

ENHANCED MODEL FOR TERMINAL AIRSPACE CAPACITY ESTIMATION

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Abstract

Terminal Airspace comprises the area around an airport in which various aircraft in its vicinity are in ascending or descending phases. This paper describes an enhanced model for estimation of Ultimate Capacity of Terminal Airspace, given its geometric layout, traffic data, and the separation minima maintained. This model can be used to determine the number of aircraft in the Terminal airspace of an airport that can be safely handled by the Air Traffic Controllers. An existing probabilistic model for Terminal Capacity assessment was enhanced to include operations on intersecting and parallel runways. An important out-come of this methodology is the minimum time gap between successive operation at the runway, which is utilized to draw a time space diagram of runway operation, and thus obtain an estimate of Delay under various operational scenarios. The model was first utilized to estimate the Terminal airspace capacity of the two most busy airports in India, viz., Mumbai and Delhi, and later for other main Airports viz., Kolkata, Chennai, Ahmadabad, Guwahati, Hyderabad, Kochi and Thiruvananthapuram. A critical analysis of the results lead to suggestions like slot distribution, rescheduling of aircraft, restructuring of spacio-geometrical conditions of airspace and airfield etc. that maybe considered to increase capacity and reduce delays at Indian Airports.

Index Terms: *Terminal Airspace, Capacity Modeling, Arrival and Departure modeling, Delay and Rescheduling at Airports, Air Transportation Systems*