

## CONCEPTUAL DESIGN OF AMPHIBIOUS AIRCRAFT

G. Anoop; Gargi Meharu; A.K. Rajesh  
Aircraft Research and Design Centre  
Hindustan Aeronautics Limited (HAL)  
Marathahalli Post  
Bangalore-560 037, India

Email : [anoop.g@hal-india.com](mailto:anoop.g@hal-india.com); [gargi.m@hal-india.com](mailto:gargi.m@hal-india.com); [rajesh.ak@hal-india.com](mailto:rajesh.ak@hal-india.com)

### Abstract

The airplanes designed to operate from water are commonly known as seaplanes and there are three kinds of seaplanes in general. They are floatplanes, flying boats, and amphibians. While a floatplane is actually a landplane with landing gears removed and installed with pontoons that are partially submerged floats, the flying boat is a seaplane version in which the payload is carried inside a fuselage designed to function as a hull for operation on the water. The amphibian is an aircraft that has features for water operations by using hull type fuselage and for land based operations by using retractable landing gear. An amphibious aircraft combines the speed and range benefits of a conventional aircraft with the additional ability to land and take-off on open water. Conceptual design of an amphibious jet transport aircraft is discussed in this paper. An optimized design approach addressing key features like hydrostatic stability, dynamic stability, wave handling, and water performance is conceptualized with due care for aerodynamic characteristics and overall performance figures. An innovative scheme named as SAGAR, using artificial intelligence concepts, is also proposed for an efficient control and guidance of the amphibious aircraft for water operations. Additionally, a case study is discussed on optimal design approach for converting a currently operated landplane into its amphibian version.

**Keywords:** Amphibious aircraft; Seaplane; Floatplane; Flying Boat; SAGAR