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Flight Simulation eMagazine : Review



# ALABEO™

*Corvalis  
C400TT*



## Cessna 400TT Corvallis | Alabeo

### General Description & History of design and development

The Cessna 400 was derived from the normally aspirated Columbia 300, which in turn was derived from the Lancair ES kit aircraft. The 400 is powered by a turbocharged Continental TSIO-550-C engine producing 310 horsepower (230 kW) at 2600 rpm. The 400 features a Garmin G1000 glass cockpit that was later incorporated into the 300 to create the Cessna 350.

The 400's Continental TSIO-550-C engine is capable of being operated lean of peak. Measured in flight at 11,000 feet (3355 m), 50 F° (28 C°) rich of peak turbine inlet temperature, maximum cruise yielded 199 knots (369 km/h) true air speed and 24.7 US gallons (93 L) per hour fuel flow. At the same operating parameters and 50-75 °F lean of peak the 400 was measured at 189 knots (350 km/h) TAS and 17.8 US gal (67 L)/hr (106.8 lb/hr, 67.6 l/hr).

The Columbia 400 was marketed with an optional ice protection system, known as E-Vade that was not certified for flight into known icing. The system consists of heat-conducting graphite foil panels on the wing and tail leading edges. These panel areas are heated by 70 volt 100 amp electrical power delivered from a dedicated alternator. The system is controlled by a single switch.

The 400 features optional speedbrakes mounted on the wing's top surfaces.

The 400 nosewheel is not directly steerable; directional control while taxiing is accomplished using differential braking on the mainwheels. Initially sold simply as the Cessna 400, the aircraft was given the marketing name Corvallis TT for twin turbocharged by Cessna on 14 January 2009. The name is a derivation of the town of Corvallis, Oregon which is west of the Bend, Oregon location of the Cessna plant that built the aircraft, prior to closing the plant and relocating production to Independence, Kansas in 2009.

In April 2009 Cessna announced that it would close the Bend, Oregon factory where the Cessna 400 was produced and move production to Independence, Kansas, with the composite construction moved to Mexico. The production line was restarted in October, 2009 in the Cessna Independence paint facility, at a rate of one aircraft per six months initially. This was to allow the new workers, plus the 30 employees transferred from Bend, to gain experience and also allow Cessna the opportunity to retail its unsold inventory of Cessna 350s and 400s. At that time the company anticipated moving the 350/400 production to a permanent facility by the end of 2009.

In December 2010 a Cessna 400 that was being test flown by an FAA test pilot at the factory developed a fuel leak, the cause of which was determined to be that the aircraft had "suffered a significant structural failure in the wing during a production acceptance flight test. The wing skin disbonded from the upper forward wing spar. The length of the disbond was approximately 7 feet." As a result the FAA issued an Emergency Airworthiness Directive affecting seven Cessna 400s and one 350, all on the production line. The AD did not affect any customer aircraft in service, but did delay deliveries. In September 2011 the Federal Aviation Administration proposed a US\$2.4M fine against the company for its failure to follow quality assurance requirements while producing fiberglass components at its plant in Chihuahua, Mexico. Excess humidity meant that the parts did not cure correctly and quality assurance did not detect the problems. The FAA also discovered 82 other aircraft parts that had been incorrectly made and not detected by the company's quality assurance.

On 29 March 2011 Cessna unveiled several improvements to the Cessna 400 at Sun 'n Fun, designating the new variant the TTx. The aircraft has not been selling well since the late-2000s recession started, with 110 delivered in 2008, the first year Cessna produced the model, 41 in 2009 and just seven sold in 2010. The improved aircraft features a new glass cockpit panel, designed by Cessna and based on the Garmin G2000. Called IntrinziC, it features two 14 in (36 cm) wide high definition displays and a touchscreen controller that uses an infra-red grid to accept touch commands. The updated model also has dual Attitude and Heading Reference Systems, a GFC 700 autopilot, a Garmin GTS800 traffic avoidance system, Garmin GTX 33ES transponder with ADS-B and the Garmin Electronic Stability Protection System, which protects the aircraft from operations outside the approved flight envelope. The new TTx model has no traditional instruments and instead employs the L-3 Trilogy as a back-up. The TTx also features a built-in pulse oximeter, a new paint scheme and a new interior. By the end of Sun 'n Fun 2011 the company indicated it had sold 16 of the new TTx model.

At Sun 'n Fun in March 2012 the company announced that a flight-into-known icing package would be an option on the TTx model. The system will provide up to 2.5 hours icing protection.

### Weights

The 400's maximum take-off weight is 3600 lbs (1633 kg) and the maximum landing weight is 3420 lbs (1551 kg). A typical empty weight without deicing equipment is 2575 lbs (1168 kg). With a full fuel load this leaves 413 lbs (187 kg) for crew and baggage.

### Certification

The aircraft was originally certified by the Federal Aviation Administration under FAR 23, on April 8, 2004 as the Model LC41-550FG (for Lancair Certified, Model 41, Continental 550 engine, Fixed Gear) and marketed under the designation Columbia 400. EASA certification was added in February 2009.

The Cessna 400 is certified in the Utility Category, with a positive limit maneuvering load factor of 4.4, whereas most comparable aircraft (such as the Cessna 182 and Cirrus SR22) are certified in the Normal Category with a load factor of 3.8.

The 400 has a certified airframe maximum life of 25,200 flight hours.



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#### Specifications:

##### General characteristics:

Crew: 1 pilot  
 Capacity: 3 passengers  
 Length: 25 ft 2 in (7.67 m)  
 Wingspan: 36 ft 1 in (11.0 m)  
 Height: 9 ft 0 in (2.74 m)  
 Wing area: 141 ft<sup>2</sup> (13.1 m<sup>2</sup>)  
 Empty weight: 2,500 lb (1,134 kg)  
 Max. takeoff weight: 3,600 lb (1,633 kg)  
 Powerplant: 1 × Teledyne Continental TSIO-550-C flat-6 engine, 310 hp (230 kW)

##### Performance:

Maximum speed: 235 knots (270 mph, 435 km/h) calibrated airspeed  
 Cruise speed: 235 knots (270 mph, 435 km/h) true airspeed at 25,000 ft (7,600 m)  
 Range: 1,107 nm (1,274 mi, 2,038 km)  
 Service ceiling: 25,000 ft (7,600 m)  
 Rate of climb: 1,500 ft/min (7.6 m/s) or greater, below 16,000 ft (4,875 m)  
 Wing loading: 25.5 lb/ft<sup>2</sup> (125 kg/m<sup>2</sup>)  
 Power/mass: 0.091 hp/lb (150 W/kg)

#### Appraisal - Introduction:

##### Developers Description:

##### Features:

Version 1.1  
 Alabeo G1000  
 Superb material shines and reflections.  
 Volumetric side view prop effect  
 Gauges reflections  
 Knob click sounds  
 Windows scratches and blades shines  
 High quality 3D model and textures.  
 Realistic behavior

##### Requirements:

Windows Vista/7/8 (32 or 64 bits)  
 Microsoft Flight Simulator FSX with SP1 and SP2 (or Acceleration Pack) installed or Lockheed Martin - Prepar3D Flight Simulator.  
 Pentium V/2GHz or similar – 2GB RAM – 512MB graphics card.  
 790MB available hard disk space

INTERNET CONNECTION is required for installing this product.



**Appraisal - Exterior Model :**

The modelling of the exterior of the aircraft is to Alabeo's usual very high standard with excellent detailing and shaping. There are no visible mesh errors to be seen and absolutely no bleed.

The form of the fuselage especially the nose and cockpit areas is very nicely implemented. The window cut-outs etc. have smooth edges with great internal detailing around the framing.

All of the cockpit / cabin windows exhibit a slight tint and good reflective properties. The animated baggage bay / cabin doors also have smooth cut-outs. They have detailed structural edges and exhibit no bleed when closed. The cabin doors hinge out to the sides and upwards with their latches being animated both inside and out.

Other modelled details on the fuselage are antennas and a tail position light. Various other ports, access panels, are detailed through the very highly detailed texture sets.

Wings, horizontal stabs, vertical fin and the associated flying controls are well modelled with good shaping / detailing where necessary, which includes static wicks which balance when the engines are running. The wing gives a subtle balance when the engine is running and a slight flex during take-off and landing. Animation of all flying controls is smooth and linear.

The wing tip strobes / navigation / recognition lights are very nicely modelled, having very good light sources which have a nice bloom effect.

The engine cowlings / intakes etc. are as equally well modelled as the rest of the exterior with excellent shaping of the two cooling intakes. Parts of the engine can be seen through these two cooling intakes.

The propeller and spinner are nicely modelled with the propeller spin disc varying nicely during power variations.

The three landing gear units are nicely modelled / detailed including detailed spats. The main leg fairings blend very nicely with local structures. The nose wheel strut is a simple tube which compresses and extends during take-off / landing. Landing lights are mounted on the leading edge of the starboard wing and like the wingtip lights have good light source / bloom.

Exterior texture sets are very well defined HD textures with very nice detailing and alignment. They are both bump and specular mapped giving good effects to panels, static vents, fixings etc. The package comes with 6 color schemes.

**Appraisal - Interior Model:**

When in virtual cockpit view the pilot and passenger are not visible, but from outside the aircraft they are, and are animated in their head movements. The pilot is also holding the side stick in his left hand and his arm is animated to move with it. (*Nice touch*)

Now to the Garmin instrument panel, it's a nice simple affair with the two main Garmin 1000 displays, PFD / MFD and between those the Garmin audio control panel. To the left of these we have a conventional ASI, ADI, and ALT as a backup to the digital displays. Below these displays in a central position is switch panel which contains a rather unique type of flap control switch in the form of a rotating lever. Other switch controls are for specific high altitude flying and autopilot annunciators. Each side of this panel there is a manual air vent.

Below the switch panel is the main Throttle, Propeller Control and Mixture control push / pull levers and further down an environmental control panel. On the extreme right side of the main panel is an ELT control switch. Below the pilot's control stick there is a circuit breaker panel, and in a central overhead position is a switch panel which contains the Battery Master, Avionics Master, Alternate Battery switches, plus map / floodlight lighting dimmers. The control quadrants (*side sticks*) are very nicely modelled from wood with active switches for AP trim & disconnect. Even the side stick boot changes shape when the stick is manipulated (*Very nice touch*).



The nose section, cockpit windshield area, baggage bay, cabin doors, pitot blank, cones, tug etc. are all very well defined in this package.



The engine cowling, cooling intakes / exhausts, propeller and prop cone are all very well defined in their shaping / detailing.



Wings, Nav lights, flap / aileron actuation hinges and static wicks are also very well defined in their shaping and detailing.





*This rear view of the Cessna C400TT shows off the great smooth curvatures that Alabeo always seems to achieve in their modelling. Great blending of the engine cowls / wings / vertical stabilizer etc. also adds to the realism of the model.*



*This view shows once more the great curvatures, plus the landing gear and spats. Though of relatively simple detailing it's very well defined. The engine cowlings are very nice with various panels and fixings.*



*This 45° front view shows more of the engine cowl details plus the landing gear. This view again shows off very well the smooth curves in the modelling.*

*This view shows off the equally great detailing of the upper section of the rear of the aircraft / wings etc. Also to be seen is the detail of the cut outs for the cabin doors and baggage bay door. The static wicks on the control surfaces are also visible in this shot.*



*The detailing of the lower wing, stabilizer, fuselage and engine cowling is of very high quality modelling / detailing. Very nice texture sets that show no signs of mis-alignment and are crisp in their definition. Very nice work indeed.*





The rudder pedals are also very well modelled / textured though there is no major wear / tear so I think we've got an almost zero time aircraft! There is a control console between the two cockpit seats which contains : in its forward section a Garmin GCU 476 FMS/Nav data input control panel. On an angled section aft of this is the exterior lights control panel and aft / above this is the Fuel selector control again finished in wood.

In summing up the instrument panel it has to be said that the modelling, functionality, texturing etc. is again to Alabeo's exceptional standards and this aircraft like all the others has a nice office to manage!

There are hingeable anti-glare panels at the top of the forward cockpit windows. Also through the drop down 'Shift +4' you can select cockpit windshield tint and instrument reflections, plus other selections. *(Nice feature)*

The cabin is decked out in a nice black / grey leather and high quality furnishings, which are modelled / textured to Alabeo's very high standards. Night lighting in both the cockpit and cabin gives a very realistic night environment. *(Great work)*

#### Appraisal - Flying the Cessna 400TT:

The aircraft is relatively simple to operate in its basic functions with simple procedures for engine start etc.

Procedures are detailed in various pdf files supplied along with a guide to the G1000 & FMS control units.

Engine start-up time is realistic like the real aircraft with good engine sounds in both the exterior and cockpit / cabin environments.

Taxying the aircraft is simple at slow speeds with turns easily maintained.

During take-off acceleration is responsive with very nice engine sounds. The aircraft climbs very well and is easily trimmed. Handling of the aircraft is again smooth with good reaction rates to control column inputs. The aircraft handles well in all flight regimes, being a real pleasure to fly.

The aircraft's stall is very nicely reproduced with a good stalling effects that accompanies the stall warning.





The modelling of the cockpit is excellent to say the least. Everything is detailed and functional. Great avionics and Garmin GNS1000 system. A fully integrated Comm / Nav / FMS system on just two screens. How times have changed!!!





Handling on approach is good and even at slow approach speeds the aircraft is stable and doesn't over react to control inputs. Braking action was very positive on landing. The aircraft systems all appear to operate as intended including the autopilot which was checked on various Nav tracks and using the APR function. The aircraft flew the ball as you would expect down to decision height as long as the approach was captured at recommended distances. We did not check short or steep angle captures. Overall the aircraft flies very nicely indeed and performs well.

**Appraisal - Our Findings:**

Overall Alabeo's rendition of the Cessna 400TT Corvalis is to a very high standard of quality, both inside and outside as we have come to expect from this developer. In general the aircraft flies very nicely indeed with no obvious problems found during our flights. To be noted is that this is V1.1 of the Corvalis which is the latest version at the time of testing. Overall we give this product our gold seal for quality and value for money. Visit the Alabeo site for product purchase. [www.alabeo.com](http://www.alabeo.com)





*For a GA aircraft its very chic, with high end leather seating and expensive furnishings. Just like my car! Not!*





Top : Central Switch panel with unique type of flap control lever.  
 Middle : Engine and propeller control panel.  
 Bottom : Environmental control panel.

Garmin FMS data input control panel is located between the pilot's seats.



Overhead switch panel.

