## CAITR Abstract

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### Stochasticity of Airport Passenger Arrival Process in System Dynamics

The airport arrival terminal is a complex system, comprised of various interdependent and dynamic processes. A model has been developed for airport terminal analysis and performance assessment. The model adopts a system dynamics approach, which captures the dynamic complex interactions within a system. Although system dynamic models give considerable insight, when parameters are set to a constant or average value, variance is lost. Variance is important in representing any risk or uncertainty involved in a system. The arrival terminal system contains elements of uncertainty or randomness, which can be modelled by Monte Carlo methods. The Monte Carlo simulation is used to vary the input parameters to the system dynamics model. The randomness is applied as a preliminary process external to the internal mechanisms of the system, as it is the parameters to the system being sampled. Thereby, introducing stochasticity into the system dynamics model can provide extensive insight into the system's behaviour and be a useful tool. For example, the arrival of passengers debarking from an aircraft is variable and dependent on a number of factors. These factors include the size of the passenger load, aircraft, scheduled time of arrival, walking speed distributions, length of terminal, amongst many others. This paper reveals that the arrival metrics of passengers at an airport arrival terminal shows that the aggregation of these measurements forms a statistical distribution, which is approximated by the log-normal distribution. The distribution fit allows the input of arrival metrics to be represented as a cumulative distribution function, which serves to better represent arrival profiles. The paper continues to discuss the introduction of stochasticity in the system dynamics model. This will provide significant utility in capturing the randomness of events by incorporating Monte Carlo simulation in the system dynamics model.