Abstract
Alaska’s people and history have been shaped by flight. Alaska, arguably the least-connected state in terms of road transportation, contains some of the busiest airport facilities and has more pilots and aircraft per capita than any other place in the country. The airplane, specifically the bush plane, truly carved the face of the Last Frontier and is still the number one choice for Alaskans who want or need to reach remote villages, coastal towns, or off airstrip gravel bars and hilltops. Overall, the bush plane has become an iconic symbol within Alaska. This project traces its history and evolution in order to illustrate the unique relationships between flying, pilots, and aircraft.

Introduction
Flight is often cited as one of the most remarkable achievements of the 20th century. In the history of aviation one can examine overlapping, yet distinctive images of the experience of flight and its place within human affairs (Batteau 2001). Flying has become second nature to hundreds of millions of people and it is difficult to imagine a world without it (Grant 2007). Aviation has fundamentally altered the interconnectedness of the world; changing the ways in which we think about distance, time, and space. In North America, one area in particular has been significantly affected by aviation. This area is Alaska.

Figure 1: Map of Alaska

Despite the significance of aviation within the state, little anthropological or archaeological research has been conducted on this topic. My project investigates the historical development of civil aviation in Alaska by incorporating multiple lines of evidence such as material culture, historical documentation, oral traditions, and participant observation in order to
demonstrate the unique social, cultural, and material relationships associated with flying, pilots, and aircraft. This paper, however, focuses specifically on the material culture component, namely the bush plane.

**Flying, Pilots, and Planes**

Flying can be thought of as an interaction between culture and technology or more simply put, between a pilot and his or her aircraft. It has been stated that “human flight is an experience of perfection: in flight, polished skills and highly engineered devices enable aviators to transcend normal human limitations. The devices are significant: it is the marriage of man and machine, or more accurately the subservience of man to machine, that enables this transcendence. Those who submit are allowed to enter the sacred spaces of flight” (Batteau 2001:202). An example of this interaction in the case of Alaskan aviation is between pilots and bushplanes.

To be clear, I define pilots as a distinct social group brought together by a shared set of experiences (Figure 2). Pilots are differentiated by a number of certain characteristics, including physical abilities such as eye-sight and motor skills; background such as standardized flight training; initiation rite which is often a pilot’s the first solo flight; language or aviation lingo; and stylized dress (Batteau 2001). In Alaska, as well as in parts of Canada, Africa, and the Australian outback, pilots must often acquire additional skills and abilities. Flying in these areas of the world is often termed “bush flying” which simply refers to off-airport takeoff and landings (Szurovy 2004). Since there is no chapter on bush flying in any formal flight instruction manual, pilots acquire their skills mainly through experience. In Alaska every flight is unpredictable due to the fact that many pilots do not take off and land at “traditional” airports or runways due to the lack of improved and paved airstrips. Therefore, this type of flying demands that pilots have an intimate knowledge of his or her aircraft, its systems, and also its limitations (Mason 2002).

The aircraft I examine in this research are primarily bush planes (Figure 3).

Bush planes are distinguished from other types of planes due to a number of specific attributes. First, bush planes have high wings to help improve ground visibility. Having the wings on top also allows airplanes to land on small strips that have become overgrown with vegetation. Second, bush planes are equipped with tailwheel (or conventional) landing gear. The tailwheel, as opposed to a nose wheel, produces a nose high attitude which...
increases ground clearance. In Alaska, nose-wheel planes are often limited to improved airstrips because their propellers are more susceptible to dipping down into gravel or other obstructions upon landing. Third, although bush planes come in all sizes and shapes, an efficient bush plane will be able to take-off and land in short distances, a capability known as STOL.

The Development of the Bush Plane

The earliest bush planes in Alaska were surplus, open-cockpit biplanes from World War I (Brown 1983; McCaffery 2002). As pilots and mechanics returned from the war, the aircraft that were used were sold at bargain prices on the civilian market (Szurovy 2004). Many pilots quickly saw the monetary potential that could be gained from airplane use. Canada is often credited as creating some of the first bush planes. For instance, the Laurentide Company, a large Canadian paper mill headquartered in Quebec, realized how aircraft could be used to identify and control forest fires, one of the company’s biggest concerns (McCaffery 2002). Since landplanes were an issue in Canada’s forested areas, Laurentide’s choice was the Curtiss HS-2L (Figure 4), the so-called “flying boat” at the time or in more current terms a sea or floatplane.

Several of these planes were sold to Canada by the U.S. Navy and two were loaned to Laurentide by the Canadian government. The aircraft was a large 3 1/2 ton biplane, with an unreliable engine and poor takeoff performance. However, it had a range of about 300 miles and could handle large loads making it suitable for the company’s needs. The early success of Laurentide helped inspire the rapid growth of bush flying throughout Canada, as well as influenced the development of flying in Alaska.

In 1913, the first airplane, a Gage-Martin biplane, reached Alaska packed in a wooden crate that traveled by steamship, railroad, and riverboat from Seattle to Fairbanks (Stevens 1990; Ruotsala 1997; Rozell 2004; Szurovy 2004). On July 4th hundreds of Alaskans gathered around the ballpark in Fairbanks to watch the 11 minute exhibition flight by entrepreneur and pilot, James Martin (Figure 5).

Several of these planes were sold to Canada by the U.S. Navy and two were loaned to Laurentide by the Canadian government. The aircraft was a large 3 1/2 ton biplane, with an unreliable engine and poor takeoff performance. However, it had a range of about 300 miles and could handle large loads making it suitable for the company’s needs. The early success of Laurentide helped inspire the rapid growth of bush flying throughout Canada, as well as influenced the development of flying in Alaska.

In 1913, the first airplane, a Gage-Martin biplane, reached Alaska packed in a wooden crate that traveled by steamship, railroad, and riverboat from Seattle to Fairbanks (Stevens 1990; Ruotsala 1997; Rozell 2004; Szurovy 2004). On July 4th hundreds of Alaskans gathered around the ballpark in Fairbanks to watch the 11 minute exhibition flight by entrepreneur and pilot, James Martin (Figure 5).

Figure 5: The 1913 Exhibition Flight

Seven years passed before airplanes were seen over Alaska again. In 1920, on the first international cross-country flight in history, officers and enlisted men of the Army, known as the Black Wolf Squadron, traveled from New York City to Nome, Alaska with four de Havilland DH-4Bs (Stevens 1990a; Ruotsala 1997; Rozell 2004). Two years later, the start of Alaskan bush flying officially began with the formation of Alaska’s first commercial air service, Northbird Aviation Company. Similar to Laurentide, Northbird’s choice in aircraft was the ex-Navy Curtiss MF Seagull, a 180-horsepower biplane on floats.

While much of Alaska’s interior had its share of water surfaces, the opportunity to operate on dry land was far greater, and
consequently so were the choices of aircraft for the pioneer bush pilots (Szurovy 2004). In the early 1920s, the war surplus Curtiss Jenny bi-plane (Figure 6) was introduced in Alaska; followed by the de Havilland DH-4; the Standard J-1, another open cockpit war surplus biplane; the Dutch Fokker III, a large single-engine, high-wing monoplane; the Stinson Detroiter, one of first planes with an enclosed cockpit; the Travel Air, a larger bi-plane also with an enclosed cabin; the Hamilton Metalplane; and the Waco and Stearman, both open-cockpit biplanes (Brown 1983, McCaffery 2002, Szurovy 2004).

Early pilots gradually demonstrated the airplane’s potential in Alaska’s vast wilderness. Parts of Alaska that had never heard the sound of an automobile – and still haven’t – heard the sound of aircraft flying above. So quickly did the airplane revolutionize travel, that by the early 1930s planes were being used extensively within the Alaskan territory.

The Golden Years: 1930s – 1950s
Pilots from the 1930s through the 1950s enjoyed a mix of romance, science, innovation, and routine (Bruder 1991). Bush flying dramatically increased during this time and as people in Alaska needed more and more service by air, the pilots, in cooperation with the manufacturers, adapted airplanes to serve their needs (McCaffery 2002; Rozell 2004; Szurovy 2004; Rossiter 2005). The tenuous experiments with a few dozen or so of the early bush planes transformed aircraft into more predictable and stable forms of transportation. The key development during the late 1920s and early 1930s was the creation of more reliable and substantial air-cooled engines, such as the Wright Whirlwind (Figure 7), and the Pratt and Whitney Wasps and Hornets.

The new engines were able to increase the performance of the traditional open-cockpit biplanes and eventually led way to the development of single-engine, high-wing monoplanes such as the Fairchild series (Figure 8). The Fairchilds were specifically designed to be versatile and were able to operate on floats, skis, and wheels. In fact, in 1932 a 450-horsepower Fairchild 71 performed the first glacier landing on Mount McKinley. With the development of the Fairchild, additional enclosed-cockpit monoplanes entered the market, such as the Lockheed Vega, the Bellanca Pacemaker and Skyrockets, the Gullwing Stinson, and the Noorduyn Norseman, a Canadian monoplane designed specifically for bush flying due to its fixed tail-wheel, load bearing capability, versatility, and its ability to take off and land in short distances (McCaffery 2002). Soon, isolated areas of
the Alaskan landscape became more and more accessible thanks to these aircraft with greater speed and range capabilities and the willingness of pilots to venture out into the unknown.

Innovations and Modifications

As bush flying increased in popularity over the years that followed, the planes continued to be modified to suit pilots’ specific needs. Due to innovations in technology brought forth by pilots themselves, the bush plane went through a series of developments that eventually led to the establishment of an effective type of aircraft that could be used to fly the Alaskan skyways.

As mentioned previously, skis allowed for landing on glaciers and snow packed airfields and floats were used to land on rivers and lakes. New innovations in technology saw the development of planes that could be equipped with ski and wheel combinations allowing a pilot to takeoff from a gravel or paved airstrip and land on a glacier, or vice versa. Tundra tires were another very common modification that allowed pilots to land somewhat smoothly on gravel bars, alpine hilltops, and other improvised airstrips. In addition, the manufacture of amphibious planes (Figure 10), planes with both floats and tires, provided pilots the option to land belly down in the water or on land with the help of retractable landing gear. Downward-curved wingtips were also added to the wings to provide extra lift, allowing for slower speed takeoffs and landings. In the winter months, air restrictor plates were often placed over the front cowl to retain more engine heat. Further technological advances have also allowed bush planes to have terrain awareness and on-board weather systems.

Figure 8: The Fairchild

Aviation and bush flying continued to flourish after World War II (McCaffery 2002, Szurovy 2004). Improved technological innovations brought better aircraft with more reliable communication systems and navigational aids. During the late 1940s and 1950s, the famed de Havilland Beaver (Figure 9) and Otter, the Grumman Goose, and the Piper Super Cub were developed (Rossiter 2005).

Figure 9: The deHavilland Beaver
Conclusion

The bush plane, now an iconic symbol within the history of Alaska, truly carved the face of the Last Frontier and is still the number one choice for Alaskans who want or need to reach remote villages, coastal towns, or off airstrip gravel bars and hilltops (McCaffery 2002; Rozell 2004; Szurovy 2004; Rossiter 2005). While Alaska has changed in many ways since the first flight almost a century ago, one feature has remained the same – bush planes are still the best way to access this vast frontier. Bush planes evolved over time from unstable open-cockpit biplanes to the more sophisticated bush planes of today, complete with GPS navigational systems, Automatic Dependent Surveillance-Broadcast systems (ADS-B), and even iPod jacks. The lasting usefulness of bush planes says a lot about the people who fly them and even more about Alaska and with much of the state too rugged for the construction of new roads, bush planes will continue to be a main source of transportation for many years to come.
Acknowledgments

This research is supported in part by the Virginia Space Grant Consortium, Women in Aviation, International, the Roy R. Charles Center, the Office of Graduate Studies and Research, and the Department of Anthropology at the College of William and Mary.

Bibliography

Alaska Geographic Society

Batteau, Allen W.

Brown, Dale M.

Bruder, Gerry

Federal Aviation Administration (FAA)

Grant, R.G.

Mason, Mort

McCaffery, Dan

Rossiter, Sean

Royal, Weld

Rozell, Ned

Ruotsala, Jim

Stevens, Robert W.

Szurovy, Geza