Aircraft Nut Tension Monitoring Washer

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Aircraft accidents are often caused by inadequate maintenance or unforeseeable structure failures due to loosen bolts and nuts on the aircraft. Although many different safety products available in the market to prevent such accidents, they still failed to put an end to the problems. In this project, the ‘ Aircraft Nut Tension Monitoring Washer’ is designed to solve these serious accidents. We have focused on how to examine loosening of bolts, which could facilitate visual inspection by the aircraft maintenance workers. The problem can be fixed as soon as the loosened bolts warning signal are detected by the workers in order to avoid the accidents. The ‘Aircraft Nut Tension Monitoring Washer’ consists of a double layered washer. The outer layer is an ordinary solid ring-shaped washer with a small hole which indicates the tightening status of the bolt. The inner washer is of the same size with a small spiral spring connecting the two layers together. When the washer is tightened, it will not show any signal however when loosened, the two layers will spring apart and rotate, prompting a “warning signal” to be visible on the outer washer. The invention is relatively inexpensive and reusable. It could also be used on other machines or infrastructures that use bolts and nuts. Rigorous tests were carried out under different temperatures and atmospheric pressure as well as under vibrating conditions to ensure that the washer can perform under most extreme environment. ‘Aircraft Nut Tension Monitoring Washer’ can be used with other anti-loosening products such as Nylon Self-locking nut or Lock Washer. Not only does it prevent screws from loosening, it can also provide an early warning alert in order to prevent serious flight accident hence save lives!

Awards Won:
Arconic Foundation: Sustainable Design In Transportation, First Award $2,500