Performance Maximization of Tactical Unmanned Aerial Vehicles via Integrated Passive and Active Morphing

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***Abstract*— In this conference paper integrated passive and active morphing methodology is used on tactical unmanned aerial vehicles (TUAVs) in order to maximize autonomous flight performance. For this drive dynamic modeling of TUAVs produced in Erciyes University Faculty of Aeronautics and Astronautics Model Aircraft Laboratory is followed in order to get state-space models and a simulation model. This TUAV called as ZANKA-III is 50 kg, has range of around 3000 km, endurance of around 28 h, and ceiling altitude of around 12500 m. Von-Karman turbulence modeling is benefited in order to model atmospheric turbulence in simulation environment. A stochastic optimization method namely simultaneous perturbation stochastic approximation (i.e. SPSA) is applied in order to get optimum morphing parameters (e.g. assembly position of tailplane to fuselage and extension ratio of wing span).**

***Index Terms*— Tactical Unmanned Aerial Vehicles (TUAVs), Autonomous Flight, Performance, Morphing, Stochastic Optimization.**

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