The Next Generation Professional Pilot – Not Your Father’s First Officer

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With the demise of the Cold War, the subsequent drawdown of the military, and with many airline pilots opting not to return from furlough after the recent rash of bankruptcies, the demand side of air carrier pilot hiring has driven significant changes in new hire pilot demographics. Experience levels of new hire regional pilots are at an all time low, and are approaching an average well below 1000 hrs of total time and less than 100 hours multi-engine. These demographics changes bode ill for aviation safety and these changes in new hire pilot demographics are showing up in increasing incidents and accidents that are related to lack of experience, lack of flight discipline, lower levels of professionalism and a general lack of maturity. To identify and recruit qualified pilots, there is a desperate need to employ effective screening and selection tools that will accurately predict the applicant’s success in demanding airline curriculums.

Introduction

The United States economy has seen unparalleled growth for nearly 20 years and the increasing globalization of the world economy is also providing unprecedented growth opportunities around the world. Despite the recent rash of bankruptcies of airlines in America and indeed around the world, aviation is seeing explosive growth in spite of industry turmoil. Indeed worldwide air travel is expected to double in the next 20 years and this growth is well underway. Since deregulation, revenue passenger miles have more than doubled in the United States. In short, despite recent industry turmoil, the industry will see unprecedented growth over the next 20 years which is in turn imposing a high demand for more pilots in the airline industry.

This demand will have to confront the selection and training needs implied by radical changes in new hire pilot demographics over the past three decades: Today, the majority of pilots hired by air carriers come from civilian backgrounds. Historically the majority of airline pilots were supplied from military backgrounds with good reason. Military pilot selection criteria are highly selective, enabling the services to begin with excellent raw material. The training is highly structured and very demanding, washing out those whose personal discipline, intelligence, and abilities are found lacking. Only those individuals who possess the required high-level innate abilities and underlying cognitive skills typically make it through the training successfully.

Advantages of Military Background

The practice of military flying itself reinforces the disciplines learned in flight school and include comprehensive preflight planning, attention to detail, and procedural discipline. Military flying promotes and accelerates the acquisition of expertise through a number of practices such as:

- Mentorship through pairing new pilots with older veterans.
- Frequent training and review.
- The requirement for comprehensive mission planning enables new aviators to identify repeating patterns and threats. Through such detailed planning the aviator in effect “experiences” the flight before strapping on the aircraft, planting the seeds that enable the pilot to exercise recognitional situation assessment, significantly lowering their cognitive workload and accelerating the acquisition of expertise.
- Comprehensive debriefing of every mission reinforces the lessons learned, solidifies relevant cue patterns, and habituates the aviator to think reflectively on their performance and experience. This in turn builds the metacognitive skills so crucial to identifying gaps in situational awareness and violations of expectations.
- Constant enforcement and fostering of professionalism in military aviation.

Military vs. Civilian Pilot Training

In contrast much of civilian pilot training fails to meet the training and operational standards found in military flying. Perhaps as much as 50% of all civilian pilot training occurs at local flight schools where there is very little structure in comparison and weak standardization among instructors. The majority of the instructors themselves are relatively inexperienced, just beginning their journey to the acquisition of expertise. Aeronautical universities do
a better job although the quality of the programs varies significantly from program to program. Many of the better programs approach the standardization, structure, and discipline of military programs but they all share a significant shortcoming – once the student graduates, the students are on their own in terms of acquiring experience, maintaining professional and procedural disciplines, and gaining expertise. Whereas in the past the airline industry could rest assured that they were getting a high quality, known product from a retiring military aviator, the civilian world presents them with a wide range of quality of professionalism, skills, discipline, and experience. No wonder that in past times, many airlines hired the vast majority of their pilots from the military services. Recent events however have changed that demographic.

Experience-Related Incidents on the Rise

With the demise of the Cold War and the end of the Vietnam conflict, the military has considerably curtailed their operations, moved to an all volunteer force, and closed many bases. This has significantly reduced the pool of qualified pilots available for hiring into the airline business. As a result airlines, especially regional airlines, have significantly reduced their hiring minimums. Many airlines have abandoned for instance the requirement for a college degree. Many regional airlines are hiring former interns with total flight experience measured in the low hundreds of hours. Ab initio programs are on the rise and the trend of hiring pilots with the absolute minimum experience bodes ill for aviation safety. Military pilots make up a significant minority of the pilots hired today. The shortcomings of drawing pilots fresh out of the civilian training industry are making themselves felt in the regional airlines today in any number of areas including professional discipline, experience, maturity, risk assessment skills, and team skills. Consider the following actual incidents from regional airline operations.

A regional jet departs Roanoke VA. Roanoke is a mountainous airport ringed on three sides with close in mountains and for this particular model of jet, relatively short runways. About 100 miles into the flight the aircraft loses all fluid in hydraulic system 2. Because of redundancies, the only systems actually lost are the inboard ground spoilers and the inboard set of brakes. The only performance thus affected is in stopping distance on the runway. There is no immediate inflight issue as there are two more redundant systems powering the flight controls. Despite that, the checklist calls for a divert to the nearest suitable airport. At the particular location of the aircraft, the airports located within the company’s criteria for the nearest suitable airport are Bristol TN, Knoxville TN, Asheville NC, Greenville SC, and Roanoke VA. Of these airports, Asheville is a mountain airport with significant terrain in all quadrants and a single runway that is longer than Roanoke. Bristol TN is in rolling Appalachian terrain with a single runway longer than Roanoke. Knoxville TN is in flat land with two long runways and with a reserve KC-135 squadron, plenty of fire and crash rescue equipment. Greenville SC is a flat land airport with a single runway longer than Roanoke. Despite advice from his dispatcher, the Captain elected to return to Roanoke VA – the highest risk airport of those available.

Another inflight event highlights problems with risk assessment skills.

The turboprop commuter aircraft was well enroute with a company pilot on the jumpseat when the one of the flight attendants noticed a metal canister propping open the waste bin in the aft lavatory. She removed the canister and noticed it leaking a foul brown liquid. She called the Captain to report it. The Captain sent the jumpseater back to examine it. The jumpseating First Officer identified it as a personal cannister of CS tear gas – it was a common product sold for self-defense. He reported it to the Captain via the intercom and asked the Captain what he wanted to do about it. The Captain, presumably wanting to exercise good CRM skills, suggested he bring it to the cockpit where they could all discuss how to handle the problem. In the subsequent incident report to the company, the Captain stated that “fortunately” the only personnel affected by the fumes were the cockpit and cabin crew.

These two incidents reflect the declining level of experience and absence of the development of critical thinking skills – just two examples of an increasing array of experience-related deficits in new hire pilots.

In any segment of the aviation industry, standardized procedures have been developed to assist pilots in safely managing their flights. Experienced
professionals understand the necessity of adhering to SOP: Many of these procedures have been developed after comprehensive analysis including various task analyses. Some have been developed as a result of lessons learned – usually after an accident or serious incident. In two crew cockpits, standardized procedures and flight profiles serve a number of functions:

- They define the best balance between safety, efficiency, and customer service.
- They provide a standard against which the quality of the flight management being conducted can be measured.
- In providing a baseline for performance, they enable the flight crew to estimate the amount of safety margin left when an inadvertent deviation occurs.
- They provide a framework for good task management – spacing out tasks so that no one crew member becomes overloaded an loses situational awareness.
- They provide for a division of duties so that one person is always flying the aircraft.
- They provide for implicit crew coordination, reducing the need for the crew to explicitly coordinate their actions. This in turn significantly reduces the cognitive load on the crew, reducing the probability of situational awareness loss.
- They provide points of feedback / action loops, in effect requiring the exercise of pre-determined actions – actions that in prior analyses have been found to provide the highest level of safety. This significantly reduces in many cases the cognitive workload to define viable options. The common prescriptive to go around if not stabilized by 1000 ft agl on an instrument approach is one example of this.

Procedural discipline is one hallmark of the military aviator. The high levels of enforced discipline and the constant reinforcement of a professional culture result in aviators who demonstrate very high levels of procedural adherence. When military aviators come to the airline, the “why” behind the requirement to be procedurally disciplined and the practice of it as part of being a professional aviator is well known and familiar. Subsequently there is little or no cultural transition in this regard when getting hired by an airline. This is not necessary true of those pilots who are hired from civilian backgrounds, especially those who are hired with low total times. Even when hiring civilian pilots with “quality” flying experience and thousands of hours of general aviation time, one has to recognize that for the most part, the only professional standard that is imposed on these aviators is the standards they impose on themselves. The following incident in regional airline flying was related to the author and illustrates this concept:

The regional jet crew was approaching the airport in clear weather but in an area of scattered showers. After calling the airport “in sight” they were cleared for a visual approach to the outboard runway. The First Officer was flying. After lining up visually, on the final about 6 miles out the crew flew into a rain shower encroaching on the final approach course. Company guidance called for the initiation of a go-around in this case. The First Officer after losing sight of the airport initially announced “going around” but was immediately countermanded by the young Captain who stated: “Keep going - we’ll break out in a few seconds.” After many seconds and noticing the localizer needle was off scale, the First Officer asked, “We are off the localizer – should I go around now?” The Captain again demurred, insisting they would momentarily break out. They did shortly break out at about 300 ft agl and lined up with the taxiway.

The Captain took the controls and initiated a side step maneuver to the runway at about 100 ft agl in an aircraft with a 70 ft wingspan. In banking back to line up on the runway, with all three wheels in the air and the stall warning stick shaker triggered, the left wing struck the runway but the Captain was able to safely continue the landing. After pulling off the runway, the Captain pulled the CVR circuit breaker and began trying to persuade the First Officer to conspire with him to offer some other explanation of the resultant damage to the left wing.

Such a lack of professionalism, flight discipline, integrity and moral character are a dangerous combination in any high-stakes profession. The airline in question was lucky to have gotten away with only minor damage to the wingtip of the aircraft and a number of frightened and angry customers. Unfortunately such a lack of professional discipline can and has killed innocent people as we can see in the crash of Corporate Express Flight 5066 on October 19, 2004 in Kirksville MO. The following is a sample of just a portion of the CVR tape which contained many more illustrations of the lack of
The professionalism of this crew than the ones just in this segment of the flight.

HOT 1 = Captains Intercom  
HOT 2 = First Officer’s Intercom

1909:27  
HOT 1:  “gotta have fun.”

1909:31  
HOT 2:  “that’s the truth man, gotta have fun.”

1909:35  
HOT 1:  “too many of these &%#! (First Officers) take themselves way too seriously in this job. I hate it. I have flown with them and it’s a month of agony.”

1921:44  
HOT 2:  “you know, I think you (the passengers) are gonna need to just shut the &%#! up.”

1921:57  
HOT 1:  “we have come to the conclusion that you should all shut the &%#! up.”

1931:00  
HOT 2:  ‘cleared the approach.”

1931:01  
HOT 1:  “&%#! approach, you’re &%#!. &%#! the approach!”

1931:11  
HOT 2:  (sound of chuckle) (sound of lips vibrating) that’s funny when it happens too. (vibrating lip noise) is that a &%#!? Yeah (sound of laughter) he &%#!. Thirty one.

In the midst of all of this cutting up, the Captain continues the approach and descends below the MDA. Soon after we hear the following comments:

1936:44  
GPWS warning: “TWO HUNDRED!”

1936:52.2  
GPWS warning: “SINK RATE!”

1936:52.8  
HOT 1:  “no!”

193653.2  
HOT 2 “Trees!”

The Jetstream impacted the trees well short of the runway after the crew lost track of their altitude and descended below the MDA. The NTSB came to the following conclusions:

“The National Transportation Safety Board determines that the probable cause of the accident was the pilot’s failure to follow established procedures and properly conduct a non-precision approach……… and their failure to adhere to established division of duties between the flying and non-flying pilot.

Contributing to the accident were the pilots’ failure to make standard callouts……. The pilots’ failure to establish and maintain a professional demeanor during the flight and their fatigue likely contributed to their degraded performance.”

While this may seem a very isolated event, one must remember the recent findings of the NTSB in the crash of a Pinnacle Airlines CRJ when it stalled and flamed out at 41,000 ft. In this accident the NTSB initial investigation found that a lack of professionalism was a probable contributing cause to the crash of the Pinnacle jet. The recent release of the CVR transcripts of the crew of Comair 5191 crash in Lexington which revealed the crew violated sterile cockpit procedures on their taxi out to the runway also calls into question whether there is a declining level of professional discipline in regional pilots. A review of past major airline accidents, while it reveals problems with CRM skills in some accidents, rarely uncovers the NTSB attributing the crash in whole or in part to a failure of the crew to exercise flight discipline and high levels of professionalism. This is increasingly a new phenomenon in airline aviation.

**Better Screening and Selection is Critical**

These incidents, while still few, mask an increasing number of less critical incidents found to be related to insufficient discipline, risk assessment skills, critical thinking skills, maturity and a general lack of experience in regional airline flying. This trend in turn argues that the effective employment of pilot selection instruments and extensive training of pilot selection personnel will be mandatory to ensure the safety of the traveling public in the future. And in an industry that can generate only razor thin profit margins, avoiding the costs of litigation and an accident investigation resulting from unqualified and unprofessional crewmembers through better selection may well be the key to survival.
References


M.Larson, Regional Airline Safety Officer (personal communication, April, 2004).

