Recruiting and training better 'bush pilots': a research-based approach

Laurence Leigh,
American University of Beirut, LEBANON

Roy Rissanen,
Finnish Evangelical Lutheran Mission,

Abstract

Because bush pilots operate on their own in remote areas, they have highly developed aviation knowledge and skills. Recruiting and training them presents peculiar challenges. Qualitative interviews with a group of pilots currently active in Africa revealed the characteristics of successful bush flyers and their orientation towards their profession and their employers. The findings suggest that recruitment and training should include more emphasis on interpersonal communication skills as well as the technical aspects emphasized in current programs. The authors also suggest that the qualitative interview technique can be usefully applied elsewhere in making aviation education more effective.

Keywords; Bush pilots, recruitment, training, interpersonal communication, qualitative research.

Introduction

The concept of 'internal marketing' is now commonly used to refer to the management of relationships between staff departments such as Human Resources and the line activities they service. Nevertheless, the use of market research techniques in the process of designing appropriate professional training and career management programs in organisations is much rarer. One of the current authors used focus groups to assist in the design of a recruitment program for student nurses (Leigh and Frauman, 1990) while, since then, a comprehensive literature search revealed a single example of similar qualitative research to explore training practices among line managers in private clubs (Barrows, 2000). What is unique about this study is that it uses in-depth interviews with a professional group – 'bush pilots' - to research their attitudes and orientation towards their activities and the organisations they work for. Diagnosis of training needs and the recommendations for the development of appropriate development programs were then based on analysis of the interviews and the attitudinal segmentation of the target markets derived from them.

The Bush Pilot

The terms 'bush pilot' and 'bush flying' evoke images of the golden age of aviation – swashbuckling pilots with flowing silk scarves skilfully manoeuvring a vintage aircraft into the most inhospitable regions on earth. In this case, unlike many legends, these romantic images are very close to reality – bush flying is one of the last vestiges of aviation's early roots and is still relied on by many isolated communities to provide a vital lifeline. Bush pilots have opened up new frontiers in places so perilous to fly to that insurance companies refuse to provide coverage for their lives and property. The risky nature of the occupation is in many cases the allure that attracts the bush pilot in the first place – flying to unspoiled places in uncertain weather with an ever-changing mission is just a typical day in the world of bush flying.

Modern bush flying in Africa usually means conducting commercial charter flights by transporting passengers and/or cargo within or to isolated areas where aviation infrastructure is poorly developed. Bush pilots in Africa operate on short, unpaved runways and fly mostly in sparsely populated and often hostile environments such as jungle, desert or mountains. Bush pilots generally work with organisations that provide air charter services for passengers and cargo some of which specialise in particular work, such as transporting medical patients or providing humanitarian aid flights. Common problems include lack of radio communications, air control and ground facilities, possible insecurity on the ground, disorganised flying and ground environments, shortage of maintenance and refuelling facilities, lack of available information on weather and runway conditions and incomplete, outdated or inaccurate flight charts, airport diagrams and operating procedures.

Literature Review

Only a small amount of previous research has been identified that deals specifically with bush flying in Africa. This has dealt with issues such as aviation history and air traffic control procedures. It is evident, however, that all the old master pilots had one common trait; motivation. They learned the fundamentals well. They recognised the value of any learning and stored that knowledge in their bank of experience for future use. Although flying equipment has become more sophisticated over the years, the theory of flight has not changed and probably never will (Webb, 1990). The life of a bush pilot can be tough and the living conditions are often rudimentary. Frequently there is no hangar and the maintenance may need to be

performed outside. It therefore takes true dedication to keep the pilot's focus on professionalism and safety (Manningham, 2003).

Kern (2001) suggests that there are six human faculties fundamental to flying: abilities, motivations, knowledge, procedural techniques, perceptual motor skills, and decisional judgment. Continuous improvement means that the pilot seeks for greater precision and constant improvement in personal performance (Kern, 1997). The prime factor in motivation is an individual's own desire to learn (Kershner, 1993). A significant indicator of a successful pilot is his capacity to handle change and stressful situations. The successful career pilots are usually optimists with a strong coping personality. Unfortunately, there are no guaranteed psychological tests to determine precisely who will be a safe pilot. There are some pilots who are reluctant to accept responsibility but always tend to blame others, even for their own mistakes. These pilots may be incapable of changing their habits because in their own minds there is nothing to improve (Bangs, 2004). Generally, pessimists do not find a pilot's job appealing. They would just find the work too stressful. Pilots tend to be optimistic and more thick-skinned than ordinary people, which are good qualities to have because pilots are evaluated constantly throughout their careers and sometimes the evaluation can be quite harsh. Other positive signs of a good pilot character are patience and assertiveness (Bangs, 2004).

During the Second World War, the German Air Force recognised the need to make predictions of a pilot's career potential when they were assessing their student fighter pilots (Kaufmann, 1989). It was a duty of the instructor to analyse both the strengths and weaknesses of a student as early as possible and this was the most important stage in flight training. Their assessment procedures at the time were reasonably developed in that they would be able to give a fairly reliable indication of what kind of career each pilot would fit into and how long it would last. Their system relied heavily on personal mentoring, so the instructor had to keep in close contact with the student to get to know him well personally and to win his trust. The student would score positive marks if he was perceived to be genuinely enjoying the flying and happily performing other related side-activities. The positive marks of pilot's character were optimism, helpfulness, social orientation, consideration towards others, adaptability, organising skills and self-discipline (Kaufmann, 1989).

Kershner (1993) argues that motivation is enhanced by using the 'what, why and how' approach. The instructor has to explain what is to be learned, why it needs to be learned, how it needs to be done and how it relates to other skills. To improve the motivation of pilots, management should also work to ensure that the pilots understand the mission of the organisation, explain where the pilot fits into it and emphasize the individual importance of each one's job (Sheehan, 2003). Another important component of motivation is the influence of peers who in this case are other pilots (Kern, 1997). Their attitudes form a model of social proof, which puts pressure on others to imitate the group's behaviour (Cialdini, 1993).

It has been said that pilots who have been in aviation for ten years and have reached the age of thirty two, are the type of pilot they will remain for the rest of their lives. Whether excellent, average, or below average at that stage, they will be exactly the same at the age of sixty (Webb, 1990). However, learning is a continuous process which should take place on every flight throughout the pilot's career. In fact, any flight is continuous management of small errors (Bangs, 2004). Pilots must learn to analyse their every manoeuvre and phase of flight for desired performance. They must constantly strive to improve both their technique and judgement through practice. They must also learn to criticise themselves honestly in evaluating their mistakes and be able to teach themselves to a significant degree (Webb, 1990).

Development of perceptions and insights and the formation of the correct habit patterns should be the chief aims of flight instruction (Kershner, 1993). If good habits are established early and continually reinforced throughout a training program, it is likely that the pilot will follow them faithfully throughout his flying career. In order to obtain a US commercial pilot's

licence, a pilot needs to have aeronautical knowledge of various subjects that are listed in the air regulations (FAA, 1978a). Knowledge requirements in various countries may differ slightly in content but they are all designed for the same purpose; a commercial pilot is required to be trained in flight proficiency, which must cover listed items, such as flight preparation, takeoffs, landings and emergencies.

A flight instructor needs to find ways to help the student to understand how all the learned experiences form the total picture (FAA, 1978a). This concept is also referred to as 'building block' learning. The use of the building block or relational concept of learning provides a way to ensure the development of correct habits (Jeppesen, 2002). Flight instructors are required to understand the basic principles and processes of learning and teaching. They must be able to relate this information to their task of conveying aeronautical knowledge and skill to students. Learning occurs when, as a result of a learning experience, an individual's way of perceiving, thinking, feeling and doing changes in some way (FAA, 1978a). The best instructors know their subject well, have the ability to teach, take a genuine interest in the student, act professionally in the air, know how to adapt to using alternate methods for teaching different individuals, update their knowledge and are consistent with their approach (Kershner, 1993).

The Jeppesen Flight Instructor Manual (Jeppesen, 2002) proposes a set of consistent principles that can be applied to most learning situations. These are based on the theory of behaviourism (Skinner, 1969) which relies on the study and measurement of observable behaviour. In addition to changes in outward behaviour, learning involves use of decision making and problem solving processes which are based on the models of cognitive theory (FAA, 1978b; Piaget, 1928). The principles used are known as the six laws of learning, which are laws of readiness, exercise, effect, primacy, intensity and recency. A skilful flight instructor utilises them effectively in mixed combinations when planning and delivering lessons. The law of readiness states that individuals learn best when they see a clear reason for learning. The law of exercise states that things will be better remembered with repeated practice. The law of effect states that a person will learn more effectively when learning is associated with a pleasant feeling. The law of primacy states that the things learned first have a more permanent sticking effect for a student. The law of intensity means that a vivid experience can teach more than a dull or boring experience. The law of recency states that the things most recently learned are best remembered.

Jeppesen (2002) also points out that various 'defence mechanisms', although they generally serve a useful purpose, may also hinder learning. For example, 'rationalisation' occurs when a pilot, instead of accepting real reasons for personal behaviour, substitutes excuses for reasons. 'Aggression' occurs as a result of frustrations and reveals itself in an emotional outburst in the form of anger. 'Compensation' occurs when a student is using a strong quality to compensate for a weak one. 'Projection' means blaming other people for one's own mistakes. 'Reaction formation' is development of behaviour patterns and attitudes against undesired needs. 'Mental flight' is often associated with daydreaming and is used as an escape to seek relief from frustration or boredom. 'Resignation' means accepting defeat and giving up on the task. 'Denial' is ignoring undesirable facets of reality.

The FAA (1978a) suggests that there are four levels to successful learning. The first level is rote learning, which enables the student to repeat a learned item. The second level, understanding, provides the deeper meaning or insight into the issue. The third level, 'application', means that the learned thing can be recalled and put into practice when needed. The fourth and the highest level, 'correlation', enables the student to associate the new learning experience with something that was learned before. Kershner (1993) notes that past perceptions, insights, and habits generally get transferred to new knowledge.

A properly trained and aware pilot has the ability to think, act and often avoid a potential emergency before it happens (McAllister, 1997). There are too many examples of accidents caused by pilots' failure to recall information and therefore their failure to respond correctly. This reflects a lack of preparation. The only way to impart this innate knowledge is deeper study and drill so that critical knowledge recall becomes a subconscious event and the information comes forward effortlessly when needed (Kern, 1997). Loss of control is the number one cause of accidents following an engine malfunction. Pilots must concentrate on following the basic procedures, including the most basic – fly the airplane (Aarons, 2003). As the aircraft have become progressively more mechanically reliable over the years, human factors have become a prime cause of aviation accidents (McAllister, 1997), accounting for approximately 75% of the total (Jeppesen, 2003). These human errors contribute to a pattern that has been called an 'accident chain'. This starts with the loss of awareness and is followed by flawed decisions, poor choices and finally the accident itself (Craig, 2001).

Good, safe flying does more to promote air safety consciousness than all the spectacular air journeys combined. The less spectacular the pilots are, the more safety they bring to aviation (Searles, 2004). Conforming to good operating practices and exercising good judgment should be accomplished on every flight (Sheehan, 2003).

Cockpit resource management or CRM means maximising mission effectiveness and safety through effective utilisation of all available resources (Kern, 1997). The CRM training provided is partly responsible for a marked increase in the safety of airline operations. Because of its success, CRM is now recognised as an important part of all pilot training (Jeppesen, 2003). A pilot must continually gather information to create and maintain a model of the flight environment (Kern, 1997). A pilot must learn to project ahead in both time and space to stay ahead of the speeding aircraft in thinking and planning. His decisions and actions must be based on an extension of the position in flight to a predicted position in time and space. This allows the pilot to cope adequately with the situation presently at hand (Webb, 1990).

For example, many experienced pilots have the ability to constantly update their closest emergency landing sites in their heads. If necessary, they could instantly turn to their nearest suitable landing field. These decisions are the automatic, pre-conditioned responses of an aviator who knows how to manage the physical environment (Kern, 1997).

Situational awareness means dealing with all the factors and conditions that affect the aircraft and the pilot at any given time. A pilot needs to know all the time what is going on inside and around the aircraft and be able to anticipate what is going to happen ahead. Flying ahead of, not behind, the aircraft is one mark of a pilot's professional discipline. Pilots with good situational awareness are safer pilots (McAllister, 1997). Workload management is a way of prioritising tasks so that a loss of situational awareness does not occur through overload or distraction in the cockpit (Kern, 1997).

Decision making is a skill that can be systematically developed through knowledge and practice. Risk means the probability and severity of a loss linked to a hazard and it can be approached in a controlled, logical and organised manner by identifying and assessing it. The risk can be related to the pilot, aircraft, environment, or organisation. The organisation a bush pilot works for can have an impact on safety by providing an example of how the rules are viewed by its management. By looking at the underlying values on the basis of which

individuals are rewarded, punished, respected and listened to, it is possible to analyse the organisational environment. Sometimes these values exhibited in reality may conflict with the organisation's own mission statement (Kern, 1997).

Based on this literature review, the theory of how good pilots are produced can be summed up as follows; a good pilot is continuously motivated to acquire and improve his aeronautical knowledge and flight proficiency by using the relational concept of learning to generate correct habits. The process is reinforced by constant use of self-assessment and goal setting but occasionally human factors and pilot errors distort it. When a pilot's perception and reality do not match, the responses to the flight situation may be incorrect and this process cannot then work effectively. To make flying safe, it is necessary to eliminate this distortion and make sure that perceptions match reality as accurately as possible. Any discrepancies should be removed from the loop by using self-assessment to detect them and to set goals for eliminating them in the future.

Methodology

Given the theoretical models of training discussed above, the object of this study was to determine how to apply them in the specific setting of African bush flyers. To do this, in-depth interviews were arranged with a sample of 50 active pilots. These focused on their ideas and suggestions, based on their experience and knowledge, as to how the flight operations may be improved in terms of flight safety and efficiency and how such changes might be realized through appropriate training programs. Specifically, the interviews covered the following topics; demographics and experience of the respondents, their likes and dislikes about bush flying and suggested improvements, the main challenges of the profession, required personal and professional qualities and, finally, ways to enhance bush pilot training with special emphasis on enhancing safety skills. The discussion was limited to basic bush flying, namely fixed wing, single-engine, single-crew, light aircraft operations. The main limitation of the study was that the input was collected mostly from pilots who work in the same African geographical environment. The study does not cover the challenges of other types of bush flying environments such as mountain flying, ski operations, jungle flying, float operations, cold weather operations or helicopter flying.

Discussion of Findings

A typical pilot is a male of above 40 years of age. He completed his initial flight training in a commercial flight school more than 20 years ago. He has 5000-10000 hours of accumulated flight experience and more than 5000 hours of bush flying experience. He has been working as a bush pilot for more than 10 years and has flown a light single or multi-engine aircraft. His primary work is to fly commercial charters but he has some experience in other kinds of flight operations as well. His primary duty is to fly as a captain but he is also busy and familiar with other duties within the organisation. Analysis of the age distribution in the sample suggests that bush flying is favoured by older pilots.

One of the strongest motivational elements toward bush flying was found to be personal freedom in aviation, which reflects the fact that the bush flying environment is still relatively undeveloped. Another factor in motivation was the unpredictability of bush flying. Any scheduled and predictable job would be considered too tedious. The unpredictable nature of bush flying adds to the flavour of the job.

One of the keywords in motivation was 'challenge' in the flying context. Many pilots seemed to get job satisfaction from the daily battles with demanding situations, such as landing on short airstrips and the need to operate the aircraft at its performance limits. Coming out

successfully from these difficult situations appeared to provide the satisfaction that fuels the desire to fly. The employers that want to keep these bush pilots happy and motivated need to be able to supply a constant flow of manageable, practical, present and increasingly difficult challenges.

Some pilots knew that they were in the right jobs. Flying was 'their thing' that fitted their personalities very well. Often this ambition could be traced to their childhood. A significant part of their motivation was flying itself; they saw it as their most beloved hobby turned into a dream job.

Most of the negative motivational factors were related to the environment and issues related to attitudes, behaviour and culture. More organised structures and stricter control would be a welcome element in bush flying. One de-motivating factor was that bush flying is usually done in a disorganised way. While bush pilots appeared to enjoy the thrill that comes with the difficulty of bush flying, the pleasure diminished once the difficulties became excessive. At that point, the pressure to make decisions becomes a burden and motivation turns into de-motivation.

For example, arguments over payloads between customers and pilots are a recurring issue which adds to the stress of flying and detracts from motivation. It is noticeable that the pressures to break regulations may come not only from customers or other outside parties but from people within the pilot's own organisation. This may create a conflict of priorities.

When asked about ways in which bush flying could be improved, respondents often pointed to deficiencies in their work environment. In particular, aviation authorities in developing countries tend to suffer from inadequate resources, resource misallocation and general lack of standards in all areas of governance. Internal organisation was also often criticised and respondents often pointed out that a proper job design is one of the key solutions to their development. Everything should start at the recruitment stage. If the job description is properly put together, it should clearly present what the pilot is expected to do. Basic documents such as organisational charts, clearly defined roles, responsibilities, policies, procedures and job descriptions should also be in place in any flying organisation.

As regards training needs, suggestions for the flight curriculum included personal relationship training, assertiveness training and preparation of pilots to face the practical challenges of the job. This should include discussions of realistic scenarios with experienced bush pilots.

More attention should be given to developing work processes. This involves the right attitude more than money or other resources. Even with limited financial resources, a company could excel in professionalism by doing things the right way. Unlike some other businesses, flying is a strictly controlled industry and in many areas of operations there is a right way and a wrong way of doing things. The right work processes start from having basic operational systems and paperwork in order. This applies to areas such as flight booking systems, accounting, maintenance scheduling, internal logistics and communication.

A majority of pilots reported three major challenges in their work environment: airstrips, weather and terrain. If these can be handled successfully, a pilot has gone a long way toward learning some very critical skills. These three challenges should be covered effectively in every bush pilot's orientation training.

Respondents always perceived pressures to complete given tasks. This pressure comes usually from the clients and managers but it could also come from pilot him/herself. Just getting through a normal day can often be a considerable challenge in a bush flying environment. The psychological challenge of bush flying involves mastering personal self-discipline, having a professional attitude and sticking with procedures and standards. This helps a bush pilot to avoid unnecessary risks and potentially fatal accidents. The bush pilot is normally self-sufficient since there is no one to supervise how closely the pilot follows the rules. The

requirements in bush flying are contradictory. On the one hand, the pilot is supposed to conduct flights safely. On the other hand, he/she is supposed to offer the service that matches the expectations of the customers. For example, this often means carrying as much load as possible and making concessions on fuel reserves and turnaround times. The pilot must therefore maintain the correct balance between safety and service.

Respondents generally felt that if the pilot's personality fits the job, he is more likely to remain highly motivated throughout a long flying career. The love of flying seemed to be common among veteran pilots who had more than twenty years' experience. Many of those pilots had extended their involvement with flying to other related professional activities, such as becoming involved with maintenance or becoming entrepreneurs and running their own aviation companies.

Value systems are important as they determine behaviour. Ideally, the person's value systems should be in line with the values of the organisation. In this situation, the pilot is likely to remain loyal to the organisation as long as the organisation remains loyal to its own values.

An inherently conservative attitude provides a safeguard for operations as it prevents the pilot taking unnecessary risks. For a conservative pilot, safety is always a high priority. Finishing the day without running into problems is more important than always getting the job done.

To promote safe operations, respondents felt that consistency is a habit that helps to maintain the level of performance above the necessary minimum without allowing it to fall into the danger zone. This is an important part of flight safety. The practical application is to focus on such things as thorough preparation, having contingency plans available and maintaining a high level of self-discipline.

The research revealed that social skills are generally neglected in training. These are required because bush pilots are normally involved in taking bookings, writing tickets, checking the passengers in, loading their baggage, fastening their seat belts, helping them to find ground transport or communicating their messages through the aircraft's radio.

All the ex-military pilots who were interviewed stressed the positive impact of their military training. The flight instructors, peers and exemplary pilots in this group served as effective role models and have a strong influence on the pilots around them, who copy their attitudes and behaviour. There are always things that cannot be absorbed from reading a book or by theoretical studies alone; they can only be learned through personal exposure to marginal situations. It would be worth exploring how features of military training could be implemented efficiently in civilian training.

As regards general training, respondents thought it would be more meaningful if it could be made to simulate real-world scenarios as closely as possible. This would help pilots to validate the learned material. To make their training relevant, handbook figures should be compared to the actual performance of the aircraft. For example, a pilot with more than 10,000 hours of experience, who was trained by an airline suggested:

> "Pilot's Operating Handbook's figures should be compared to recorded figures from practical exercises. This validates book information and teaches what the aircraft can really do. Validation by one's own experience builds professionalism. Do the calculations and then compare them to actual performance."

Respondents also suggested that their training should involve focusing on special problems that bush pilots face. The local operating environment needs to be taken into consideration, as well as the special flying techniques that are used in bush flying. The training should also involve the use of instructors who are experienced bush pilots since bush pilots need techniques and skills that are different from those that are taught in normal flying schools. Precise training goals should be developed which cover all facets of flying. The training

syllabus should then be followed meticulously as doing this cultivates the attitude that following the procedures is crucial.

Bush pilots need to be able to operate the aircraft throughout the entire range of its performance envelope. This requires proper instruction and plenty of practice in a safe training setup before the pilots have to cope with actual operational pressures. The training needs to focus on flight procedures, which are designed for the phases of flight that have very small margins for error. These potentially dangerous phases of flying include night operations, low-level flying, emergencies, flying in bad weather, and operations over mountainous areas.

The methods of training are important in making the pilots learn most effectively. Some of the key elements are setting personal limitations, close supervision, gradually increasing exposure to challenges as experience builds up, open communication channels and setting up a mentoring system. CRM (crew resource management), ADM (aeronautical decision making) and SA (situational awareness) should be taught as integral parts of the program.

Respondents felt that every flight should be considered as a 'training flight'. Pilots should not just be flying the aircraft but creating some goals for learning new things or improving their skills on every flight. They would like to see budgets allocated to flight training on mechanical knowledge, simulator and upgrading of licences. Periodical review of ground study material, practical goals, detailed targets and continuous personal evaluation are the key items in the pursuit of continuous improvement of their skills. A combination of factors that ensures continuous improvement is having an all-rounder's skills, flexibility, a relaxed attitude, hard-working mentality and time for good rest.

A focus on safety and maintaining open communications results in the development and management of a safety-conscious culture and environment. The rules cover safety in a lot of situations and so flight safety could be improved dramatically by just obeying the regulations and directives; it is the violations that jeopardise safety. These rules apply to items such as flight and duty limitations, controlling aircraft weights, securing cargo properly and aircraft maintenance. There should be safety related training available for pilots and this should be integrated with the necessary development of safety systems. These should cover dissemination of information, safety versus economic analysis in operations, safety control systems, risk analysis and management.

When asked about their own experiences in emergencies, respondents generally concluded that the highest priority in all emergencies is to keep flying the aircraft. After the situation has been stabilised, it should be analysed, rectified and followed up by using the emergency checklist. One of the main challenges in any emergency is to keep the situation under control mentally and not give in to the pressures. A pilot who can think calmly in all situations is in a better position to make sound decisions than one who has a tendency to lose control. There are different types of training that prepare the pilot to handle emergencies and accidents. Some of them can be conducted as self-studies: practising drills, memorizing checklists, analysing causes of accidents and learning about aircraft systems. Other emergency training should be available through training courses and seminars.

The proper response can prevent an emergency developing into an accident. It could also minimise the consequences in the event of an accident. The proper responses are to use the emergency checklist and to follow the set procedures according to the given situation.

One problem respondents reported is the perceived diverse nature of emergencies. They come in so many different forms that it is hard to write manuals that would cover them all. Sometimes the pilot needs to rely on personal intuition as to how to proceed with emergencies of an unpredictable nature. Practice of all imaginable emergency scenarios should be conducted in settings that are as realistic as possible. This would greatly increase the chances of successful outcomes should they occur in reality.

Recommendations

Bush pilots need to adapt to surroundings in which each individual is responsible for maintaining his/her own freedom, following his/her own procedures and coping with the lack of infrastructure. This contributes to motivation if the pilot enjoys these challenges and the bush pilot needs a constant challenge to stay motivated. There is a point, however, when a challenge becomes excessive and starts creating frustration. The secret of motivation is to find this point and ensure the challenges are held just below it. Doing this depends on the personality and skills of the pilot, the nature of the task at hand and the environment in terms of weather conditions, facilities etc. in which he is operating.

Once the individual profile for a pilot is figured out, his motivation can be enhanced by providing a detailed job design for the individual. The organisation does the best favour to everybody by recruiting pilots who have had a long term vision of flying and who love bush flying as it is, without reservations.

Managers need to step in and clearly define the steps throughout the flight task, otherwise the operations will remain chaotic. A mechanism that ensures the operations are conducted within the safety parameters is also needed and this requires resources in terms of appropriate training and equipment.

A commercial pilot's training alone does not prepare a pilot to master the challenges of marginal airstrips, flying in bad weather without proper information, or operations in mountainous areas. There is a need for special flight training to focus on these conditions and give the pilot experience of them. The curriculum should therefore aim to build skills to achieve mastery in these three areas.

Developing the correct attitude towards their tasks is a matter of finding the right balance between efficiency and safety. The result should be consistent and reliable performance, optimising the service without undue risk. The organisation should recruit pilots, who demonstrate conservative judgment and always opt for taking low risk approaches. They need to be adaptive, social and have personal values that match those of the organisation; above all, they also need to aspire to continuous improvement of their skills.

The bush flight training program should be purposeful, of high standard, detailed and cover all relevant areas. It should train pilots to discipline themselves to follow the set procedures. One particular area that needs special emphasis is aircraft performance. The instructors need to be experienced bush pilots. As they are the role models for the pilots, they need to be exemplary not only in their skills but also in their attitudes and habits. They need to have good instructional capabilities to find and apply the right teaching method for each individual pilot. Apart from flight training, an effective plan to cover ground studies should also be included.

Expertise and experience are the two most important qualities that an instructor should possess. There is no substitute for either of them in the training process. The secrets of bush flying cannot be learned from books. There are numerous teaching methods that an organisation can take advantage of. They range from self-study and self-practise to simulator training, seminars and formally recognised flight training programs. The right combination to use depends on the students' level, the availability of training facilities, the organisation's budget, the local requirements and the set goals.

The ideal syllabus should be tailored to cover the needs throughout the scope of operations that the pilot experiences. If the syllabus is designed for wider use, there should be some possibility for adjustment and some flexibility to cater for the special needs of each local operating environment. One possible way to conduct this would be to start from training in general skills and then use separate special local training modules.

Perhaps the greatest margin of safety is built into flying when every action is performed consistently. If the processes and procedures are professionally thought out, following them should eliminate most of the potential hazards. Those who are responsible for flight training should set an example of consistency. The whole training process should include a series of progressive goals, each leading towards the grand goal, which should be accident-free and effective flight operations.

There is a need to prepare for all possible potential scenarios, always maintaining safety as the highest priority and learning the self-discipline to do things the right way consistently. This concept applies equally to pilots, instructors, managers and other operational staff. The instructors are in a key position to demonstrate this attitude to the pilots.

Pilots should be trained to make every flight a learning opportunity. They should know and constantly review the documented procedures related to flying. This knowledge needs to be practised and applied consistently. Augmented safety and emergency training should be a part of the bush flying training curriculum. Knowledge combined with regular practice helps to ensure that the correct response is made when something unexpected happens.

A bush pilot can learn to develop an orientation toward following procedures, even when nobody is watching, a habit that not only provides a reliable safeguard but also relieves the pilot from some stress. The habit of following procedures is a sign of integrity, and it should generate healthy professional pride and self-respect.

In order to enhance its applicability, three checklists for management were developed as a result of the research. Exhibit 1 was designed to be used as a basis for designing job interviews for pilots who have already obtained a commercial pilot's licence. It particularly emphasizes exploring their motivation towards working in the free and relatively unstructured world of bush flying. Exhibit 2 is designed to aid managers who are carrying out self-assessment and performance enhancement exercises.

Exhibit 1: Checklist for improving recruitment

- ✓ Does the pilot have a training background from a well-known and well-recognised flight training facility?
- ✓ Does the pilot indicate that his/her personal values are in line with those of our organisation?
- ✓ Does the pilot indicate that flying has been a long term personal dream?
- ✓ Does the pilot indicate that he/she has a realistic picture about bush flying and the ability to cope with those conditions?
- ✓ Does the pilot indicate that he/she loves bush flying as it is, without 'if's, 'but's or other reservations?
- ✓ Does the pilot demonstrate high adaptability to new situations, cultures and unexpected changes?
- ✓ Does the pilot appear to be capable of working independently?
- ✓ Does the pilot demonstrate good social and team playing skills?
- ✓ Does the pilot communicate that his/her intention is to keep learning new things and improve his/her personal performance continuously?
- ✓ Does the pilot demonstrate the behaviour that reflects low risk taking?
- ✓ Does the pilot demonstrate conservative judgment and safety-mindedness?
- ✓ Does the pilot demonstrate a stable personality?
- ✓ Does the pilot demonstrate consistency in performance?
- ✓ Does the pilot demonstrate the intention of doing things right?
- ✓ Does the pilot demonstrate thoroughness in preparation?
- ✓ Does the pilot demonstrate that his/her reactions to abnormal situations are predictable

and consistent?

- ✓ Does the pilot demonstrate that his/her rapid response is correct as far as unexpected and potentially hazardous situations are concerned?
- ✓ Is the response in line with what can be reasonably expected from his/her training background and experience?

Exhibit 2: Checklist for improving management

- ✓ Do the pilots have a detailed job description that defines the chain of command, key areas of responsibility and the normal duties?
- ✓ Does the individual job design take into account the pilot's skills and core competencies?
- ✓ Does the individual job design take into account the pilot's experience in terms of flying hours, living in the environment and acting in a variety of roles?
- ✓ Is there a system that allows the chief pilot to set and adjust personal limitations for the pilots, such as maximum flight or duty hours per given period, what kind of airstrips to operate from and restrictions for weather or night flying?
- ✓ Is there a mechanism that allows the managers to monitor that the pilots are constantly working within their optimum capability range? This means a constant and progressive – but not excessive - supply of challenges to pilots in their daily duties.
- ✓ Is there a system that ensures operational problems are communicated to managers?
- ✓ Do the managers make an effort to find solutions to problems that need managerial intervention?
- ✓ Do the managers take corrective and timely action to fix the problems that are within their scope and influence?
- ✓ Do the managers allocate adequate resources to training, and investment in equipment that is fit for the purpose?
- ✓ Do the managers have a realistic picture of the challenges and problems in daily flight operations?
- ✓ Do the managers keep active contact with the customers to discuss their service needs? This could be done by visits, meetings or phone discussions.
- ✓ Do the managers demonstrate integrity in their behaviour and leadership?
- ✓ Do the managers set the example of following the procedures and acting in the interests of flight safety?

Exhibit 3 is a comprehensive checklist for the redesign and enhancement of pilot training programs based on improving pilot knowledge and skills and their ability to cope with the specific working stress inherent in the bush flying environment. While based in part on the authors' experience, much of it represents a direct development from the conclusions of the qualitative research. As such, it is a checklist for both managers and instructors and is organized around five crucial steps. The first step is to define the criteria on which the organisation should invest in pilots' further training. The second step is to write a grand training plan, which is a broad overview of the goals of the organisation's flight training program. The third step is to create modules, that are a set of training components that can be used to tailor a program and which should cover all relevant areas that are important in the local bush flying environment. The fourth step is the currency training program, which ensures that the pilots maintain their skills and can complete the flights safely by following the organisation's procedures. The fifth step is the design of an appropriate self-study program.

Exhibit 3: Checklist for improving training

- ✓ Does the organisation have a principle that every pilot should have had high standard basic flight training – a commercial pilot's licence - before he/she can join the organisation?
- ✓ Does the organisation have a principle that, before they can join the organisation, the pilots should have no serious attitudinal flaws that could compromise flight safety?
- ✓ Does the organisation have a long term grand flight training plan? This document should be part of the organisation's strategic plan.
- ✓ Is high reliability in operations one of the chief goals in the organisation's grand flight training plan?
- ✓ Are the governing principles in the organisation's grand flight training plan based on the goal of training pilots to complete operational tasks effectively and safely?
- ✓ Is the organisation prepared to make an investment in high quality training, provided that the choice appears to be economical in the long run?
- ✓ Does the organisation encourage its potential future pilot applicants to invest in high quality primary flight training?
- ✓ Does the organisation analyse the alternatives and actively search for the option that best fills its flight training needs?
- ✓ Does the organisation weigh the pros and cons of outsourcing the recurrency training and doing it in-house?
- ✓ Does the organisation maintain a principle that the instructors should have thorough personal experience of bush flying?
- ✓ Does the organisation maintain a principle that the instructors should be experts in the knowledge and skills required in bush flying?
- ✓ Does the organisation actively search for and apply the training methods that could achieve the set targets most effectively?
- ✓ Does the organisation have a systematic and documented bush flying training program to equip its new pilots with the necessary skills and knowledge to work safely in the local environment?
- ✓ Does that training program help to enforce and maintain the standards of the organisation?
- ✓ Does the training program include a mentoring system, which means that an experienced pilot is assigned to take responsibility for coaching and supporting a new pilot for a set period of time?
- ✓ Does the training program have modules that can be combined to tailor an effective and relevant training package that fits the local operational environment?
- ✓ Does the modular program include studies on aircraft performance?
- ✓ Does the modular program include flight training and actual practice on marginal and short airstrips?
- ✓ Does the modular program include flight training and actual practice in flying over high terrain?
- ✓ Does the modular program include flight training and actual practice in extreme weather conditions?
- ✓ Does the modular program include flight training and actual practice in instrument and night flying in the bush flying environment?
- ✓ Does the modular program include transition training for each type of aircraft that the organisation is using?
- ✓ Does the modular program include ground lessons and up-to-date ground study material?

- ✓ Does the modular program include a detailed ground study program to give thorough training in aircraft systems?
- ✓ Does the modular program include a component on aeronautical decision making?
- ✓ Does the modular program include a component on cockpit resource management?
- ✓ Does the modular program include a component on situational awareness?
- ✓ Does the modular program include a component on how to manage relationships, especially with difficult clients?
- ✓ Does the modular program include a component on learning all applicable local procedures?
- ✓ Does the modular program include a component on learning about the organisation's standard operating procedures, such as documentation requirements and aircraft checklists?
- ✓ Does the modular program include a component on learning the pertinent information about the local environment and culture?
- ✓ Does the modular program include a component on how to set, monitor and manage personal limits?
- ✓ Does the modular program include a component on flight safety?
- ✓ Does the modular program include a component on emergency procedures?
- ✓ Does the modular program cover all areas that are relevant to learning so that the bush flying task may be completed successfully?
- ✓ Is the modular program built efficiently so that every training hour has a designated purpose for learning something new?
- ✓ Does the organisation have a currency training program?
- ✓ Does the currency training program include base checks that focus on evaluation of the pilot's flying skills and emergency handling?
- ✓ Does the currency training program include line checks that focus on evaluating the pilot's performance in terms of preparation, completing a normal flight and following the organisation's procedures?
- ✓ Does the currency training program include simulator training?
- ✓ Is there a mechanism that assists pilots to set their own targets?
- ✓ Is there an evaluation process that ensures regular feedback on the progress of the pilots' performance against set targets?
- ✓ Does the organisation have a self-study program and material available for pilots?
- ✓ Does the organisation actively encourage pilots to practise their flying skills during operational flights when there are no passengers?

The overall hypothesis of the research was that experienced bush pilots are a valuable source of information on best flying practices, and this information has not been widely documented. The results suggest that there are no magic secret findings or shortcuts to success. Everything that was mentioned in the research suggests that success can come only from motivated people, persistent hard work and the cultivation of healthy attitudes.

Nevertheless, the analysis revealed some key insights that do not normally appear in the flight training guidebooks and which reflect the unique nature of bush flying. For example, an emphasis on social skills, appreciation of total freedom and thrilling challenges and a need to stay in constant close contact with the local environment. The key to successful bush flying is not teaching any pilot how to fly in the bush: it is more about defining a preferred prototype lifestyle of a bush pilot, communicating that information to potential recruits who match the ideal pilot profile and then coaching them carefully in the process. Finally they should then be encouraged to build their experience under wise control and supervision.

Conclusions

The fundamental question "What is the best way to train bush pilots?" was kept in focus throughout the research process. If the research findings are studied and those that are relevant to the operator's needs are implemented, there should be a noticeable improvement in effectiveness and safety, no matter how professional the pilots' organisation already is. There are many other issues open for further research. One of them would be to focus on bush flying accidents and their causes. Another would be to focus on career development. How could the bush flying sector and other sectors within the aviation industry be of benefit to each other?

This research has also demonstrated the value of using techniques more normally associated with market research activities to guide the development of appropriate training programs – particularly in fields such as bush flying where normal corporate structures are generally not employed. The approach to identifying training needs used here could, for example, be useful for other professions that have qualities similar to bush flying: ability to work independently, small margins of error, potential catastrophic consequences, need for self-discipline, need to set, monitor and control one's own limits, multi-level challenges, unpredictability, dealing with disorganisation, a non-structured environment, procedure-oriented work, need for reliability and high standards, specialist skills application and strong commitment to the job and individual task. Possible examples might include professional operators in fire-fighting and other fields where protection of the public in emergency situations are involved. While the conclusions reached here in relation to bush flyers may not have a direct carry over into other activities of this type, they hopefully provide some useful pointers. In any event, the type of qualitative research program used here would be a very desirable first step in developing appropriate recruitment and training programs in these sectors.

References

Aarons, R. N. (2003), 'Rules for handling engine failure in turboprops', *Business & Commercial Aviation*, 93, 4, 64-67.

Bangs, K. (2004), 'Customised flight training', *Business & Commercial Aviation*, 95, 4, 62-66.

Barrows, C. (2000), 'An exploratory study of food and beverage training in private clubs', *International Journal of Contemporary Hospitality Management*, 12, 3, 190-194.

Cialdini, R. B. (1993), *Influence: The Psychology of Persuasion* (New York: Quill).

Craig, P. A. (2001), *Controlling Pilot Error: Situational Awareness* (New York: McGraw-Hill).

FAA (1978a), FAR Part 61 Sec 61.105. Available from http://ecfr.gpoaccess.gov/cgi/t/text/, Title 14; accessed 22 Apr 2008.

FAA (1978b), FAR Part 91 Sec 91.3. Available from http://ecfr.gpoaccess.gov/cgi/t/text/, Title14; accessed 22 Apr 2008.

Jeppesen S. (2002), *Flight Instructor Manual* (Englewood, CO: Jeppesen Sanderson).

Jeppesen, S. (2003), *Jeppesen Instrument Commercial* (Englewood, CO: Jeppesen Sanderson).

Kaufmann, J. (1989), *Meine Flugberichte 1935-1945* (Schwäbisch Hall, Germany; Journal-Verlag).

Kern, T. (1997), *Redefining Airmanship* (Hightstown, NJ: McGraw-Hill).

Kern, T. (2001), *Controlling Pilot Error: Culture, Environment, CRM* (New York: McGraw-Hill).

Kershner, W. K. (1993), *The Flight Instructor's Manual* (Ames, IA: Iowa State Press).

Leigh, L.E. and Frauman, A.C. (1990), 'Marketing of Nursing Education; A Case Study,' *Journal of Nursing Education*. 29, 3, 134-7.

Manningham, D. (2003), 'Letter from Kabul Part II', *Business & Commercial Aviation*, 92, 3, 78-84.

McAllister, B. (1997), *Flying the Edge* (Shrewsbury, UK: Airlife Publishing).
Piaget, J. (1928), *Judgement and Reasoning in the Child* (M.Warden, Trans.) (New York: Harcourt Brace).
Searles, R. (2004), 'When Embry met Riddle', *Business & Commercial Aviation*, 95, 4, 94-98.
Sheehan, J. J. (2003), *Business and Corporate Aviation Management* (Hightstown, NJ: McGraw-Hill).
Skinner, B.F. (1969), *Contingencies of reinforcement: A theoretical analysis* (Englewood Cliffs, NJ: Prentice Hall).
Webb, J. (1990), *Fly the Wing* (Ames, IA: Iowa State Press).