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## Filter Jam Detection Algorithms

General Dynamics Mission Systems (GDMS) is seeking methods to reduce downtime due to filter advance failures for the Radionuclide Aerosol Sampler/Analyzer (RASA) system. The primary concern during filter advances are filter jams, which occurs when the filter media wraps itself around the driver rollers. Filter jams often lead to hardware damage to the advance motor gear assembly, thus requiring manual intervention. Damage to the filter media can also occur due to tension stress or from actions taken to restore the system. To address this concern GDMS is investigating ways to leverage existing RASA sensors to detect and mitigate filter jams. One such sensor is the filter advance motor current transducer. This state-of-health sensor has in the past only reported its minimum, maximum, and average values during a filter advance. However, GDMS has been able to successfully identify patterns indicative of a filter jam by observing minute fluctuations in the current values while the motor is engaged. An algorithm was then developed to search for these patterns in real-time and take appropriate actions to prevent catastrophic component failures. Further corrective actions are also being investigated to automatically restore the system using existing hardware and without human intervention.

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