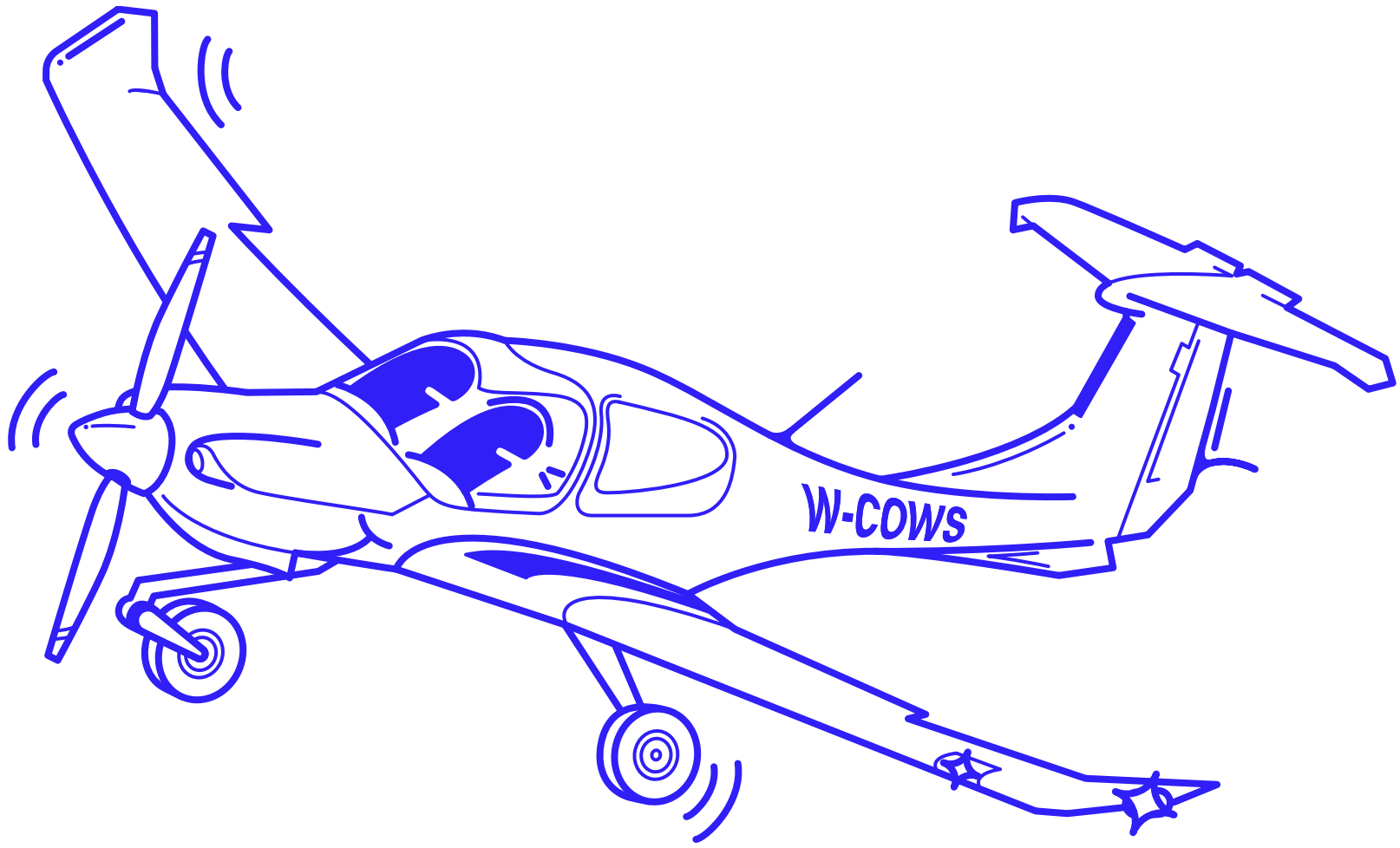
Pilot’s Operating Handbook



DA40 Series

COWS	UPDATED: 16/08/2025	
	MADE WITH LOVE AND PASSION	
Creator of Worlds - COWS Bespoke Aircraft for Microsoft Flight Simulator & X-Plane From Australia | Austria | United Kingdom | United States	DA40 Series for: MSFS, FS2024 For Version: 1.1.0+	YouTube Instagram cows.studio

Introduction

Welcome to the pasture! Isn't this exciting?

These moments are the reason we're here —the excitement of beginning and the thrill of discovering something new.

Thank you for being a part of our story.

The COWS DA40 Series is a manifestation of our mission of facilitating flight students with their Single-engine training. You can feel, hear, and see our differences while practicing critical procedure flows and manoeuvres.

We desire that you will find flying it, either for training or leisure, a pleasant and valuable experience.

Use #COWSFS on Instagram for a chance to be featured:

COWS INSTAGRAM

Or join us here, where your voice is valued, and your creativity is celebrated:

DISCORD COMMUNITY

This COWS manual has been prepared as a guide to help you get the most out of your airplane. It contains instructions, features, and tips on operating the airplane within the simulator. This manual will reference and link Diamond's Official DA40 Operating Manuals to ensure proper procedures.

If you have any questions, requests, or suggestions, please reach out to us via Discord, our most active discussion platform: **LINK**

Table of Contents

Section I

Toggling Features

This section contains information on the operation of failures, aircraft state-saving, engine-damage, and more.

Failures

The COWS DA40XLS and DA40NG have over 240 Combined failures that are saved between flights. There are 4 modes for controlling failures:

- Off
- Normal (5% Chance of an item failing per hour)
- High (100% Chance of an item failing per hour)
- Chaos (1 failure per 30 seconds, above 30 knots)

How to enable and select failure settings:

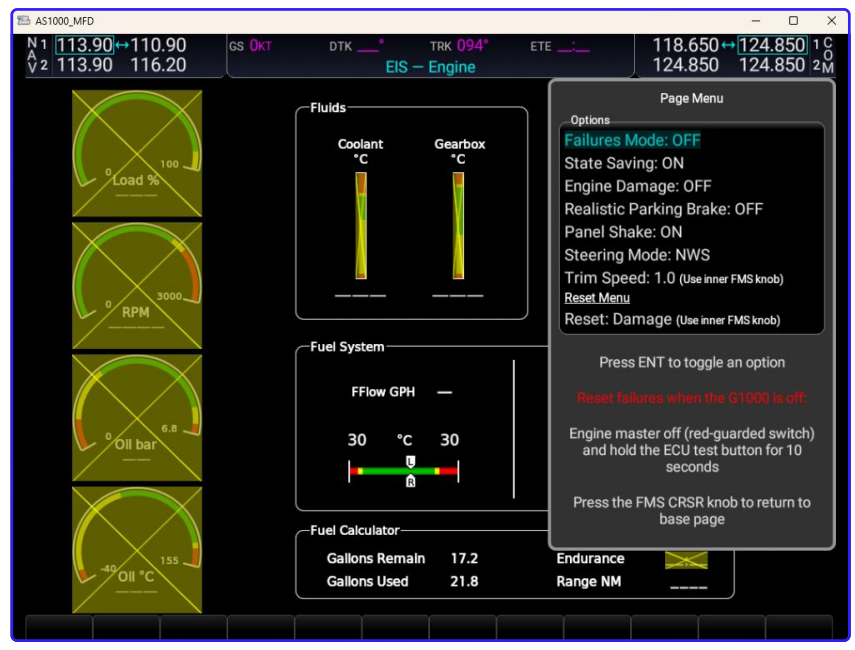
1. Navigate to the Engine Indicating System page (EIS).
2. Click on the “Menu” button on the right side of the MFD.
3. Use the large FMS knob to scroll through the options and the enter key to toggle.

Note: Circuit breakers and engine damage accumulated will not be reset.
In the case of an MFD or PFD failure, the EIS menu will not be accessible. Turn the electric master off and hold the Ignition to “Start” for 10 seconds.

To mitigate failures, we recommend familiarising the abnormal and emergency procedures in sections 3 & 4 of the DA40 Airplane Flight Manual. If the failure is absent from the flight manual, use aeronautical decision-making (DECIDE model) to mitigate the situation. **LINK**

DA40-XLS

DA40-NG



Engine Damage

The COWS DA40 has a custom engine damage model that will progressively deprecate engine performance when the user operates the powerplant improperly.

User errors that will inflict damage:

- Improper warmup
- Overheating
- Oil starvation
- Overspeeding
- Unfiltered dirty air
- Improper leaning (XLS)
- Shock cooling (XLS)
- Lead fouling (XLS)
- Sustained high load >92% (NG)
- Improper cooldown (NG)

State-Saving

The COWS DA40 has custom state-saving capabilities to restore the airplane to its prior configuration. The aircraft will **not** restore its previous configuration when spawning directly **on the runway** or **in mid air**.

Items that are not saved:

- Canopy & window positions
- Parking position
- Alternator masters
- Ignition switch position
- Electric, Alternator and Engine masters

Other Features:

Realistic Parking Brake: The COWS DA40 has the ability to simulate a parking brake valve. The valve will hold the pressure inputted by the user.

Mixture lever starting: For players without hardware, the mixture lever can be used to activate the starter. For the starter to engage, the ignition must be set to "Both". The action of pulling the mixture back will engage the starter, enrichen the mixture once the engine fires to complete the engine start.

Panel shake: Toggles the panel shake on and off

Trim speed: Adjusts the trim speed

Steering mode: Switches between steering modes

Priming assist: A gauge will guide you on how much to prime the engine for starting.

Reset menu: The reset menu allows you to reset specific parts of the aircraft.

- *Damage:* Reset engine damage and damage related failures
- *Failures:* Resets all random failures
- *Battery:* Recharges the batteries
- *Flooding:* Removes all the fuel in the engine and cools the fuel lines (XLS)
- Spark Plugs: Removes spark plug fouling (XLS)
- *ECU:* Removes any ECU failures. This doesn't fix the problem, only the resulting failure message (NG)
- *Wire:* Restores the Fuel selector break wire (NG)
- *Everything:* All of the above

Section II

Engine Control — XLS

This section contains information on the operation of the DA40-XLS' **Lycoming IO-360** powerplant

Performance Variations

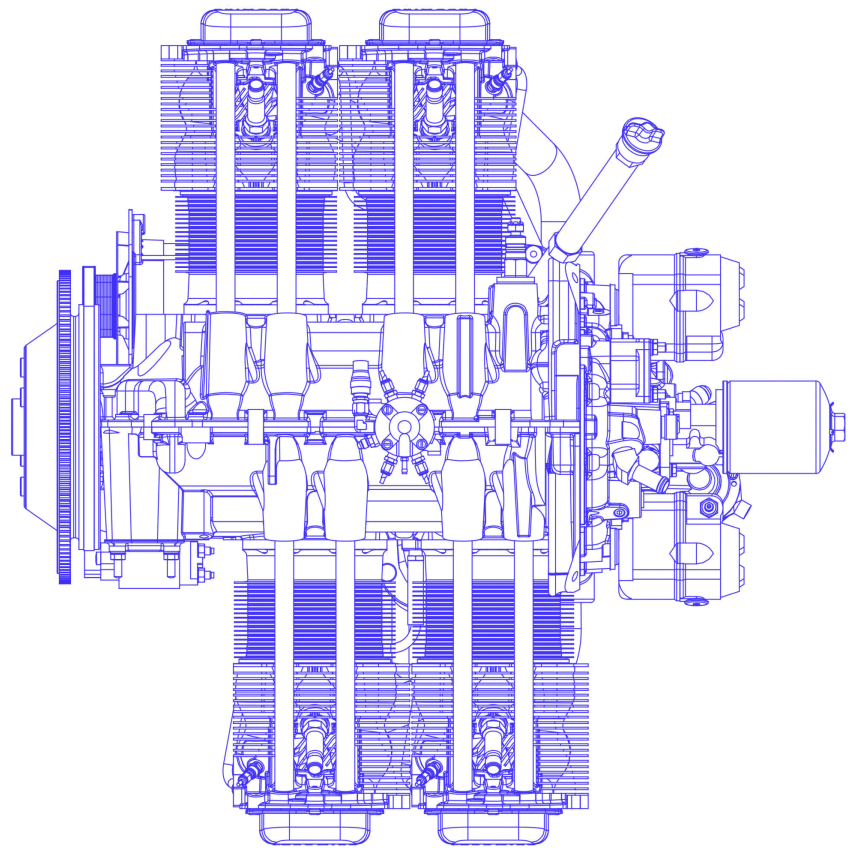
The Lycoming IO-360 is made from thousands of mechanical parts moving together. Due to manufacturing tolerances and mechanics' preferences, each engine behaves differently, this has been modelled in the COWS DA40.

The performance variations are randomly generated, saved, and can be regenerated by resetting the engine damage in the G1000 engine page menu.

As the variances are completely random, some users may have engines that run rich, slow and sputter at idle, or even stall in some conditions, while some users may have a leaner running engine that runs perfectly in all conditions.

These variances affect:

- Fuel flow, mixture and EGTs.
- Idle rpm and throttle response.
- Oil and fuel pressure.
- Oil and cylinder temperatures.
- Magneto timing.
- Minimum and Maximum propeller RPM



Combustion:

The COWS DA40-XLS runs a full simulation of the engine for startup. The engine combustion simulation simulates all 4 strokes of the engine for each piston/cylinder. Forces and torque are calculated and sent to the crankshaft.

This is to get past the limitations with the MSFS engine model which has a lower limit of 400 rpm, below which the engine cannot run. Engine starters however can only turn the engine to around 200 rpm. The COWS DA40 engine simulation has no lower limit and computes all the way down to 0 RPM.

After startup, the simulation continues, but injects a computed manifold pressure back into the MSFS engine model to provide the correct engine output. This computed manifold pressure takes into account many engine parameters and may cause a mismatch to the external manifold pressure gauge in FS2024.

Throttle Body & Fuel Servo:

The COWS DA40-XLS fully simulates the throttle body, fuel sending unit and more. The throttle body simulation also has no lower limit and will run all the way till shutdown. As the engine RPM increases, so does the airflow, however due to the restriction from the throttle body, manifold pressure decreases.

The fuel servo/fuel sending unit is the mechanical device responsible for delivering the right amount of fuel. The fuel servo has 2 "jets". The "Main jet" and the "Idle/starting jet".

The "Main jet" uses a venturi to sense the mass flow through the engine and with a set of diaphragms and springs the fuel flow is metered to the injectors. However at low RPM/manifold pressure, the pressure drop in the venturi is not enough to move the diaphragms. This is where the "Idle/starting jet" comes in.

The "Idle/starting jet" controls fuel directly with the throttle and mixture lever and is independent of the engines RPM and manifold pressure.

Engine Start/Priming:

As mentioned in the previous page, The “Idle/starting jet” does not require airflow through the engine, this makes priming the engine for start tricky as the engine can easily be flooded. That is why the correct priming procedure must be followed, unlike a carbureted engine where the mixture can be kept full rich. Follow the instructions on the right side of this paragraph to properly prime the engine.

If you are struggling to start the engine, use the “AUTO START ENGINE” keybind. The autostart script will perform the correct normal or flooded start procedure. Observe the lever movements, switch timings and sounds.

To start/prime the engine correctly:

1. Set the bottom edge of the throttle lever to the bottom of the "E" and turn on the fuel pump.
2. Push the mixture full forward for around 5 seconds. Confirm a fuel flow indication above 4.5gph. Depending on engine and air temperature the fuel required for priming will vary.
3. Set the top edge of the throttle to the bottom of the "E" and engage the starter. When you hear the engine fire, push the mixture forward.
4. If the engine does not start within 10 seconds, disengage the starter and prime the engine again for another 1-2 seconds and re-engage the starter.

Tip: As there is no way of knowing which side of the mixture band you’re at, it is easier to put yourself on the richer side. Fuel will always be removed while rotating the engine. As the mixture leans out, the engine will fire up.

Engine Leaning:

Ideally, the air/fuel ratio of all engines would be set to the stoichiometric ratio of 14.7:1. This provides the hottest and cleanest burn of fuel. Unfortunately due to weight, material and manufacturing limitations, this optimal mixture can only be used below power settings of 75%.

A mixture ratio of 12.5:1 provides more power than the stoichiometric ratio without damaging the engine, but comes with the hottest cylinder temperatures. The fuel servo is not perfect and the mixture ratio can vary up to 2 parts, potentially damaging the engine by providing an incorrect fuel flow.

In general, the full rich setting provides an air/fuel ratio of 10:1. This mixture ratio will ensure safe operation at any power setting, but ~30% of the fuel will be unburnt and wasted. The mixture lever gives the pilot the ability to run the engine safely at high power settings and efficiency at lower power settings.

For climb, the mixture should be set to full rich to provide good cylinder cooling and prevent damage, however the mixture can be leaned if cylinder head temperatures are kept in a safe range. We recommend not exceeding EGTs of 1350°F.

During cruise, the mixture can be leaned further to reduce fuel consumption. There are 2 ways to lean. **The simplest involves setting the manifold pressure, rpm and fuel flow using the tables on the next page.** However the required fuel flow varies depending on air density.

To lean the engine correctly:

1. Set your desired manifold pressure, rpm and enable the lean assist function in the G1000 engine page.
2. Slowly pull the mixture lever back until the 1st EGT indication peaks.

The mixture can either be enriched or leaned depending on the pilot's needs. For faster cruise speeds, enrich the mixture until the EGT decreases by 100°F. For more efficient flying, the mixture can be leaned with a slight loss in cruise speeds.

If you are struggling with leaning, the “SET BEST MIXTURE” keybind can be used to set a mixture of 12.5:1.

DA40-XLS Table to set engine performance [65 - 75]

			Engine Power as % of Maximum Take-Off Power				
			65%			75%	
	RPM		2000	2200	2400	2200	2400
Fuel Flow [US gal/h]	Best Economy		7.9	8.2	8.5	9.2	9.5
	Best Power		-	9.5	9.8	10.7	11
ISA	°C	°F	Manifold Pressure (MP) [inHg]				
MSL	15	59	26.8	**24.9**	23.4	**27.3**	25.8
1000	13	55	26.4	**24.5**	23.2	**26.8**	25.5
2000	11	52	26.0	**24.2**	22.9	**26.5**	**25.2**
3000	9	48	25.7	**23.8**	22.6	**26.1**	**24.8**
4000	7	45	25.4	**23.5**	22.3	-	**24.5**
5000	5	41	-	**23.1**	22.0		**24.1**
6000	3	38		**22.8**	**21.7**		-
7000	1	34		**22.4**	**21.4**		
8000	-1	31		-	**21.0**		
9000	-3	27			**20.7**		
10000	-5	23			-		

The areas shaded light blue under each RPM heading are the recommended bands.

Correcting the table for variation from standard temperature:

- At ISA + 15 °C (ISA + 27 °F) the performance values fall by approx. 3 % of the power selected according to the above table.
- At ISA - 15 °C (ISA - 27 °F) the performance values rise by approx. 3 % of the power selected according to the above table.

An abbreviated version of these tables is provided in the in game checklist

DA40-XLS Table to set engine performance [45 - 55]

			Engine Power as % of Maximum Take-Off Power						
			45%				55%		
	RPM		1800	2000	2200	2400	2000	2200	2400
Fuel Flow [US gal/h]	Best Economy		5.8	6	6.3	6.6	7	7.2	7.5
	Best Power		-	-	7.3	7.7	-	8.5	8.7
ISA	°C	°F	Manifold Pressure (MP) [inHg]						
MSL	15	59	**22.7**	21.3	20.2	19.0	**23.9**	22.4	21.2
1000	13	55	**22.4**	21.0	19.9	18.7	**23.6**	22.2	21.0
2000	11	52	**22.1**	20.7	19.6	18.4	**23.3**	21.9	20.7
3000	9	48	**21.8**	20.4	19.3	18.2	**23.0**	21.6	20.4
4000	7	45	**21.5**	20.2	19.0	17.9	**22.7**	21.2	20.1
5000	5	41	**21.2**	19.9	18.7	17.6	**22.3**	20.9	19.8
6000	3	38	**20.9**	19.6	18.4	17.4	**22.0**	20.6	19.5
7000	1	34	**20.5**	19.3	18.2	17.1	**21.7**	20.3	19.3
8000	-1	31	**20.2**	19.0	17.9	16.9	**21.3**	**20.0**	19.0
9000	-3	27	**19.9**	18.7	17.6	16.6	**21.1**	**19.7**	18.7
10000	-5	23	**19.6**	**18.4**	17.3	16.3	-	**19.4**	**18.4**
11000	-7	19	**19.3**	**18.2**	17.0	16.1		**19.1**	**18.1**
12000	-9	16	-	**17.9**	**16.7**	15.8		-	**17.8**
13000	-11	12		**17.6**	**16.4**	15.5			**17.6**
14000	-13	9		-	**16.1**	15.3			-
15000	-15	6			**15.8**	**15.0**			
16000	-17	2			**15.5**	**14.7**			
17000	-19	-2			-	**14.5**			

The areas shaded light blue under each RPM heading are the recommended bands.

Correcting the table for variation from standard temperature:

- At ISA + 15 °C (ISA + 27 °F) the performance values fall by approx. 3 % of the power selected according to the above table.
- At ISA - 15 °C (ISA - 27 °F) the performance values rise by approx. 3 % of the power selected according to the above table.

Section II

Engine Control — NG

This section contains information on the operation of the DA40-NG's Austro Engine AE300 powerplant

FADEC

The COWS DA40-NG also shares similar features to the COWS DA40-XLS like combustion simulation and engine variance. These variances affect:

- Oil pressure and oil cooling.
- Thermostat opening temperature.
- Maximum propeller RPM

The DA40-NG comes equipped with a Full Authority Digital Engine Controlled engine (FADEC). These are also referenced as ECUs. There are 2 ECUs (A/B) for redundancy. With this the pilot workload is significantly reduced.

Starts are handled by the ECU, simply turn the key and go. Additionally the Austro engine AE300 is water cooled making the engine immune to shock cooling.
Oil cooling is handled by an Oil-Water heat exchanger. This decreases oil warm up times as the water can warm up the oil.

The power lever sets the target load from 0-100% and the ECU will adjust manifold pressure and injected fuel quantity automatically based on density altitude. At high altitudes and or high temperatures, the engine may not be able to provide the target load. The pilot must confirm proper engine operation before departure by setting max power and comparing the load displayed to the tables shown below.

Tip: Check the table before taxiing out to avoid scrambling for it later.

DA40-NG Minimum Load

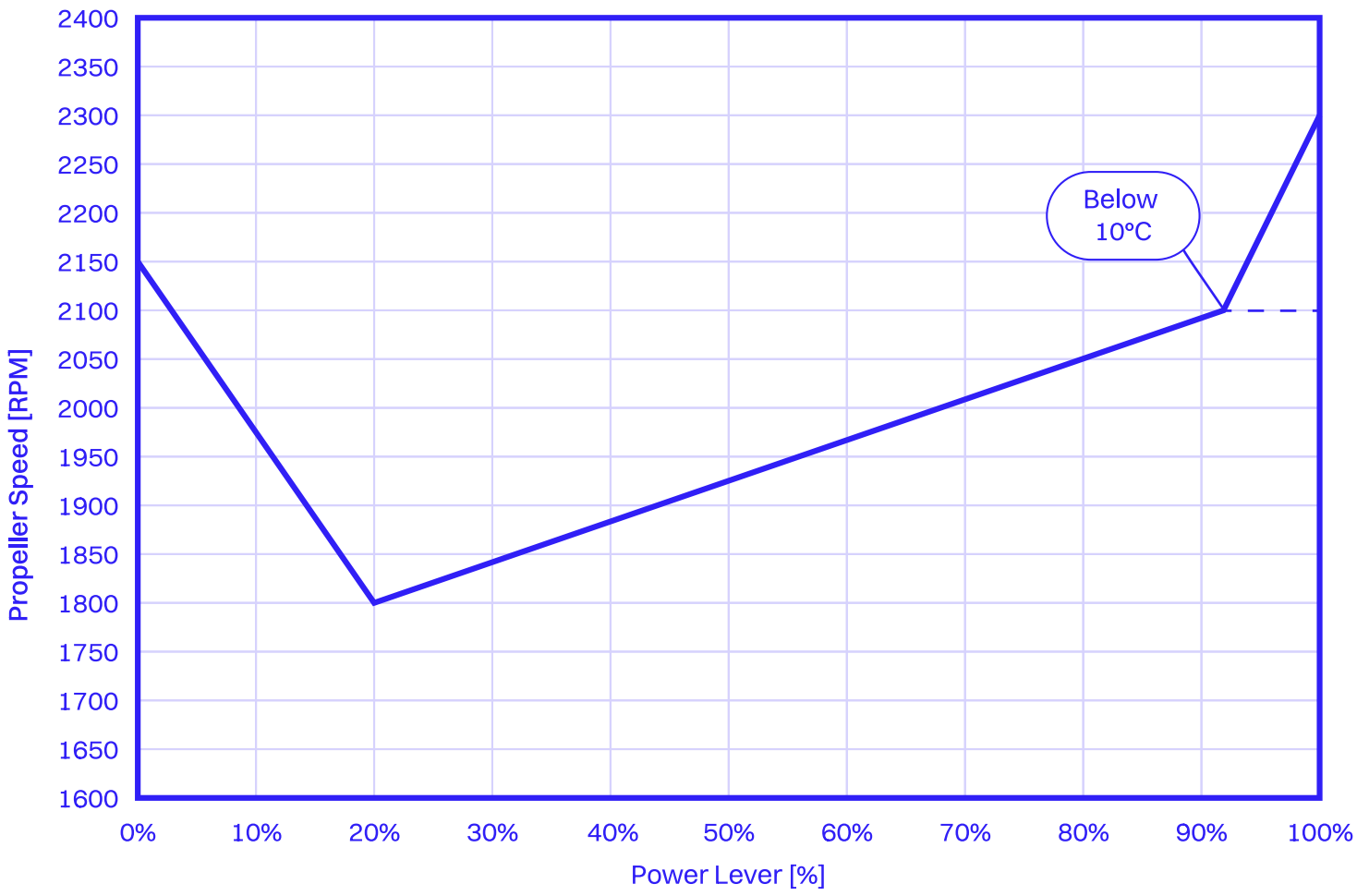
	OAT								
Altitiude [ft]	**-35°C -31°F**	**-20°C -4°F**	**-10°C 14°F**	**0°C 32°F**	**10°C 50°F**	**20°C 68°F**	**30°C 86°F**	**40°C 104°F**	**50°C 122°F**
0	94%			96%			95%	92%	90%
2000	94%			96%			95%	92%	
4000	96%						95%	92%	
6000	96%						95%	92%	
8000	96%					95%	94%	91%	
10000	96%			94%	93%	91%	88%		

FADEC [cont.]

Propeller RPM is also set by the power lever. The target RPM follows the curves shown below.

The area below 20% is called “disc mode”. The reduction in power and increase in RPM causes a large increase in drag. This can be used to bleed off speed or descend quickly.

Below -10°C the full power RPM is reduced to 2100.



Power Lever %	DA40-NG Values:
0	2150
20	1800
92	2100
100	2300

Fuel System

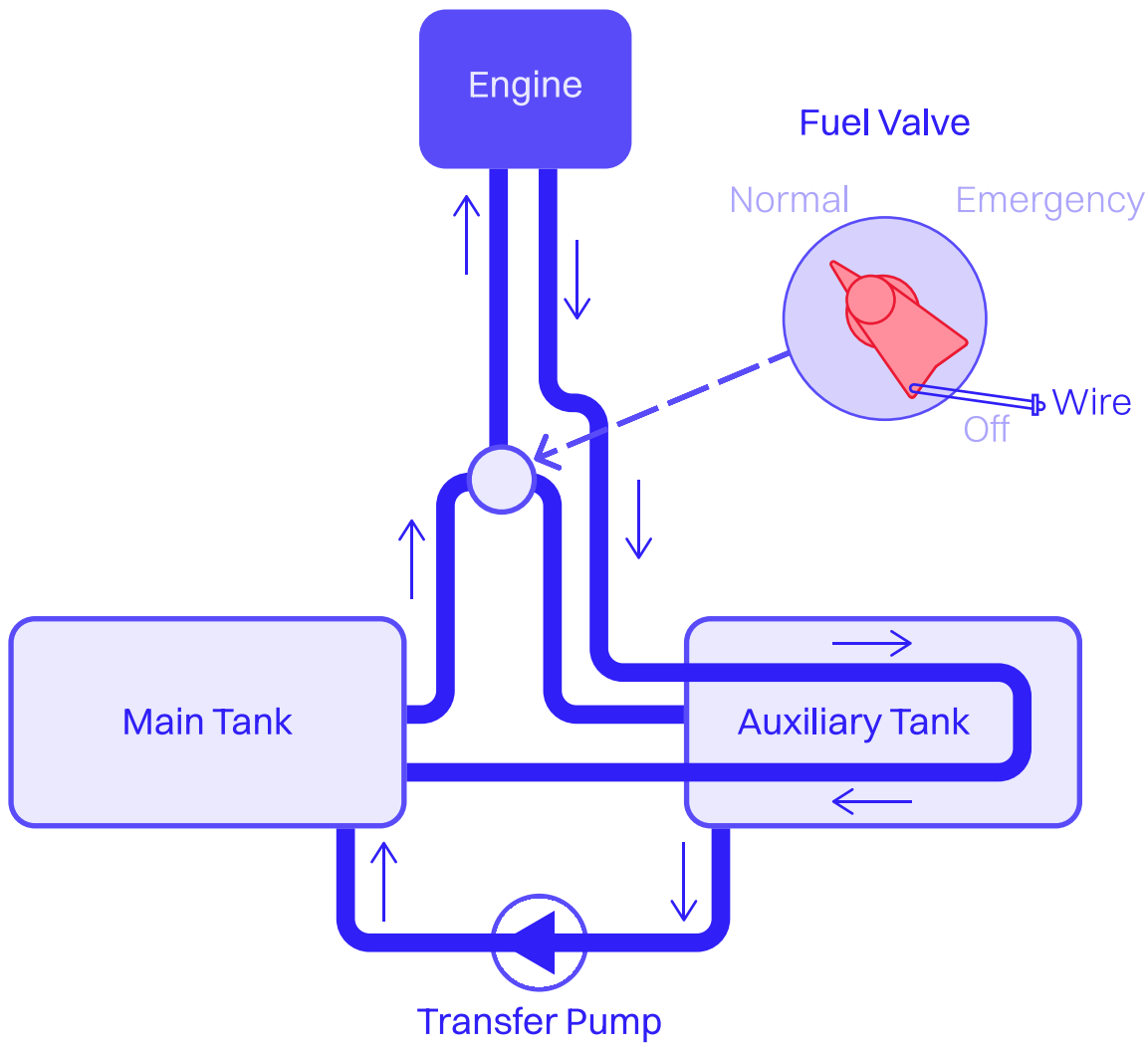
The DA40-NG has an unconventional fuel system. The fuel tanks are not “Left” and “Right” but “Main” and “Auxiliary”.

The common rail injection system creates a lot of heat. To avoid overheating, excess fuel is drawn from the Main tank and is pumped through the engine, through the Aux tank cooling loop and back to the Main tank. This warms up the fuel in both tanks.

To balance the tanks in flight, an electric transfer pump is used to transfer fuel from the Aux tank to the main tank at around 1gal/min. There is a sensor at around 14gal to prevent overfilling of the Main tank.

The fuel valve is held in the Normal position with a small copper break wire. To avoid accidental breakage in MSFS, the fuel selector is locked and the wire can be removed by **clicking and holding it for 3 seconds**.

In the “Emergency” position, the fuel is drawn from the “Aux” tank, through the engine, Aux tank cooling loop and back to the Main tank. Fuel is transferred at around 0.7gal/min and depends on engine RPM. **There is no sensor to stop the transfer of fuel. Fuel will be pushed overboard if the transfer isn't stopped.**



ECU Test

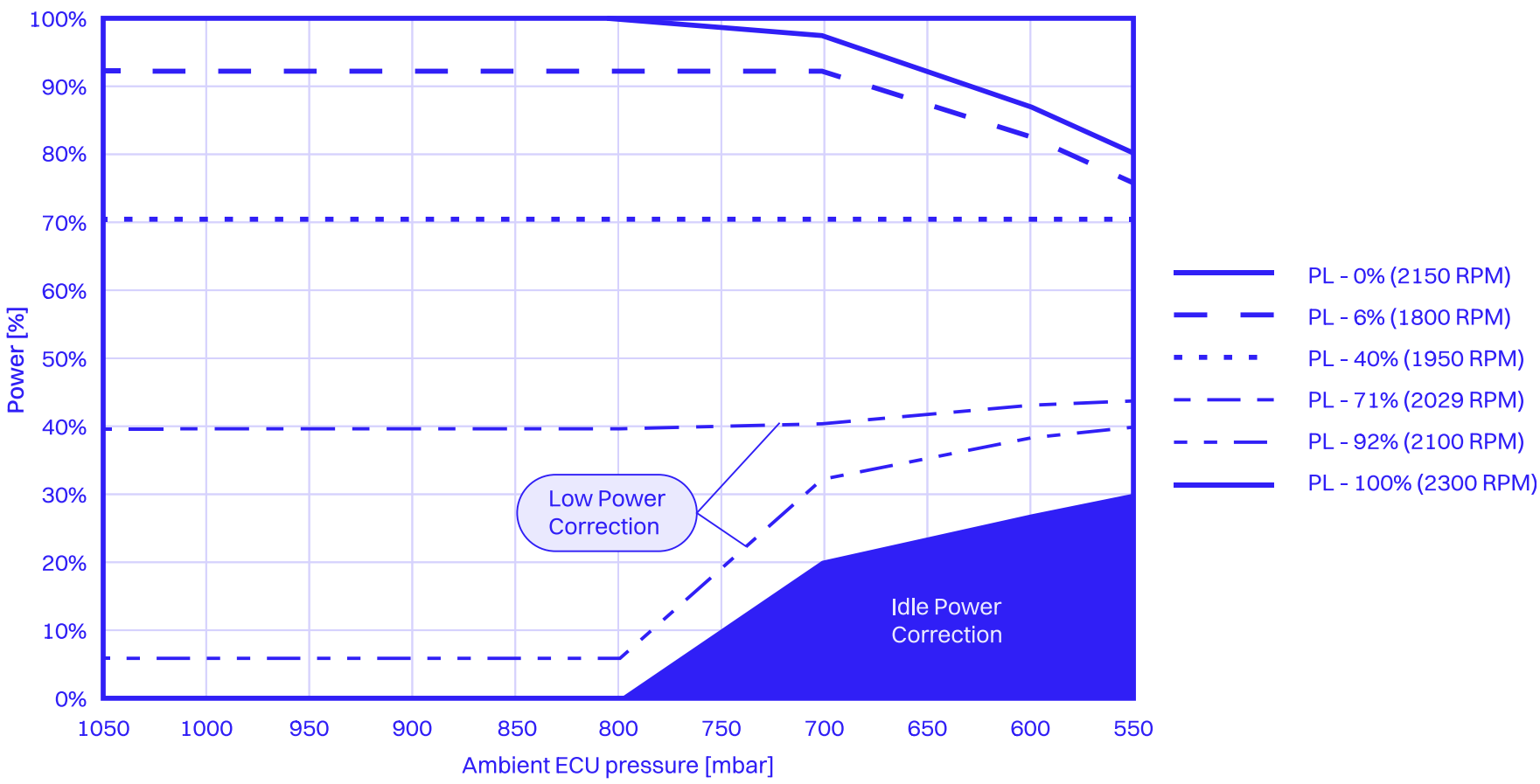
Just like on any aircraft, a before departure check must be performed (run-up). As the pilot does not have manual control of the systems the run-up is done automatically by the ECUs. This is done by pressing and holding the corresponding ECU test button on the left side of the instrument panel.

To start the ECU test, certain criteria need to be met:

- Power levers idle
- ECU voters set to auto
- Propeller below 1100 rpm
- Weight on wheels
- No errors
- Gearbox temperature above 35°

The engine rpm will increase, the propeller will be cycled back and forth, and come back down to idle once per ECU. Hold the button down until all CAS messages are gone and the engine has rested at idle. The test takes around 20-25s.

Engine Performance depending on Ambient ECU Pressure and Power Level (PL) Position



At high-altitude airports, the DA40-NG will run at a higher idle setting to prevent Combustion extinction (flame out). Take this into account when landing at high altitude airfields. This may increase the RPM above the threshold mentioned above.

Manual ECU test procedure:

- Set Voter switch to A. Confirm smooth running engine.
- Set MAX power, Confirm good and stable LOAD/RPM. No ECU warnings
- Set IDLE power
- Repeat for ECU B

ECU Error Handling

If an ECU detects any anomalies it will display an “ECU FAIL” CAS message and automatically switch over to the other ECU. The “FAIL” message does not mean the ECU has failed. The message simply shows that something isn't perfect and the engine may still run perfectly fine.

There are 2 types of failures. Category “Low” (unlatched) and category “High” (Latched) errors. An unlatched error can be reset while a latched error cannot.

Types of ECU Errors:

- **Unlatched:** An unlatched error can occur if a parameter shortly exceeds a threshold (eg: boost pressure).
- **Latched:** A latched error can occur if a sensor fails (eg: Boost sensor failure).

What to do if you encounter an ECU failure:

- Ensure the Aircraft is in a safe attitude, airspeed and area. Temporary engine failure may occur
- Troubleshoot the initial cause of the error. (filter icing, fuel pressure, power change)
- Voter switch to the failed ECU.
  - If the error clears, return voter switch to auto and continue flight.
  - If the error persists, return voter switch to auto and land at the next suitable airfield.

Do not pull ECU circuit breakers: Power loss is a category “High” failure and engine failure may occur if the wrong circuit breaker is pulled by accident.

Detailed steps and troubleshooting can be found in the Aircraft's flight manual.

Section III

Clickspots & Accessibility

This section contains information on the operation of clickspots, tips, and operable features of COWS DA40 Series.

Nosewheel Steering

The DA40 features a castoring nosewheel. This is lighter and simpler than a steerable nosewheel, but comes with less controllability on the ground. Steering is performed with airflow over the rudder and/or differential braking.

For players without rudder pedals, the COWS DA40 can switch between "*Auto brake"* and *"Nose wheel steering"* modes by pressing the *"TOGGLE LANDING GEAR"* keybinding. A CAS message will appear on the G1000 displaying the control mode.

Windows & Doors

The COWS DA40 has various operable doors throughout the model:

- The left front red handle within the cockpit operates the front canopy
- The left rear red handle within the cockpit operates the rear door
- The left & right storm window notch operate their respective window

The COWS DA40 has the following inoperable doors:

- GPU access panel
- Oil access panel
- Fuel cap

Control Sensitivities

The COWS DA40 flight model reacts appropriately across various control sensitivity settings. However, it is recommended that the user has flight control peripherals tuned to the right sensitivity options in the simulator. We recommend only adjusting one setting:
REACTIVITY:

- Less than or equal to 30% across all control surfaces

Loudness Limiter

In FS2024, certain aircraft sounds will play at a unrealistic volume - to remedy this, we recommend disabling "Loudness Limiter" setting for the best experience.

Headset Simulation

The COWS DA40 has implemented and referenced real sound recordings from the Bose A20 to mimic its ANC (Active Noise Cancellation) feature. To enable headset simulation, locate the GA plug jacks found on the **rearward side** of the **middle console**. The click spot is the jack itself.

Propeller Lever (XLS)

The propeller lever often gets covered by the throttle lever. To help with accessibility the clickspot of the propeller lever has been lengthened so it can be grabbed from the side under the throttle lever.

Priming assist (XLS):

The priming assist shows the amount of fuel in the whole engine. During a hot start the engine may start below the green area.

Automixture (XLS):

When the in-game “Automixture” setting is enabled the mixture lever will behave like a standard MSFS mixture lever. Priming is still required, however the engine can no longer be flooded.

Flood Light

The COWS DA40 has implemented an easier click spot for the cabin lights. The click spot is located on the **standby airspeed indicator needle.** The pilot’s floodlight is connected directly to the main battery and will function even when the electric master is off.

Pilot & Copilot Visibility

The COWS DA40 has the ability to toggle through 3 modes of pilots visibility. These can be toggled by clicking the seat belt buckles

1. **Normal**: The pilots are only visible externally with a weight over 10lbs set
2. **On**: The pilots are always visible
3. **Off**: The pilots are not visible

Section IV

Important Speeds & Operating Limitations

This section contains information on critical airspeeds and limits of the COWS DA40 Series.

DA40-XLS VSpeeds

It's important to note specific airspeeds for takeoff, landing, cruise, and stall conditions.

DA40-XLS (2646lbs) (Section 2, 4, & 5 in the AFM):

Vr - Takeoff Rotation Speed:	**59 KIAS**
Vy - Best Rate of Climb (Flaps T/O):	**66-67 KIAS**
Vy - Best Rate of Climb (Flaps UP):	**73 KIAS**
Vref - Approach Speed:	**73 KIAS**
Vbg - Best Glide Speed:	**73-76 KIAS**
Vref - Short-Field Approach Speed:	**62-64 KIAS**
Va - Maneuvering Speed:	**108 KIAS**

	Airspeed	**IAS**	**Remarks**
^{V}A	Manoeuvring speed	**111 KIAS** (above 1036 kg / 2284 lb up to 1200 kg / 2646 lb) **94 KIAS** (780 kg / 1720 lb up to 1036 kg / 2284 lb)	Do not make full or abrupt control surface movement above this speed.
^{V}FE	Max. flaps extended speed	LDG: 91 KIAS T/O: 108 KIAS	Do not exceed these speeds with the given flap setting.
^{V}NO = ^{V}C	Max. structural cruising speed	129 KIAS	Do not exceed this speed except in smooth air, and then only with caution.
^{V}NE	Never exceed speed in smooth air	178 KIAS	Do not exceed this speed in any operation.

DA40-NG VSpeeds

It's important to note specific airspeeds for takeoff, landing, cruise, and stall conditions.

DA40-NG (2888lbs) (Section 2, "Limitations" in the AFM):

Vr - Takeoff Rotation Speed:	**67 KIAS**
Vy - Best Rate of Climb (Flaps T/O):	**72 KIAS**
Vy - Best Rate of Climb (Flaps UP):	**88 KIAS**
Vref - Approach Speed:	**66-77 KIAS**
Vbg - Best Glide Speed:	**88 KIAS**
Vref - Short-Field Approach Speed:	**63-69 KIAS**
Va - Maneuvering Speed:	**101-113 KIAS**

	Airspeed	**IAS**	**Remarks**
^{V}A	Manoeuvring speed	**111 KIAS** (up to 1080 kg / 2381 lb) **108 KIAS** (above 1080 kg / 2381 lb up to 1180 kg / 2601 lb) **113 KIAS** (above 1180 kg / 2601 lb)	Do not make full or abrupt control surface movement above this speed.
^{V}FE	Max. flaps extended speed	LDG: 98 KIAS T/O: 110 KIAS	Do not exceed these speeds with the given flap setting.
^{V}NO = ^{V}C	Max. structural cruising speed	130 KIAS	Do not exceed this speed except in smooth air, and then only with caution.
^{V}NE	Never exceed speed in smooth air	172 KIAS	Do not exceed this speed in any operation.

Section IV

Flight Planning Tips

This section outlines tips and tricks to make a flight plan and calculate critical distances, time, and speeds for a general aviation flight. Below are techniques derived from real-world flying.

For a more detailed outline, take a look at Mitchell's flight instructor lesson plan here: Download

Planning a Flight

To plan a cross-country flight, using tools such as Skyvector, Foreflight, or Garmin Pilot will help aid your flight planning process. Begin by first plotting the departure and arrival airport. Then find waypoints in between, whether VFR or IFR, use visual waypoints on the map, or use VORs and NAVAIDs. Waypoints should be within 20nm to ensure navigational signal integrity and basic pilotage.

After establishing waypoints, pick an altitude of over 2000ft AGL over the highest terrain or obstacle en route, then add 500ft if VFR. This will be your cruising altitude.

Top of Climb

To calculate top of climb, refer to the operating manual cruise climb performance chart to calculate rate-of-climb at your given weight. Then average that climb rate with the departure altitude and the cruising altitude. Then, divide the altitude difference (cruise altitude - departure field altitude) by the climb-rate. This will give you the resulting minutes it takes to reach top of climb.

To calculate the distance, you will need to multiply your ground speed by the time it takes to reach top of climb (in hours). To calculate groundspeed, take indicated airspeed, convert it to calibrated airspeed in AFM, then use local winds aloft to add or subtract from the calibrated airspeed.

Finally, divide the resulting calculated minutes above by 60 to convert it to hours, and multiply that by the groundspeed to determine how far out your TOC will be in NM.

Top of Descent

To calculate the top of descent, multiply the altitude difference (Cruise altitude - arrival field altitude) by 3. Move the decimal 3 places to the left and this will be the NM out that you will need to start your descent.

To calculate how fast you should descend, take your groundspeed and divide it by two, add a 0 to the end and the result is your standard FPM descent rate on a 3-degree standard glideslope.

Refer to this worksheet developed for Utah State University for formulas to calculate Top of Climb (TOC) & Top of Descent (TOD) Calculations: **LINK**

Section V

Product Information & Useful Links

This section provides users with links to useful documentation from official Diamond training checklists, to the paint kit for the aircraft if you want to get creative.

Product Features

Systems

- *Fully custom DA40 EIS page with Lean assist and interface to control failures and other features*
- *Accurate electrical system with circuit breakers, alternator voltage simulation and parasitic losses*
- *Custom standby flight instrumentation*
- *Custom AFCS and trim system with adjustable speed*
- *Custom lighting that warms up and responds to system voltage*
- *Engine damage, state saving, and 130+ random failures*
- *Automatic localizer back course switching and multiple fixes to native Asobo systems*

Sounds

- *Developed from the creator of sounds behind the COWS DA42 Series, FBW A32NX, FlightFX vision jet and others.*
- *Dynamic engine, wind, and ground roll sounds*
- *Engine sounds differ depending on prop pitch, fuel flow, and speed*
- *Dynamic wind sounds, howling sounds in slips and drag noises with flaps*
- *Sounds sourced directly from a local DA40-XLS*
- *Headset simulation*

Visual Model

- *Light-baked photorealistic reflections and ray-traced shadows & lighting textures*
- *Faithful exterior model cross-referenced with hundreds of pictures*
- *Intricate interior model featuring moderate and heavy wear*
- *Two interior options of black panel/ standard grey furnishings*
- *Subtle and photorealistic photo-overlays for incredible lifelike textures*
- *All placards sourced and positioned from Diamond maintenance manuals*
- *Exterior features realistic moderate to heavy dirt/wear, matching reference DA40*
- *Fiberglass scratching on the fuselage, wings, and empennage*
- *Realistic bug splatter on the leading edge of wings, cowlings, and various other areas referenced from local DA40*
- *Subtle panel vibrations during ignition, takeoff, and landing to include free-castering nose gear shimmy*

Engine Model

- *Accurate engine performance in relation to manifold pressure, RPM, and pumping losses*
- *Custom combustion simulation for startup*
- *Throttle valve, venturi, fuel servo, and induction system simulation*
- *Per cylinder: Mixture, Fuel Atomisation, EGT, CHT, Spark, Air and Oil cooling simulation*
- *Custom fuel and oil pressure system simulation*
- *Per user randomly generated engine variance and behaviors to provide everyone with a unique experience*

Flight Model

- *Accurate Performance and handling with over 1000 hours of testing from DA40 pilots, students, and instructors*
- *Replicated performance and behaviors on maneuvers from FAA's Commercial Airplane ACS to include: Lazy Eights, Chandelles, Steep Spirals, and 8s-on-Pylons*
- *Accurate precision landing performance, descent rate, induced drag, to replicate Short-Field Approach and Landings, Power-Off 180° Accuracy Approach and Landings*
- *Airframe shakes during ground power runs*
- *Hot-swappable castering or steerable nose gear*
- *Brake fade and tire rolling resistance*

Paintkit

Get creative by turning your COWS DA40 into a virtual canvas with creating custom liveries and paints through our official paint kit for the COWS DA40 Series:

DOWNLOAD

Normal & Emergency Checklists:

The official Diamond training checklists is recommended to be used with the COWS DA40 Series:
DOWNLOAD

Aircraft Flight Manual:
DOWNLOAD

Aircraft Flight Manual Supplements:
DOWNLOAD

END OF DOCUMENT