AVSIM Commercial Aircraft Review

Fly the Boeing 787 Dreamliner

Product Information		
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Reviewed by: Tim Capps AVSIM Staff Reviewer - September 17, 2009		

Introduction: The Seven Late Seven

The real Boeing 787 has yet to fly. While a machinists' strike did not help, the current delay might be summarized thusly: recent tests raised concerns that the composite wings might fail. Understandably, Boeing wants to work on this a bit before a highly publicized first flight. Boeing now says it will be November or December 2009 before the "wings-not-falling-off-for-sure" version is ready to take to the sky. If they can get the first flight in before New Year's Day, 2010, it will look more like a two-year delay than three, and they might avoid some bad end-of-year retrospectives by bored journalists.

Building an airliner at least half out of plastic is something that has not been tried before, except on kitchen tables, with colorful cardboard box lids nearby for inspiration. (I hope Boeing does a better job than I used to do at keeping the glue off the windows.) In the next few years, Airbus is coming along with the very similar A350 whose big selling point is "even more plastic than the 787!" Plastic (or "composite" as real airplane builders wisely prefer to call it, since

it is carbon fiber reinforced plastic) is a lot lighter than metal, which means less airplane to haul around with expensive fossil fuels in a volatile market. While Airbus attacked the market with the behemoth A380, Boeing is seducing it with the sexy and efficient 787.

The 787 started life looking like millionaire Bruce Wayne's own corporate jet, with severely raked wingtips, a shark fin tail, and the semi-mysterious name '7E7." It was the design successor to the abandoned/never-really-begun Sonic Cruiser, a near-Mach 1 jet that was to have better gas mileage than a 767. After a name-that-plane promotion that gave us the pleasingly retro "Dreamliner," what emerged was a beautiful, if more outwardly conventional design solidly in the tradition of the Seven Series: the 787. The "E" stood for 8 all along. Who could have seen that coming?

The 787 was originally supposed to fly way back in 2007, but that has been delayed five times now, the last coming just after Boeing officially announced at the Paris Air Show that it would fly July 1st, 2009. In the long run, however, delays are nothing compared to making the safest airplane possible, and the 787 is the future of Boeing. On the theory that sales will improve if every country has a stake in the game, the 787 is literally a world-wide production effort, with wings and fuselage sections being flown to the Everett assembly plant in converted 747 "Dreamlifters."

It was advertised with a range of 8000 to 8500 nautical miles, but overweight problems have cut that down to below 7000, which Boeing hopes will be much closer to 8000 by the time the first airplanes are delivered to current launch customer All Nippon Airways. It is supposed to carry 210 - 250 passengers at Mach 0.85. One interesting innovation is that the Rolls-Royce Trent and GE engines will be interchangeable on the same aircraft.

Whether The Wings Stay On Actually Is A Yes Or No Question

The wing composite failure issue was addressed by Boeing brass in a conference call with the aviation press. (Somehow, AVSIM was left off the list, but Boeing watchers at the Seattle Post-Intelligencer made the transcript available online. The highlight was this exchange:

Paul Merrion -- Crain's Chicago Business -- Media :

"So what would have been the worst case if you had flown? Are we talking about cracks in the fuselage or the wings falling off, or what -- if you hadn't made this fix before flying?"

Scott Fancher -- The Boeing Company -- 787 Vice President and General Manager

"The answer is our assessment is likely nothing would have happened. This is an issue where stress concentrations departed from the model. Absent being able to anchor those two pieces of data together with confidence based upon our design process, we would have had to reduce the flight envelope we were willing to fly… So it isn't really a matter of yes or no. It is gee, because we've seen this departure and haven't been able to anchor the data back to the model with sufficient confidence, we need to narrow our margins."

In other words, material in certain parts of the real airplane's wing is performing worse than computer models predicted it would. Until Boeing can match up their engineering assumptions with reality, they do not feel confident taking the airplane into the air. Whether this circumlocution means they are not 100% sure the wings will stay on is for the reader of the transcript to decide. "So it isn't really a matter of yes or no" may have been a regrettable choice of words in that context.

On August 14, 2009, wrinkles in the Italian-made composite fuselage caused production to be stopped. Boeing is addressing all these vulnerabilities with a series of patches -- literally. Remember that next time you are tempted to complain about the release-then-patch world of flight simulation! (Conversely, Boeing might learn a trick or two from add-on developers about managing expectations in an instant-online world.) It should be recalled that flight testing of the venerable all-metal 737 revealed that it produced excess drag that could buckle the wing spar at loads only 34% greater than normal, and reinforcements had to be added.

In the world of flight simulation, our airplanes are made out of electrons, or zeros and ones, or at any rate something much less substantial than plastic that nonetheless never breaks (unless we go too fast with the "aircraft stress causes damage" box ticked). Abacus has not only flown their 787, but you can download it and fly it yourself, too. Based on my testing, rest assured the wings will not fall off. Whether there are additional reasons to buy this airplane is the subject of this review.

Installation and Documentation

Test System
Dell XPS 430 2.5 Core 2 Quad 6 GB RAM Nvidia GeForce 9800 GT Vista 64 **Flying Time:** 15 hours

Abacus makes adding a 787 to your fleet easy: download, click and put in your name and code. You get 32 paints, or, really, 16 with both standard and wide-screen panels, which are welcome and should be expected from all companies that make 2D panels. Perhaps given the uncertainty over just who will be flying the 787 when it eventually does go into service, all but two -- Iceland Air and launch customer All Nippon Airways -- are virtual airlines. All-white versions are included for repaint, and the airplane is fully compatible with Abacus' painting program.

You will also find many flights to load and try out without having to go through the trouble of planning them yourself. Again, this will more likely be appreciated by neophytes.

PDF documentation consists of a 44 page "Fly the 787 Dreamliner Manual," "Boeing 787 Panel Information," "FMC User's Guide," and a "Read Me" with some basic flight simulation information and credits.

The Manual is 29 pages of useful information geared toward less experienced flight simulation hobbyists, followed by some interesting Boeing history and a rather out-dated description of the 787's development. There is a six-page gauge explanation that takes you through the intricacies of the 787 panel. Although default flight sim functions are used, the 787's panel throws a lot of information and options at the pilot, and your previous Seven Series expertise is likely to raise more questions than it answers.

Just as in the real 787, the Abacus version presents you with oversized screens packed with information. This is where the Abacus product starts to give you a taste of the real thing. Similarly, the simplified FMC warrants its own 11 page manual, and you will need it, because it is very different than what you are probably used to.

External Model

If you have been following the 787 saga, you have a pretty good idea what to look for. Swept wings with raked tips, a smoothly tapered nose that is much less blunt than the cigar-like 767, and scalloped engine nacelles meant to reduce noise. A lot could be forgiven if visual details like these were nailed. However, Abacus gets the nose badly wrong, giving the whole airplane a much more conventional look.

On the real aircraft, it slopes down nearly to the bottom of the fuselage, giving it a distinctive "futuristic" profile. Abacus has the fuselage curving up to form a stubbier nose close to the center of the cross-section, below smaller windows that are more nearly vertical than the sleek, sloping windscreen of the real thing.

Not bad but... (Boeing art on left used with permission)

...where's the new 787 nose, and why do we cruise at a slight nose-down attitude? (Boeing photo insert used with permission)

Apron toys are nice, but what's up (and down) with the wings?

Empennage looking good, but limp wings. (Boeing photo insert used with permission)

The engines do not look right either, being more nearly cylindrical than slightly eggplant-shaped as they should be, and the scallops are missing entirely. The wings look quite good in flight, producing the unusually exaggerated wing flex seen in Boeing promotional illustrations. On the ground, however, they droop down oddly from the engine attachments before bending back up, and the strobe lights flash unconnected to anything in mid-air above. The empennage fares better.

The skin is smooth as extruded plastic, and polished to a high shine. There is no detectable bump mapping. Overall, the level of detail is slightly inferior to the default FSX airplanes. Despite the bad nose, however, it does look more like a 787 than anything else out there, and the wings are an issue only when you look at them from spot view on the ground.

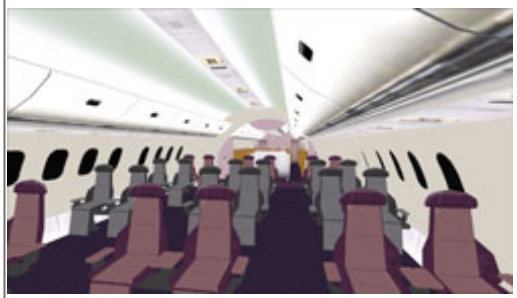
For the record, Abacus maintains the wings are accurate, or at least no one is sure what they will look like fully loaded with fuel. At any rate, you can judge for yourself and decide whether or not they are likely to bother you. There is a reason for screen shots in reviews.

One thing that makes the external deficiencies a little easier to take is the inclusion of a fleet of service equipment that surrounds the airplane at the touch of a switch on the overhead. There is a catering truck that extends up to the service door, and forward / aft stairs for your passengers. There are also custom baggage trains, conveyer-belt loaders, a striped fuel truck and even an air cart. Details like this not only make your ramp look more alive, they provide a nice scale to appreciate the size of a big airplane like this.

In the air, the airplane is unusual and beautiful, except at night, when one is exposed to ghastly window texturing on some of the paints. The white for-painting models are fine, though, so this should not be a problem for repainters.

Interior

Inside, there is a cabin that is long enough to give a sense of what a ride in the Dreamliner might look like. Arches emphasize a feeling of space, and the pinkish bulkheads with blotches was Boeing's idea. The real 787 has a bulbless LED "mood lighting" system for the cabin, but you'll have to wait for the real thing to enjoy those 128 color combinations. The visual details, such as first-class seating, are pretty basic.



This is what first class really looks like; also note the large windows.	There, but not too comfy-looking, and windows have shrunk to ordinary airliner size.	Real flight deck (Boeing photo used with permission).
		
Abacus version: not half bad from this view.	Virtual cockpit with pop-up FMC. Orange is active leg.	Very sketchy overhead.

The flight deck itself captures the Star Trek: Next Generation aesthetic of the real 787. The seats are white pod-like affairs, and the overhead, though vastly simplified, retains the curved lines of the new airplane. Boeing really went for points on style with this one, and The Airplane of the Future! vibes come across when you enter the virtual cockpit from the cabin.

By now, it should come as no surprise that the VC is nonetheless without much detail. Most of the knobs and switches are 2D, with little effort to create an illusion of depth. There are no animated extras, and, in fact, the flight deck door does not even close, so be prepared to discuss gladiator movies with Joey.

Panel

The cockpit of the real 787 has twice as much glass as the 777, with five 12 x 9 inch screens. These include a moving airport map display for taxiing and a vertical situation display. Abacus includes the latter, but, understandably, not the former. (At any rate, now you can use the Progressive Taxi feature in good conscience as in an implementation of the airport map feature.)

This is one you will probably want to fly from the 2D panel, even if you normally prefer the virtual cockpit. The head-up display is extremely basic, but has the virtue of being removable from the 2D panel with the click of a button. The virtual cockpit is, in this reviewer's opinion, not eye-pleasing once you take your seat, and you cannot work many of the switches and knobs anyway. I will admit to finding some nostalgic appeal in a big, flat 2D panel like this, so I did not miss the VC too much.

The panel replicates the big-screen look of the real thing. At first glance you may go into information overload. A comparison with Boeing pictures shows this to be reasonably accurate within the scope of this product.

On the left: Primary Flight Display (enlarged panels pop up)	In the middle: Multi-Function Display (position switchable)	Overall: note how default GPS is incorporated into nav screen
		

On the left, you have your Primary Flight Display (PFD). This includes both the familiar artificial horizon, and tape displays on either side for speed and altitude. Neither Boeing nor Abacus skimped with information here, and you get the vertical speed needle, barometer, minimums, Mach number, flight director crosshairs, ILS dots, and autopilot information. For instance, flying from Iceland to Norway, I can easily see I am at Mach .84, the autopilot is using "LNAV" (i.e. default GPS), and my altitude is held at 39,000 feet.

It says “FMS” because I remembered to hit the “XFR” button next to the heading window. In reality, the airplane is being flown by good old default GPS (as you can probably tell from the navigation display) but that information is also displayed in the customary LEGS format on the non-realistic FMC.

On the same screen, there is the familiar magenta line that follows your route from one waypoint to the next within the half-arc of a compass rose. You will also see whatever navaid you have tuned in, wind speed and direction, and your ground speed. Right now I have a sweet 104 knot tailwind.

The center screen is the Multi-Function Display, which is split between a larger navigation display on the left and everything else on the right. “Everything else” means your familiar digital engine gauges with N1, EGT, N2 and fuel flow for each engine, oil pressure, oil temperature, oil quantity and vibration. It also holds your fuel gauges, trim status, flaps indicator, gear light, and even your current gross weight and total fuel. The left-side navigation display is highly configurable, permitting you to see waypoints, navaids, airports, ILS, high-altitude airways, airspace and political boundaries.

The third panel is has a bigger use of the standard FSX moving map, which is also configurable to display various items of information, different range scales, and a either a “Map” or “Plan” orientation (orientation by North or by direction of flight).

The flight management computer is Abacus’ interpretation of a generic FMC, and although it shows waypoints and auto-sequences through them, it does not attempt the functionality of a real FMC. Do not bother looking for where to input your weight, much less departure and arrival procedures.

It does allow for some functions like changing waypoints, but does not implement them in a way similar to real FMCs. It is better than no FMC, and is in keeping with the simplistic approach to the subject. Judging it on its own terms, however, it is a neat little gadget that adds something the default airliners lack.

The overhead is a place for a couple of useful buttons, but is very sketchy, even compared to the default airplanes.

Flight

This is a basic aircraft best started up with ctl+E, as trying to use realistic start procedures will only be confusing. With flaps at 11 (?), rotation speed seems to bear a reasonable relationship to weight and manual handling seemed good enough. It is all guesswork at this point anyway, since the 787 hasn’t left the ground.

Gear up seems to be the cue for your wings to flex, and results in something pretty special in the air. Forget VNAV, which is represented by an inoperable button; you will be dialing in a vertical speed for climb. Alternatively, you can configure your FMC to attain the engaged Hold altitude on its own. (If you choose this latter option, be sure to un-choose it if you later decide to use your VS knob.) With auto thrust armed and engaged, you can push the handy 250 knot button or dial in your own speed. The airplane will level off at your selected cruising altitude if you have asked your FMC to manage your altitude.

It will follow a heading, radio navigation aid, or the standard GPS autopilot, although the latter is made to look more a programmed FMC route. It works as well as any other default autopilot-enabled airplane. It is up to you to figure out your descent or follow ATC instructions (again, no VNAV for flight level change). Autopilot permits ILS approaches, although you will take over for the actual landing.

Boeing’s depiction. (Boeing photo used with permission).

Abacus’ depiction. (Gear down, so wings droop.)

Getting slow at EHAM.

Cruise was actually flown in a slight nose-down attitude, which looked odd from certain spot view angles. Overall, flying was satisfactory once a few automated flight quirks were learned. Landing by hand seemed about right, although the engine response time is a little on the slow side, requiring some forethought. This seems fair enough.

Sounds

The 787 is supposed to be quieter, and this model, despite the lack of scalloped engine nacelles, has an absence of low-frequency sounds that reminds me of a hair dryer. The sounds come with the package, so this is what they were looking for and may actually be an attempt to produce something more 787-ish. Inside, though, there is a proper rumble. The ding dong switches -- seatbelts and “smoking” -- neither ding nor dong.

Summary / Closing Remarks

This is not an airplane without some positive points. Once airborne, it looks very much like a 787 from many angles, although the nose in profile is best avoided. The graceful flexed wings are particularly well-done and unusual in flight, regardless of how they may look on the ground. The 2D panel appears to be a serious effort to accurately represent the big screens of the 787. Apron toys are always appreciated.
It is a simple airplane that will not take long to learn or be likely to cause frustration. The ready-made flight plans are numerous and handy. It goes beyond the default aircraft by providing an FMC, albeit a simplistic one.

Simplicity per se is not objectionable, and I believe all products should be evaluated on what they attempt to do. The Abacus 787 is not billed as a procedural trainer, and I do not think anyone would buy it expecting -- or wanting -- the level of fidelity and complexity many of us enjoy in other add-ons. It is recognizable as a 787 and works to follow a flight plan automatically. You can fly it just fine, after its fashion.

However, even a simple package can be done with care; worked and re-worked until things that are done, are done right. The 2D panel is effective, but the bad nose and bent wings and other problems with the external model let the package down, in my opinion. If the thing really captured the 787 visually, it might be a fun airplane for beginners, or those times when more experienced pilots wanted a simple pleasure. If it were visually on a par with the default airliners, inside and out, I can imagine myself having some fun trying to make a repaint or two, tricking it out with FS Passengers, and AES, and still flying it without the benefit of a real FMC.

In a way, I am the Will Rogers of flight simming: I never met an airplane I didn’t like. Even in the Abacus 787 there is quite a bit to like, but not enough for me to give an unqualified recommendation. The exception would be someone who just really wants a 787 in his collection and understands what he is getting: a decent 2D panel that is pretty close to the real thing in a default sort of way, and no overhead panel to speak of, all tucked inside an external model that misses the mark.

I don’t know if Abacus has plans to do any more work on this product. With some work on the external 3D model, it could be more worthwhile for many simmers interested in the 787.

What I Like About Scotflight: Version 2
• The old-school 2D panel that nonetheless captures the essentials of the real thing • The way the wings flex (once the gear is up) • The simple pleasures of having something fairly easy to use with a few extras like apron toys • The view of the virtual cockpit as I entered it

What I Don't Like About Scotflight: Version 2

- The 767 nose
- The bent wings on the ground
- Lackluster visuals in general

Printing

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Boeing 787 Dreamliner

(adobe acrobat required)

Comments?

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