AIR TRAFFIC CONTROL - EXPLAINED.....

Editorial by Captain Chris Harrison, MSc, AMRAeS, D Hyp, BSCH Assoc. from his book 'Beat Your Fear of Flying' www.to-fly.co.uk

All over the world in the skies above us reaching vertically upwards to ten miles or] 6 kilometres high is a network of air routes that cross each other at intersections. These routes have many different levels, like lots of lanes on a major road, however they are stacked upwards. It's possible to fly from one major airport in the world to another in the world flying on these highways in the sky. The purpose of these airways as they are called is to enable aircraft to safely transit the airspace of a country under control, that control means giving an aircraft a block of airspace around it which will keep it clear both vertically and horizontally from other aircraft, who in turn have their own piece of protected airspace.

In many of the countries the airways are closely monitored on radar by a controller on the ground that will see all the aircraft in his sector of responsibility, he can see them represented as a blip moving across a large TV screen; between the outlines of the airways. The blips have a group of numbers alongside which move with the blip or "return" and they give the controller information about the aeroplane such as, flight number, altitude, speed, and the departure and destination point.

The controller will know to an exact time, the arrival of an aeroplane into his sector, because he will have been advised by the previous sector's controller by either, land line (phone), telex, radio communication or he may even be sitting next to him. Sometimes whole countries are controlled from within one large room, or they can be split into areas where remote radar sensors relay the information back to a central nerve centre,

The controllers know about a particular flight because of a "flight plan" which is just what it says, a filed report with air traffic control at the point of departure of a predicted flight, giving time of departure, the route required, the speed and altitude to be flown, times when leaving and entering a different country's airspace, the time of arrival at destination, number of passengers and crew, type of aircraft, total flight endurance, navigation equipment carried, the captains name, what he had for breakfast (no not really)and just in case the weather should be completely unsuitable or the airport should close; a set of alternate airports. This flight plan is sent telegraphically to all the air traffic control units along the intended track of the airliner so that everyone knows there are coming, where and when, together with their own piece of protected airspace. There is a requirement for the aircrafts operating crews to maintain accurately their time over a particular reporting point and if unable do that because of lets say stronger than predicted winds, they will inform air traffic control of their new estimates which will be passed on.

The function of the individual air traffic controller is to maintain the separation required by all the aircraft in his sector. He can achieve this by instructing the pilots to adjust their speed, change their altitude, or to fly a slightly different route. There are times when many aircraft want to cruise at the same altitude so he will have to consider the needs of each aircraft and adjust on a priority basis.

Over large oceans like the Pacific or Atlantic, or Indian Ocean there are no radar sites so a different approach is employed which is called "procedural", a controller exists but he cannot see the aeroplane, he communicates with them by long range radio or satellite, and based upon the estimates at certain reporting points along the way, together with a larger piece of protected airspace, he can effectively carry out his task of aircraft separation.

In today's modern airliners the navigational equipment is so sophisticated that it is accurate to a few feet and to a few seconds, there is inbuilt redundancy so that should a system fail in mid-ocean there is always an accurate backup, and should the highly unlikely occur whereby

all systems are lost, then of course there is the pilot (lets not forget him) one of them continually runs a manual plan along the route on a plotting chart (a sophisticated map) so that flight could continue using what is called dead reckoning. When over land there are additional navigational aids, placed on the ground at turning points or junctions on airways, so that progress can be continuously monitored.

When in flight you will generally see other aircraft out of the windows above or below travelling along the same airway, and you may see an airliner appearing to be flying alongside, he may well be 2 thousand feet above or below you but at altitude a 747 can seem very close indeed when in fact it is a long way off.

When the airliner has started its descent towards the destination airfield it is "handed oveC to a controller who is responsible for sequencing inbound aircraft so that they fit into an approach pattern to optimise the number of aircraft able to land on one runway, places like Chicago or Jeddah may have three different runways in use at a time to handle the volume. Both the air traffic controller and pilots form a synergy of true professionals to enable aircraft to land in a continuous sequence of up to one every 20 seconds, in twenty minutes that represents 60 aircraft to be controlled.

1 am often asked about "blind landings" no it isn't instruments with Braille on them! But being able to land in minimum forward visibility down to 75 metres (they could land in zero visibility but the pilots have to be able to find their way to the gate after landing!). Modern aircraft have to have this sort of capability in Europe, Canada and North America because of the bad winter fogs, mist and snow showers. With up to three autopilots all cross referring one another and all being monitored by both pilots ready to take over manually, instantaneously should there be a degradation of any of the systems. The pilots have to have been specifically trained and completed many actual approaches first to build up their confidence in the system. Many times practise auto lands are carried out in fine weather to continuously prove the system. And lastly the airport has to have the facilities on the ground; obviously somewhere that rarely sees fog, mist or thick snow is not going to be one of them. If freak weather has arrived at your destination and your pilots cannot carry out an auto land then you will proceed to your alternate if the weather isn't going to clear soon.

You may have heard of "missed approaches or balked landings" these are where the aircraft is not in a position to make a satisfactory landing, for example if a truck entered the far end of the runway (highly unlikely) or the preceding landing aircraft had not cleared the runway, then a go around would be carried out, a bit like taking off again but from a point still in the air, you know your pilots are capable of taking off, they demonstrated that at the beginning of the flight, so its not a problem to them but it may feel uncomfortable to you as you were not expecting it, the worst that can happen is you might miss your train or bus connection.

Another situation 1 have seen that is perfectly normal but it can cause concern in anxious passengers. Shortly after take-off the departure procedures for a busy airport like for example London's airports may require a departing aircraft to maintain a specific altitude until passing a prescribed distance from the airport due to the arrival procedures of aircraft overhead. So after climbing at maximum angle at full power in order to keep the noise to close to the airport the departing aircraft is now required to fly level so a large pitch change downwards together with a large reduction in power can leave the worried passenger in a state of anxiety, so if it happens to you, you will know exactly what is happening and feel calm and collected.