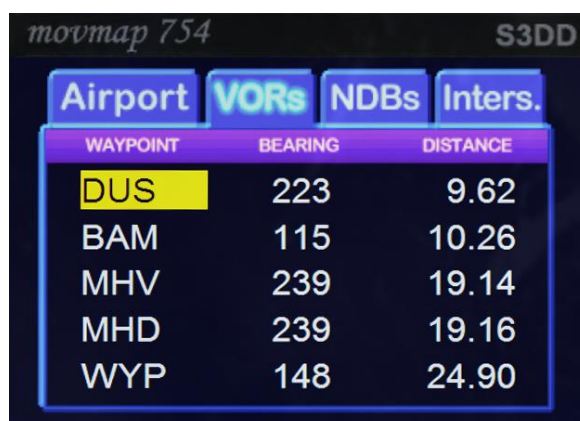
CURSOR MODE

Another option to make a DIRECT-TO flight plan, is with the help of the "Cursor Mode". When the GPS is in map mode, pressing either the UP / DOWN / LEFT or RIGHT cursor key, will put the GPS into "Cursor mode". A small cursor (blinking circle) will appear instead of the aircraft symbol. Using the cursor keys the circle can be moved on the map and the map will centre on the cursor position. A line will be drawn from the current aircraft position to the cursor.

Press ENTER to select the cursor position as a Direct-To flight plan. If the ENTER button is not pressed within a few seconds or by pressing QUIT, cursor mode will be suspended and the GPS will return to Map mode. By using the cursor mode any global position can be selected as a waypoint. This is the easiest way to make a very simple flight plan, certainly if the desired waypoint isn´t too far away. In cursor mode finer adjustments can be made by zooming in on the map first.

NEAREST STATION

Using the NRST button will open the NEAREST STATION list and the LEFT / RIGHT cursor keys will change between Airports, VORs, NDBs and Intersections. Use the UP / DOWN cursor keys to highlight an identifier and press ENTER to select it as DIRECT-TO, or press QUIT to cancel the selection.

HSI PAGE

Pressing the ENTER key while being in Map mode will bring up the HSI page. The HSI page shows:
- Compass rose, showing ground track, which is the true track over ground, taking crosswinds and sideslip into account. It does NOT show magnetic nor true heading, like a normal gyro based HSI.
- Course Needle, showing the active flight plan leg bearing.
- Course deviation indicator bar (middle part of the Course needle), showing the cross track error. Each dot represents 1 nautical mile.
- TO/FROM flag showing the position relative from the active flight plan leg.
- Right part of the screen shows Ground speed, Distance to next waypoint, Ground track (same as Compass rose) and next waypoint bearing.

If the Ground track value and the Bearing value are equal, this indicates that the aircraft is heading straight towards the next waypoint, but not necessarily following the flight plan leg.

HSI SAMPLES:

On track direct towards the active waypoint, TO / FROM flag shows TO:

Correct heading but about 2 miles left of the flight plan leg:

Still 2 miles left of the flight plan leg, but on an intercept heading of 40°:

Flight plan leg behind the aircraft, note the TO/FROM flag has changed to FROM:

Still behind the flight plan leg, but heading towards the waypoint. The Flag still shows from. Use "bearing" in this case to get to the waypoint, keeping the ground track equal or the same.
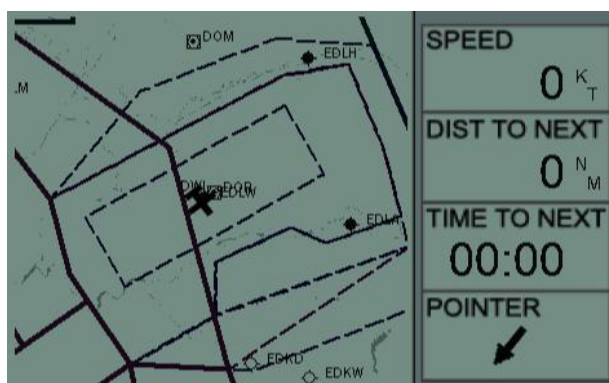

S3DD AIR MAP GPS

Some models come with a small GPS device that is modeled after the popular Garmin GPS III. This instrument has its own internal battery so it can be used when the Master switch is still off. It's charged by the main electrical bus when the Master switch is on.

To turn the GPS on, press the button with the red logo. The start-up screen appears
Note, the backlight can be turned on with right click on the red button.
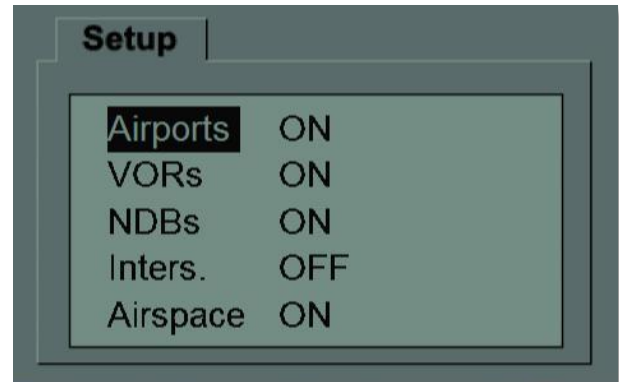
MAP MODE

After initialization the GPS will be in Map Mode: On the left 2/3 part of the display a map is drawn, showing the current position with an aircraft symbol. North is always up. On the right 1/3 part of the display, current ground speed, distance to next waypoint, estimated time to next waypoint and a pointer depicting relative bearing to the next waypoint is shown. If the pointer points up, the aircraft is heading straight towards the next waypoint. Use the IN / OUT buttons to zoom the map in or out.

The GPS can show Airports, VOR's, NDB's, Intersections and Airspace boundaries. To toggle the display of these items press the MENU button. The Setup page will now be shown:

Use the UP / DOWN cursor key (the large button) to highlight the Class (Airport, VORs, NDBs, Intersection or Airspace). Use the Left / Right cursor key to toggle the display of these items. Use the QUIT button to return to the MAP page.

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TIP: In cursor mode finer adjustments can be made by zooming in on the map first.

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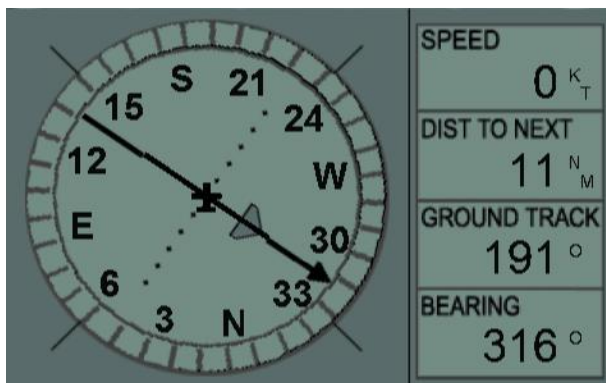
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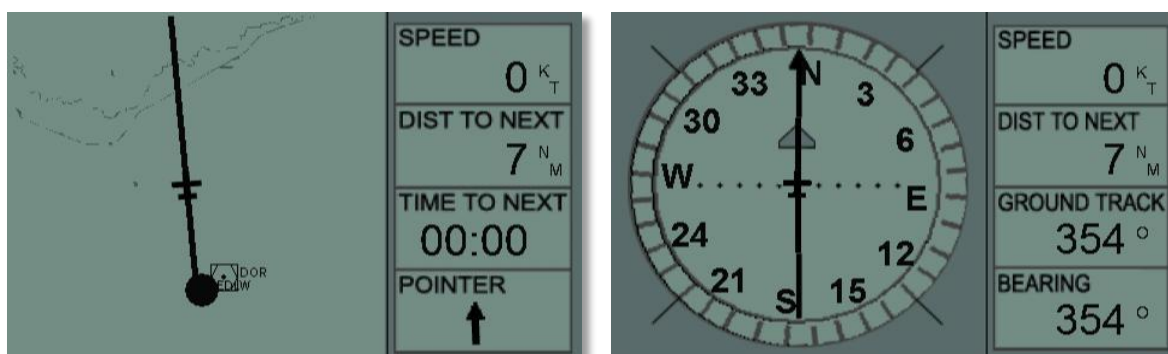
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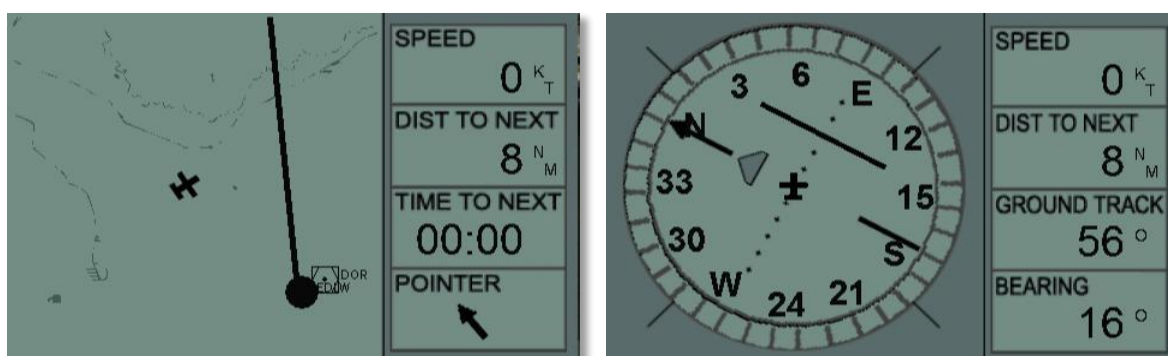
If the Ground track value and the Bearing value are equal, this indicates that the aircraft is heading straight towards the next waypoint, but not necessarily following the flight plan leg.

HSI SAMPLES

On track direct towards the active waypoint, TO / FROM flag shows TO.

Correct heading but 3 miles left of the flight plan leg:

Still 3 miles left of the flight plan leg, but on an intercept heading of 40°
(Note Ground track and Bearing readings):

Flight plan leg behind the aircraft, note the TO/FROM flag has changed to FROM:

BENDIX/KING KX125 COMMUNICATION TRANSCEIVER

The KX125 is a useful but slightly antiquated communication and navigation radio. As this instrument is carefully simulated we include the actual manual as an appendix to this manual.

BECKER TRANSPONDER

The Becker BXP 6401 transponder is a Mode S transponder which enables ATC to locate, identify and track the aircraft by responding to ATC radar interrogations. In Mode S it will conduct altitude reporting, used by other aircrafts TCAS systems for collision warnings. Remember to turn the Transponder to STDBY after landing when leaving the runway.

To set the transponder push the right rotary button to select the first digit, then turn. Press it again to select the second digit etc. Press [VFR] to directly select 7000.

SECTION III

OPERATION

3.1   GENERAL

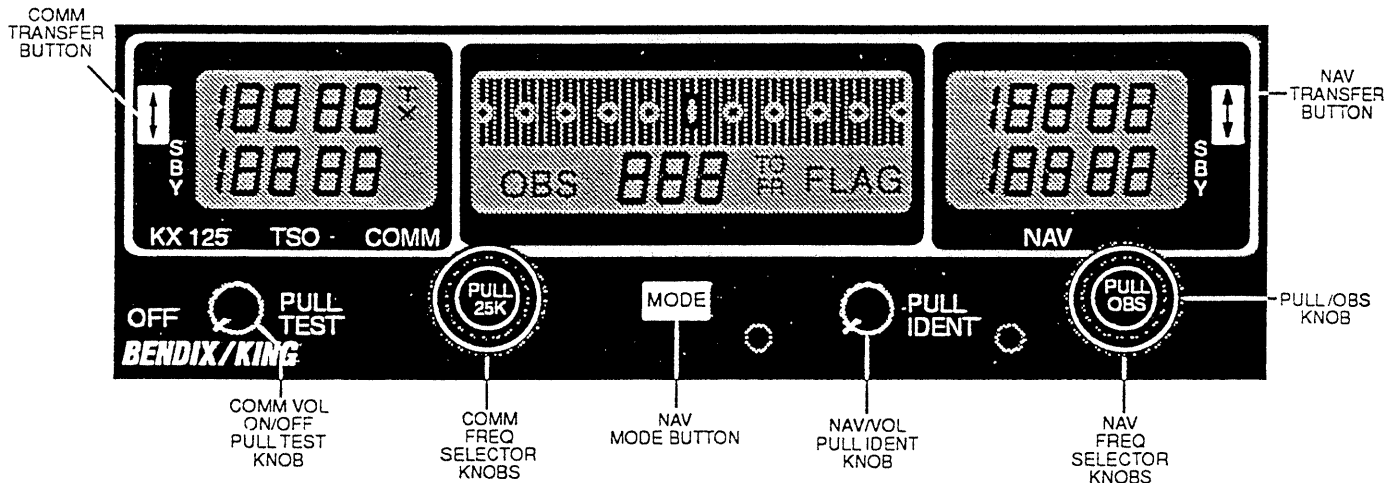All controls required to operate the KX 125 are located on the unit front panel. (See Figure 3-1)

FIGURE 3-1 FRONT PANEL DISPLAY/CONTROLS

3.2   DETAILED OPERATING MODES

3.3 TURN ON

To turn on the radio, rotate the COMM Volume (VOL) knob clockwise from the OFF position. When power is activated, the COMM FREQ and NAV FREQ windows will display the frequencies stored in the non-volatile memory before power down. If on power up, the active NAV USE frequency is a VOR frequency, the NAV INFO window will display the CDI deviation bars, "OBS" annunciator, three digit OBS setting stored in non-volatile memory prior to power down and "TO" or "FR" annunciator. A "FLAG" annunciator will also be displayed if no valid or an invalid navigation signal is received and the "TO"/"FR" annunciators will be turned off. Note that if the "OBS" annunciator is flashing, the inner NAV FREQ selector knob is in the out position. If on power up, the active NAV USE frequency is a localizer frequency, the NAV INFO window will display the CDI bars and "LOC" annunciator. The "FLAG" annunciator will also be turned on if no valid or an invalid navigation signal is received. A more detailed description of all the operational modes of the KX 125 will be given below.

CAUTION

THE KX 125 SHOULD BE TURNED ON ONLY AFTER ENGINE STARTUP. THIS IS A SIMPLE PRECAUTION WHICH HELPS PROTECT THE SOLID STATE CIRCUITRY AND EXTENDS THE OPERATING LIFE OF YOUR AVIONICS EQUIPMENT.

3.3.1   DIM SELECT

The KX 125 panel lighting may be powered up from either a 14VDC or 28VDC lighting bus supply. To enable the KX 125 panel lighting to track a 14VDC lighting bus, leave DIM SELECT (P100 pin B) open. To track a 28VDC lighting bus, tie DIM SELECT to ground.

3.4   COMM TRANSCEIVER

Pull the COMM VOL knob out and adjust for a desired listening level. Push the COMM VOL knob back in to actuate the automatic squelch.

3.4

The top frequency displayed in the COMM FREQ window is the active COMM USE frequency and the COMM standby (SBY) frequency is displayed below it. A "TX" annunciator will come on next to the COMM USE frequency to indicate the TRANSMIT mode of operation. Select the desired operating frequency in the COMM SBY display by rotating the increment/decrement knobs of the COM FREQ selector either clockwise or counter-clockwise. A clockwise rotation will increment the previous frequency while a counter-clockwise rotation will decrement the previous frequency. The outer (larger) knob will change the MHz portion of the standby display. At one band-edge (118 or 136 MHz for -0101/-0201 or 139 MHz for -0302/-0402) the following 1 MHz change will wrap around to the other band-edge. The inner (smaller) knob will change the kHz portion of the standby display. It will change in steps of 50kHz when the knob is pushed in, and 25kHz when the knob is pulled out. The wrap around at band-edge is also utilized when incrementing or decrementing the kHz portion of the standby display.

To tune the radio to the desired COMM operating frequency, the desired COMM frequency must be entered into the COMM SBY display and then the COMM TRANSFER button must be pushed momentarily. This will trade the contents of the COMM USE and COMM SBY display. The COMM transceiver is always tuned to the frequency appearing in the COMM USE display. It is therefore possible to have two different frequencies stored in the COMM USE and COMM SBY displays and to change back and forth between them at the simple push of the COMM TRANSFER button. During the TRANSMIT mode of operation, a "TX" annunciator will appear next to the COMM USE frequency display, signifying that the transceiver is in the transmit mode of operation. The KX 125 is designed to allow a continuous TRANSMIT duration of 1/2 minute. If the transceiver is keyed for more than 1/2 minute, the KX 125 will automatically stop transmitting and the COMM FREQ window display will be flashing. On release of the mic key, the flashing will stop and operation will return to normal. This feature is designed to detect a "stuck" mic key and prevent it from over-stressing the transmitter which may reduce the reliability of the transceiver.

There is a COMM active entry mode whereby, the COMM USE frequency can be changed directly by the COMM FREQ selector knobs. To activate the COMM active entry mode, press and hold the COMM TRANSFER button for 2 seconds or more. The COMM STBY frequency will blank and the last COMM USE frequency displayed can be changed directly by the COMM FREQ selector knobs. In the COMM active entry mode, the COMM transceiver is also always tuned to the frequency appearing in the COMM USE display. To exit the COMM active entry mode, momentarily press the COMM TRANSFER button. The previous COMM SBY frequency will be re-displayed.

A non-volatile memory stores the COMM USE and COMM SBY frequencies on power down. When the unit is turned on again, the COMM USE and SBY windows will display the same COMM USE and SBY frequencies that were displayed before power down. If the KX 125 is in the COMM active entry mode during power down, it will power up back in the COMM active entry mode.

3.4.1   COMM REMOTE TRANSFER

The COMM REMOTE TRANSFER button operates identical to the front panel COMM TRANSFER button with the exception that holding the COMM REMOTE TRANSFER button for 2 seconds or more will not place the KX 125 into the COMM active entry mode.

3.5   NAV RECEIVER

The top frequency displayed in the NAV FREQ window is the active NAV USE frequency and the standby (SBY) frequency is displayed below it. The NAV receiver frequency channeling is the same as the COMM transceiver. The NAV FREQ increment/decrement knobs are located on the right hand side of the front panel. Note that the smaller knob must be pushed in to allow NAV frequency channelling. The larger knob operates in 1 MHz steps and increments/decrements the NAV STBY frequency display. The smaller knob operates in 50kHz steps. The NAV receiver lower and upper frequency limits are 108.00 MHz and 117.95 MHz. Exceeding the upper limit of frequency band would automatically return to the lower limit and vice versa. Flipping of the NAV USE and SBY frequencies is achieved by momentarily pressing the NAV TRANSFER button. There is also a NAV active entry mode whereby, the NAV USE frequency can be changed directly by the NAV FREQ selector knobs. To activate the NAV active entry mode, press and hold the NAV TRANSFER button for 2 seconds or more. The NAV SBY frequency will blank and the last NAV USE frequency displayed can be changed directly by the NAV FREQ selector knobs. The NAV receiver is always tuned to the NAV USE frequency displayed. To exit the NAV active entry mode, momentarily press the NAV TRANSFER button. The previous NAV SBY frequency will be re-displayed.

The NAV audio volume can be adjusted with the NAV VOL knob. Pulling the NAV VOL knob out will allow both voice and morse code identification (IDENT) of the tuned NAV station to be heard. When the NAV VOL knob is pushed in, the IDENT tone is attenuated.

3.5.1   NAV REMOTE TRANSFER

The NAV REMOTE TRANSFER button operates identical to the front panel NAV TRANSFER button with the exception that holding the NAV REMOTE TRANSFER button for 2 seconds or more will not place the KX 125 into the COMM active entry mode.

3.5.2   NAV MODES

There are 3 NAV modes available with the KX 125: CDI, Bearing and Radial. The CDI mode works on both VOR and localizer frequencies. The remaining modes work only with VOR frequencies. On power up, the KX 125 will go into the default CDI mode. Momentarily pressing the NAV MODE button will step switch the KX 125 NAV modes in the following sequence: Bearing, Radial, back to CDI and so on. A description of each of the 3 NAV modes is given below.

3.5.2.1 NAV CDI MODE - VOR OPERATION

Tune the KX 125 NAV USE frequency to a desired VOR frequency. Bring the KX 125 into the CDI (Course Deviation Indicator) mode by depressing the NAV MODE button several times as necessary. The NAV INFO window will display an "OBS" annunciator, a previous three digit OBS bearing, an appropriate "TO" or "FR" (from) annunciator and the deviation bars. Refer to Figure 3-2 for an example of a NAV INFO window display showing reception of a valid VOR signal.
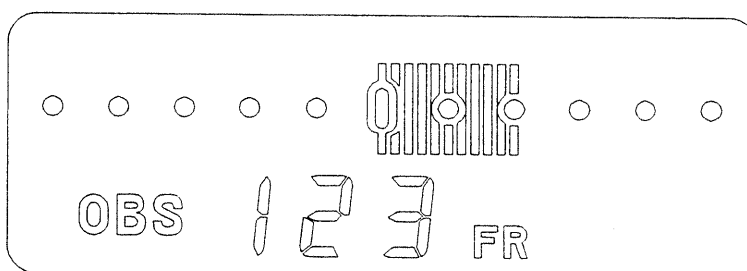

FIGURE 3-2 KX 125 NAV INFO WINDOW DISPLAY IN CDI MODE WITH A VALID VOR SIGNAL

In this example, the previous OBS setting is 123 degrees and the received VOR signal is 119 degrees FROM the VOR station. Thus the selected OBS of 123 degrees is + 4 degrees off the received 119 degrees FROM. The course deviation is indicated by the lighting up of the deviation bars as shown. Each deviation bar represents 0.4 degree and each reference dot represents 2 degrees. The KX 125 CDI display limit is ±10 degrees of course deviation. If an invalid VOR signal is received, a "FLAG" annunciator and all the deviation bars will be displayed and the "TO" or "FR" annunciator will be turned off. Refer to Figure 3-3.
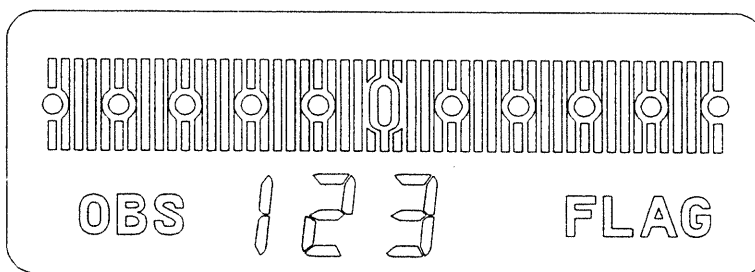

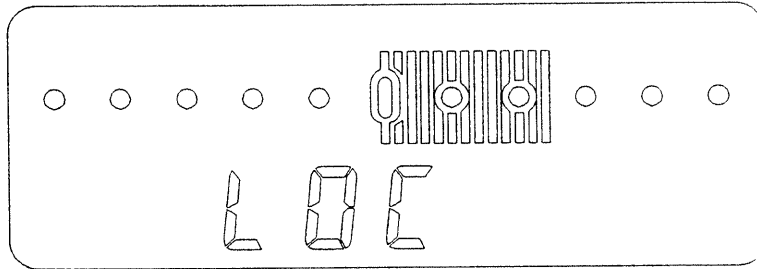FIGURE 3-3 KX 125 NAV INFO WINDOW DISPLAY IN CDI MODE WITH AN INVALID VOR SIGNAL

The OBS setting can be changed by pulling out and rotating the inner NAV FREQ selector knob. When the inner NAV FREQ selector knob is pulled out, the "OBS" annunciator will be flashing and changing of the NAV frequency will be disabled, allowing only the OBS setting to be changed.

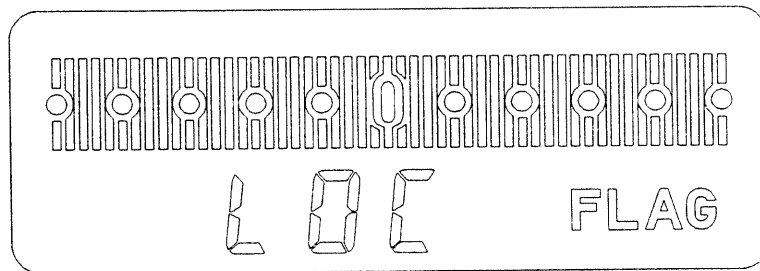### 3.5.2.2 NAV CDI MODE - LOCALIZER OPERATION

Tune the KX 125 NAV USE frequency to a desired localizer frequency. The NAV INFO window will display "LOC" and the CDI display will be activated. If a valid localizer signal is received at 5 degrees to the right of the centerline, 13 deviation bars in the CDI will be turned on. Refer to Figure 3-4. If the valid localizer signal is received along the centerline, the CDI display will be centered with only the reference dots turned on.

FIGURE 3-4 KX 125 NAV INFO WINDOW DISPLAY IN CDI MODE WITH A VALID LOCALIZER SIGNAL

If an invalid localizer signal is received, the KX 125 will show flag status by turning on the "FLAG" annunciator and displaying all the CDI deviation bars in the NAV INFO window. Refer to Figure 3-5.

FIGURE 3-5 KX 125 NAV INFO WINDOW DISPLAY IN CDI MODE WITH AN INVALID LOCALIZER SIGNAL

3.5.2.3 NAV BEARING MODE

Tune the KX 125 to a desired VOR station. Bring the KX 125 into the Bearing mode by depressing the NAV MODE button several times as needed until the NAV INFO window shows only a three digit display with a "TO" annunciator. In the Bearing mode, the KX 125 will always display the received VOR signal in TO format. Refer to Figure 3-6 for an example where the received VOR signal is actually 119 degrees FROM but is being displayed as 299 degrees TO by the KX 125 in the Bearing mode.
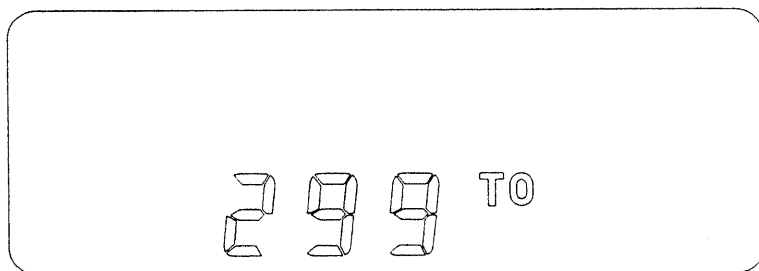
FIGURE 3-6 KX 125 NAV INFO WINDOW DISPLAY IN BEARING MODE WITH A VALID VOR SIGNAL

If an invalid VOR signal is received while the KX 125 is in the Bearing mode, the NAV INFO window will display the "FLAG" annunciator and three horizontal dashes. Refer to Figure 3-7 for an example.
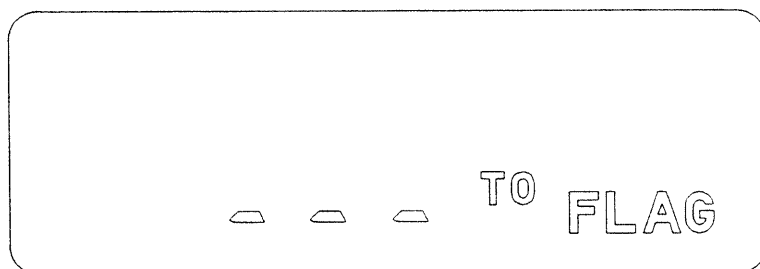
FIGURE 3-7 KX 125 NAV INFO WINDOW DISPLAY IN BEARING MODE WITH AN INVALID VOR SIGNAL

3.5.2.4 NAV RADIAL MODE

Tune the KX 125 to a desired VOR station. Bring the KX 125 into the Radial mode by depressing the NAV MODE button several times as needed until the NAV INFO window shows only a three digit display with a "FR" annunciator. In the Radial mode, the KX 125 will always display the received VOR signal in FROM format. Refer to Figure 3-8 for an example where the received VOR signal is 119 degrees FROM as displayed by the KX 125 in Radial mode.
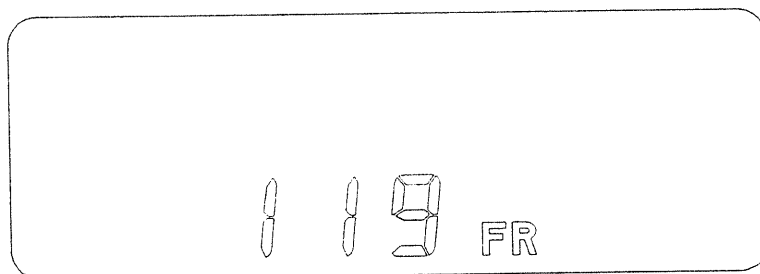

FIGURE 3-8 KX 125 NAV INFO WINDOW DISPLAY IN RADIAL MODE WITH A VALID VOR SIGNAL

If an invalid VOR signal is received, the KX 125 in Radial mode will show flag status similar to Figure 3-7 except that "FR" will be displayed instead of "TO".

3.5.3 NAV AUTO-TO FUNCTION

There is a NAV AUTO-TO function (VOR operation only) which when activated will automatically bring the KX 125 into the CDI mode, center the CDI display and replace the OBS setting with the received VOR signal bearing in TO format at that instant. To activate the AUTO-TO function, regardless of what mode the KX 125 is in, press and hold the NAV MODE button for 2 seconds or more. Refer to Figure 3-9 for an example of NAV INFO display immediately after the Auto-To function has been activated when the received VOR signal is 119 degrees FROM (same as 299 degrees TO).
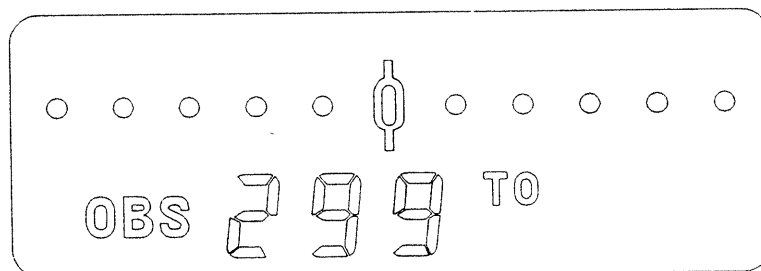

FIGURE 3-9 KX 125 NAV INFO WINDOW DISPLAY AFTER AUTO-TO FUNCTION HAS BEEN ACTIVATED

After the AUTO-TO function has been selected, any change in received VOR signal bearing will be displayed by the appropriate number of deviation bars been turned on.

3.6   DEFAULT POWER UP STATE

If the KX 125 is powered up with either the COMM TRANSFER or NAV TRANSFER button depressed, it will default into the COMM active entry mode and the NAV active entry mode. Both the COMM USE and SBY frequency will be set to 120.00 MHz and both the NAV USE and SBY frequency will be set to 110.00 MHZ.