

12 - Distributed Propulsion Bush Plane

The Twin Puffin distributed propulsion bush plane offers fast and easy transport, whenever remote and undeveloped areas lack the basic infrastructure to support regular aviation. Building upon the conventional characteristics of general aviation aircraft, the Twin Puffin enables a take-off and landing distance of less than 100 m on rough terrain. Next to that, the bush plane uses modern technology to transport people and goods to and from remote areas, to serve for medical rescue missions and to take tourists high up in the sky, pushing the boundary of bush plane applications to the extreme.

Mission Objective

Traditional bush planes show neither innovative features nor improve the existing noise and emission issues. To tackle these enormous drawbacks, group 12 designed a state-of-the-art distributed propulsion bush plane, that produces 70% less noise and reduces the emissions significantly with 50% compared to competing aircraft, going beyond the boundaries of traditional bush planes. Thereby, the mission objective statement is defined as: The product shall provide remote communities with an affordable and dependable means of transportation to reach other communities, regardless of weather, altitude or infrastructure.

System Design

Inspired by Nature, the bush plane is named the Twin Puffin. 'Twin' following the distinctive twin-boom empennage, and the 'Puffin', from the bird with a stubby display and a master of short take-off and landing on the ocean cliff-sides, a real inspiration for a STOL aircraft. The distributed electric propulsion lead to excellent STOL characteristics, as the blown air over the wing allow for a large increase in lift at low speeds. The featured twin boom empennage make aft loading of cargo or a medical stretcher easy. Furthermore, the distributed propulsion is placed on the wings leading edge, allowing unobstructed view during all flight phases, solving the typical visibility issues of a traditional bush plane. The distributed propellers are powered by a hybrid engine using both electricity from batteries and power generated by a diesel-based internal combustion engine. This allows for an increase in available power and a local reduction in the emissions and noise during electrically-powered take-off and landing. Moreover, the Twin Puffin is primarily built of the sustainable material flax fibre composite, making the aircraft more environmentally friendly. Com-

binning these properties result in a modern, impressively performing, and quiet bush plane design. The Twin Puffin is an innovative bush plane design offering many promising features, creating the possibility for an expansion of the market. The bush plane is favourable for transport uses, due to the possibility of loading and unloading the aircraft from the back of its spacious cargo area. This also enables the possibility to easily enter a stretcher into the plane, and is therefore ideal for emergency medical services. Furthermore, due to the increase in visibility compared to traditional bush planes, the aircraft is appropriate for civil transport and tourism. Moreover, the modularity of the design allows for easy implementation of new technologies, making the Twin Puffin "built today, ready for tomorrow".

