

# Advanced flight deck technology for safety

Technology



Over the years and through technology and the requirements of safety and comfort new deck flight plans have been devised and implemented. With this forward movement of a more integrated flight deck and commercial aircraft overall, this has led to a wider safety margin, a more economical cost of operations which in turn will help lower the consumers price of flights as well as their comfort and safety margin. The new flight deck of the Boeing 787 has taken into consideration many factors of the human element of not only pilots but passengers as well.

Boeing has spent many years with engineers as well as the astronauts from Nasa to incorporate and implement a flight deck design that in its overall abilities will prove to be a much safer, a more reliable “ tool” of flight ensuring the safety of all on board their commercial plane as well as ensuring specific ergonomic factors of the pilots, all of which in turn will help for a smoother flight and mitigate many more chances of potential accidents. At the same time there have also been the ongoing efforts to revolutionize the passenger decks for comfort, security and convenience.

Before the new design process for the Boeing 787 flight deck was actually implemented there were several factors that were considered. The old style flight deck instrument control panel itself had many more individual panels to read and watch, their design somewhat sporadic in comparison with what a pilot needed to view and when. There was a limited streamline for functionality. Furthermore, certain controls were either in the way or out of the way making for increased eye, hand and body movement to make a simple adjustment.

Pilot seats were more stationary, lacking the ability to swivel completely or to recline or even for basic lumbar support. The windshield has a lesser visibility radius than the new flight deck. The human factors of designing the new flight deck took into account certain specifics of ergonomics. This was to try and reduce strain on the lower back due to prolonged sitting, strain and wear on hands by operating simple hand controls and functions and less strain on eye movements or basic visibility.

These were the more important factors to help alleviate potential health issues that pilots, overtime, would experience, furthermore the flight deck design has less capability of causing carpal tunnel, eye strain, dealing with glare functions and in general less tiredness of the pilots which the end result would mean a safer flight for all involved and a more rejuvenated pilot after the flight. The new design of this deck for the pilots has incorporated many changes.

The controls, instead of all being joystick like are now more operational by the touch of a button which reduces carpal tunnel stress by having less rigidity that is common with all joystick controls. The windshield is now more anti glare and has the added function, in conjunction with the new panel, to allow for low visibility takeoffs and landings. The instrument panel has a much greater streamlined effect and fewer panels to view as well. The readouts are bigger and more detailed so that a pilot may not have to look as long or as hard to determine what they must do, this allows for quicker reaction time under all circumstances.

The data entry devices have been moved more out of the way to an off side positioning instead of an underneath or above positioning of the readout panels. This helps eliminate accidental data entry as the main point of any flight panel is centered. This has helped in wing control specifically. The rudder and indicators of the rudders, landing gear, fuel and other various indicators necessary has been moved to the main control panel that now rests in front of the pilot versus the traditional placement of above the pilot.

This way the pilot does not have to continually look up to check the indicators of a safe flight thus reducing body strain. One big change in the flight deck panel is the room for technological growth. Our technology is ever changing and the room left for this growth will help to ensure a placement of future technology without having to completely redesign the entire panel time and again. This has just become a more economy efficient plane.

One thing that most people don't realize, especially on longer flights is the need for paper to make notes on when flight plans need to be changed, when there needs to be an additional and yet unexpected change and this new implementation also helps with keeping a logbook more accurate and that is the built in, electronic scratch pad. Pilots can make notes about shifting winds, potential or unexpected weather pattern changes, a new noise that might be heard and for the mechanic or engineer to check out upon landing, whatever the case may be.

Considering the scratch pad is built in and computer controlled, should there be a failing or an accident, this along with the traditional black box may help solve many questions as to why much quicker. Airport layouts are all

different and each pilot must know the layout of the airport to help alleviate getting in the way or creating a ground accident before and after take off. The way this was dealt with is by programming an airport map function, for each airport, into a menu driven control panel.

Pilots are able to look at these maps and determine their point of entry or take off in conjunction with the tower's instructions. It gives them a much needed and yet basic heads up for comfortability in knowledge. This same programming also will record flight plans which in turn will tell you if you are off course and by how far. Additionally it will also give options to view other flight routes should an emergency or other type of landing need to be instituted. Lastly, in correlation is the gps like ability of marking waypoints.

Many would not think there could be waypoints when in the air but the lay of the land, different mountain ranges and bodies of water can be considered waypoints. With these new implementations this allows both pilots, at the same time, to have and maintain the same operational ability instead of one pilot having control aspects over a part of the plane, and the co-pilot sequestered into a different set of controls altogether. This becomes more of the teamwork atmosphere that is need for the lives of those on board.

There is a design for error tolerance where there wasn't before, meaning that should a pilot make an error in the flight path, the programming will take over to correct the situation. This error tolerance is only 1% but if you keep off course by that 1% then you will be far from your intended destination. This allows for a human to machine interface and more safety factors. Instead of wondering what the plane is doing, a pilot will know what

the plane is doing. There is obviously suggested training, especially with those who do not have flight management experience.

Boeing has done what they can at this time to insure that their safety guidelines are not only met for human risk but that these guidelines are above what is required and to the scope of guideline by other facilities and engineering specs. Now with this new integrated, streamlined flight deck, the passenger cabins have also been upgraded to include better air quality, more natural lighting via larger windows, larger overhead bins which make it easier to get in and out of when retrieving personal items.

The seats are wider as is the aisles and for those who are taller, there is a substantial more amount of headroom. There are current plans for future ATM's to be located on this plane. So with all of this in mind, taking in normal human strengths and weaknesses which vary from person to person, this new flight deck allows for more safety, especially with fewer parts being used, less failing and quicker ability for response time, and potentially less fuel which in turn creates a savings that can be put off, in part, to the consumer when they purchase a ticket to fly on the commercial Boeing 787.

The psychological effects not only on the pilots but on the customers, when they obtain this knowledge helps ease tension, behooves a less stressful environment for pilots and when all these functions are in place and all feel secure a flight goes much smoother. Small aircraft pilots would benefit greatly from this design as the majority of small plains are still archaic in their designs. Even though this is true, the safety factor needs are still the same. In some respects, with the technology into the Boeing flight

deck, this actually makes the larger plane much safer than the smaller planes of personal pleasure. (CL Tapken 2008).