Studies show that low-cost carriers have gained 15.2% market shares and enplanement has increased by 38% over a period of ten years following their emergence. Whereas flight frequency and load factor are directly influenced by airlines’ key factors such as turn-time and fleet capacity, they on the other hand directly influence other airline market parameters. This proposes a mediation possibility. However, the influence of turn-time on carriers’ market share, fleet capacity on enplanement, mediating flight frequency and load factor on the relationships, and the effect of low-cost carrier in Kenya were still unknown. There had been a substantial body of research investigating the effect of low-cost carriers on the aviation industry in developed countries but not in Kenya. The purpose of this study, therefore, was to analyze the effect of mediating route characteristics on the relationship between low-cost carriers’ key factors and the airline performance for the period 2007 – 2012 in Kenya; which was characterised with steady growth. The specific objectives of the study were to: determine the effect of turn-time on carriers’ market share, fleet capacity on enplanement, and the influence of route characteristics as a mediator on the relationship between low-cost carriers’ key factors and airline performance. The study was anchored on the theory of enhancement of vessel capacity utilisation; from which a conceptual framework was developed, taking independent variable as low-cost carriers’ key factors, dependent variable as airline performance, and mediating variable as route characteristics. Time series correlationl design was used to capture the changes in the variables over the period. The study was carried out in Kenya. Study population comprised two low-cost carriers whose time series secondary data over 72 months period were analyzed. Sources of secondary data were aircraft log books on which documents review was carried out. Panel unit root tests show all variables are first-order stationary except turn-time and load factor that are zero-order stationary; implying direct association of the variables would yield short-run equilibrium relationships. Panel cointegration tests revealed the series are cointegrated; meaning cointegrating regressions would result in long-run equilibrium relationships. Path regression analyses were used to track the influence of the mediating route characteristics, and findings show the effect of turn-time on carrier’s market share ($\beta = -0.94, p= 0.000$, $R^2 =36.4\%$); implying turn-time significantly predicts carrier’s market share, fleet capacity on enplanement ($\beta = 35.41, p = 0.000$, $R^2 = 78.25\%$); meaning fleet capacity significantly predicts enplanement, mediating flight frequency on turn-time and carrier’s market share relation ($\beta_{\text{indirect}} = -0.94, p= 0.000$); implying flight frequency significantly mediates turn-time and carrier’s market share relation, and mediating load factor on fleet capacity-enplanement relation ($\beta_{\text{indirect}} =5.82, p= 0.001$); meaning load factor significantly mediates fleet capacity and enplanement relation. Study concludes turn-time has significant negative effect on carrier’s market share, fleet capacity has significant positive effect on enplanement, flight frequency partially and significantly mediates turn-time and carrier’s market share relation by 64.14%, and, load factor partially and significantly mediates fleet capacity and enplanement relation by 16.44%. Study recommends: adoption of efficient turn-around models, timely fleet capacity adjustments, increasing flight frequency of flights during holidays and week-ends, stimulating leisure travel demand by lowering fare to enhance load factor. These results may be significant to both government and airlines management in Fleet