

**CRM CONFERENCE – NIGERIA 2006  
VIRGIN ATLANTIC PAPER – 10/08/06**

**Honourable Minister, ladies and gentlemen,**

**It is a great pleasure to have been invited here today to speak about the importance of Human Factors within air transport and more specifically, Crew Resource Management and it's value to the corporation.**

**The last speaker effectively described CRM; it's conception, development and evolution. In terms of the organisation, what are the implications for the training departments, skill base, crew 'down-time' and, of course, budgetary constraints?**

**One of the questions must be, are the benefits measurable? Can an industry already struggling with worldwide instability and increasing fuel costs, justify the time and expense of this new training requirement.**

**The truth is that as with any safety system, there *is* no empirical way to quantify the savings; not in human - nor financial terms. However, if one single life or hull loss can be avoided, the benefits then become self-evident.**

**To help us understand the ‘CRM evolution’, I’d like to take this opportunity to illustrate the development of Crew Resource Management within Virgin Atlantic. As committed as we are today, the same has not always been true. Older pilot generations struggled with the fundamental concept of ‘psychology’ within their structured**

**hierarchy but slowly, it has been shown and proven that ‘the whole is greater than the sum of its’ parts’! Synergy.**

**A practical example that I can use to illustrate the breakdown of barriers in aiding communication and also showing human fallibility is an incident that occurred in Newark, USA several years ago - to one of our 747-400 Captains.**

**It had been snowing and a decision was made to de-ice the aircraft. This took place and the captain made an announcement to the effect that the snow had been removed, the aircraft was ready for ‘push back’. A junior cabin crew-member who had been in the airline for three months looked out from her position to the left hand wing and noticed snow on the top surface. She had understood from her initial CRM**

**presentation with the airline that this was a potentially hazardous situation – she therefore contacted a senior crew- member who alerted the captain to the problem.**

**The captain contacted the ground engineer through the intercom and explained that he had a report of snow *still* on the wing. The engineer checked the left hand wing reporting to the captain that there was no snow deposit on that wing! The captain was obviously puzzled and therefore challenged the engineer’s observation and asked him to repeat the action. This sequence of events was repeated a total of three times – on the final occasion, the engineer realised **THAT HE WAS LOOKING AT THE WRONG WING!****

**Ladies and gentlemen, I am sure you have already worked out where the confusion lay! The**

**engineer was standing facing the aircraft whilst checking the left wing AS HE SAW IT when in fact, the captain and cabin crew were reporting the left hand wing from inside the aircraft, facing forward.**

**This highlights several important Human Factors. The natural assumption that what you perceive to be true through your eyes does not necessarily reflect the real situation; in this case a simple use of the term ‘left’ as opposed to ‘port’ caused confusion and a potentially catastrophic event. However, thanks to the persistence of the captain and his resolve to understand the anomaly and clarify the contradictory perspectives, a positive resolution was found.**

**So, why did this incident have such a positive outcome when so many other actual aviation**

**incidents have resulted very differently? Let's look at an accident that occurred at Washington DC:**

**It's 1982 and a Boeing 737-200 operated by Air Florida was departing Washington National; a small, congested mid-city airport. It was January and the freezing, icy conditions were extreme! Dense traffic movement and delays caused by temporary closure of the runway contributed to a build-up of PSYCHOLOGICAL pressure...Pressure that was to fatally tax the judgement of a young and relatively inexperienced airline crew.**

**A complex chain of events – too lengthy to describe in the limited time available today - culminated in the death of 78 passengers and crew. However, the comparable point is that**

**crews aboard other aircraft departing or arriving while the Air Florida Boeing was taxiing for takeoff saw snow and ice on its wings. Some of them even described it as ‘unusually heavy’. One crew, taxiing parallel with, but in the opposite direction to the Boeing 737, even discussed the amount of snow on its fuselage. The captain even commented ‘Look at the junk on that airplane...’ Almost the entire length of the fuselage had a mottled area of snow and what appeared to be ice along the upper part of the fuselage above the cabin windows.**

**Ice and snow alone were not the sole reasons for this tragic accident however, the POINT HERE MUST BE to ask WHY experienced crew who observed this well known and critical situation said NOTHING? In part of its summation, the investigation concluded that ‘the limited**

**experience of the crew was a contributing factor to the accident. Because of the rapid expansion of Air Florida between 1977 and 1981, the captain had missed the extended ‘seasoning’ experience normally accumulated by an airline first officer. An informal survey of major US airlines showed that pilots serve an average of 14 years as a first or second officer before being promoted to captain.**

**The investigators believed that flight crew training, as well as selection criteria, should include considerations of command decision making, crew resource management, role performance and assertiveness. AS a result of previous accidents in which lack of crew communication was a factor, the United States National Transportation Safety Board recommended crews be trained in principles of**

**Crew Resource Management. There are many such incidents dotting the landscape of aviation disaster – unfortunately, this one does not stand alone!!!!**

**As we can see from this catastrophic event, despite many aviation professionals knowing that the wings were contaminated, the information was never communicated to the Air Florida flight deck. Why was this?**

**When this accident occurred CRM was rarely applied and often derided. Indeed in the early days it was only referred to as Cockpit Resource Management. We understood little of the importance that each member of the crew, and for that the matter passengers, play in the safety of the aircraft. It was considered that there were two separate worlds inside the aircraft; the forward**

**and the aft. For a cabin crew-member to report a technical suspicion to a pilot was almost unheard of. Unfortunately, lost hulls and many deaths have shown the tragic cost of this lack of synergy.**

**It would be naïve to claim that CRM alone is responsible for the reduced accident rate of recent years. Technology and the increased use of automation have played an enormous role but this fact ironically reaffirms a very harsh truth...Today's aircraft do *not* fall out of the sky because of mechanical failure alone. You are all familiar with the statistic that anywhere between 75% and 85% of ALL transport incidents have a HUMAN FACTOR element. But for the advent of CRM and a few dedicated individuals willing to push the boundaries in a traditional, formulaic arena, how many more deaths may have occurred and/or business's failed???**

**Rather than ask how much this new training may cost, should we not ask what is the price of one unnecessary serious incident or worse, a total hull loss?**

**It is possible that in the early days of Virgin Atlantic the story I told earlier of ice on the left-hand wing, discovered by a junior crew member, could have had the same tragic outcome. The airline of which I am so proud to work, may not have survived the obvious repercussions following such a catastrophic event.**

**A safety critical business that stands on its reputation for safety together with sound business decisions has a responsibility to do all that it can to explore and constantly evolve. Unfamiliar**

**techniques must sometimes be applied in order that we do the very best we can. Psychology itself has shown us so much of the human condition in the last 100 years; human error, human performance limitations, organisational and cultural change. There must be a willingness to embrace new thinking, which to some may initially be uncomfortable and not sit well with their hierarchical concepts - this *must* be challenged.**

**In 1992, Cockpit Resource Management became mandatory in the UK. Some time later, the same was applied to all onboard crew and it became ‘Crew’ Resource Management. Initially there was a tremendous amount of disparate information from many varied sources and as the subject gained momentum, it was difficult to disseminate the relevant legislation. To answer**

**this dilemma, the CAA – in accordance with JAR-Ops – created CAP 737 with guidance training regulations in the separate Doc 29.**

**CAP 737 has recently been updated and forms the heart of the Human Factors principle and guides a company such as ours. To quote the UK Civil Aviation Authority:**

**‘CRM is concerned not so much with the technical knowledge and skills required to fly and operate an aircraft but rather with the cognitive and interpersonal skills needed to manage the flight within an organised aviation system. In this context, cognitive skills are defined as the mental processes used for gaining and maintaining situational awareness, for solving problems and for taking decisions. Interpersonal skills are regarded as communications and a range of**

**behavioural activities associated with teamwork. In aviation, as in other walks of life, these skill areas often overlap with each other, and they also overlap with the required technical skills. Furthermore, they are not confined to multi-crew aircraft. They also relate to single pilot operations who similarly need to interface with other aircraft and various ground support agencies in order to complete their mission successfully’.**

**As you can see from this quotation, our CAA are insightful and are giving us the tools to help our crew, ground personnel and, of course, to protect the business.**

**At Virgin Atlantic we have recently developed a new system of instruction and now deliver CRM in a somewhat unusual fashion. The UK CAA recognise the individuality of different operators**

**and business models and although legislation is strict, it allows a long-haul airline such as ours to accommodate its requirements somewhat differently to that of a short-haul, vacation carrier. An example here would be that there is a recommendation for ‘joint’ flight deck and cabin crew CRM. As simple as this may appear to a company operating B737’s – because the ratio of pilot to cabin crew is similar – for us, cabin crew far outweigh the pilot numbers and therefore, joint annual training becomes very imbalanced. And so we have designed a three yearly structure - taking into account the various requirements of each working group.**

**All operational crew take part in an initial CRM course when they join the Company. We teach these separately to address the distinctly different criteria required at this early stage. However, we**

**mix the groups for lunch wherever possible and this enables each to meet the other.**

**Because we have a requirement for pilots to have at least 2500 hours flying experience before they join Virgin, they are quite comfortable with an airline environment – this is not always true of our cabin crew who are often employed at a young age. If we fail to introduce these young people to pilots at this point, it can estrange them and engender false negative assumptions. These can, in some cases, lead to a sense of ‘us and them’ which may inhibit communication at a later date.**

**Thereafter, there is an annual requirement for recurrent CRM. The three yearly rotating structure was introduced in 2006 and is designed to address all of the different aspects of Human Factors training. In the first year of this system,**

**a pilot will take part in a technical CRM session using Human Factors very specifically to analyse the system functions on the aircraft in relation to the human machine. Spatial awareness, automation, ergonomics are just a few of the subjects covered in a practical arena using real events from which to learn.**

**Year two will involve a LOFT (Line Orientated Flight Training) exercise which takes place in the simulator and recreates a scenario in which the pilot will be asked to fly; attention will not focus upon the technical flying capabilities here, more it will be about the individuals ability to work as an effective team member – one who shares information without prejudice or ambiguity. The exercise takes place in ‘real time’ using a basic problem to which there can be several conclusions**

**– none of which are necessarily right or wrong. The idea is for the crew to logically work through the scenario to its natural conclusion. I would be happy to answer any questions you have in relation to this sophisticated use of CRM during the question and answer session later today.**

**Year three involves a full day classroom training with the cabin crew. Real life incidents, challenging conversation with regard to each group's perception of the other and cultural issues are the order of the day. Threat and Error Management, human performance limitations and/or situational awareness are just a few of the subjects that are covered. Very soon we will be inviting our engineering and traffic officers to join the groups together with Operations Control and our management. The aim is to create cohesion; to enable each group to understand that they rely**

**on the other...To recognise that nothing can be achieved without the co-operation of all departments.**

**The cabin crew will annually take part in their SEP (Safety and Equipment Procedures) training and within this three day course, theoretical and practical CRM will take the form of scenarios in which they will be asked to demonstrate an understanding of the principles of good communication and human responses.**

**We conduct a first officer development programme intended to help individuals understand the concept of leadership and command and therefore successfully move to the left-hand seat when the time comes. Virgin Atlantic Pilot Competencies have been created. These give the workforce a template which**

**outlines the technical and non-technical standard expected of every individual.**

**All promotional courses for flight deck and cabin crew encompass a CRM element. The aim is to analyse the concept of leadership, decision making, assertive behaviour and cognitive function.**

**These days, much emphasis is given to facilitation and we aim to offer in-depth training to all of our instructors. Whether out on the line or in the simulator – at ground-school or in the classroom! Any ‘teacher’ dedicated to his profession can benefit from the techniques that allow the trainee to learn through self-discovery. To quote CAP 737 once again:**

**‘To be competent in any job a person requires a certain amount of knowledge, an adequate level of skills and the right set of ATTITUDES. This is true for doctors, hotel receptionists, lawyers, footballers, soldiers and of course, flight crew. The role of a trainer in any discipline is to help people develop their knowledge, their skills and their attitudes so that they are able to do their job well. In many professions the formal training emphasis is often on developing knowledge and skills. The examination of competence is almost exclusively concerned with measuring knowledge and skills against a set of standards.**

**‘In aviation it is no different. The vast majority of training resources and all formal examinations have been aimed at ensuring people have the appropriate knowledge and skills rather than THE RIGHT ATTITUDE. The fact that attitudes**

**are fundamental to competence has not been officially recognised - despite the fact that incorrect attitudes are suspected to have contributed to many major accidents – the ultimate consequence of a lack of competence. The reason for this omission is uncertain, but a reasonable assumption may be that training and examining attitudes have been less precise and more difficult to carry out successfully.**

**‘...A person’s behaviour is based on their past experiences, values and beliefs – all of which are different from those of others. Therefore, telling people to behave differently carries the implication that their values are wrong, and this is not convincing. People generally behave in a way that they think is rational and often find it easy to justify this behaviour to themselves and to others. However, what they may not be aware of is the**

**effects of their behaviour on other people or the operations; and that an alternative behaviour, which does not question their values but has a more positive effect, may be something they might wish to consider. The technique of facilitation allows this process to occur.'**

**Honourable Minister, ladies and gentlemen, at Virgin Atlantic we have had 22 years to develop a Crew Resource Management structure and we still have some way to go. It would be disingenuous to claim that we have saved lives or hardware by acknowledging the science of Human Factors alone. However, what we can say is that through the analysis of human behaviour and the application of a disciplined training regime, we have minimised the daily mishaps, slips and lapses that were commonplace. Fully integrated crews using straightforward SOP's together with well-**

**structured check-lists contribute towards the total safety culture.**

**With the help of scientists, psychologists and outside agencies, we have been advised and assisted. Our management have embraced this advice and recognised the value of changing internal culture - and although this is a mandated subject, they have not hindered the process.**

**The world changes and an advantageous advance to one person can appear a hindrance to another and it is here that we must challenge the status quo. For a business to flourish in today's intemperate climate and compete successfully in a free market, every effort must be made to keep the promise made to our customers and that is, for every airline in existence today, that we will**

**deliver them to their destination safely and securely.**

**HUMAN FACTORS and CRM are not here to threaten anyone – it is here to stay and intended to improve every aspect of the human interface. It is appropriate here to sound a note of caution: the implementation of CRM will not deliver immediate, transparent results. We would suggest that you consider a measured approach and take time to fully understand where Human Factors belongs within your organisation. Perhaps a forward-thinking five-year plan – one that your management will fully support and in which they will have absolute faith.**

**The Human Factors department at Virgin Atlantic would be happy to advise in any capacity and extend the benefit of their experience to any**

**airline requiring assistance – indeed it would be our pleasure.**

**Honourable Minister, ladies and gentlemen, it has been a privilege to be invited to speak here today. On behalf of Virgin Atlantic, I would like to thank you for your kind attention and very much look forward to speaking with you in greater depth during the break or at the question and answer session later on today.**

**Once again, thank you and good afternoon.**

