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CONSEQUENCES OF CONTINUED GROWTH IN THE GEO AND GEO DISPOSAL ORBITAL REGIMES

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To date more than 800 spacecraft, upper stages, and apogee kick motors are known to reside in geosynchronous and nearby orbits, including geosynchronous disposal orbits. An even larger number of debris greater than 10 cm in diameter have been detected by U.S. and European ground-based sensors. Using projections of geosynchronous deployment characteristics and disposal rates, NASA and Kyushu University models of the geosynchronous and super-geosynchronous orbital regimes have examined the sensitivity of the long-term satellite population to various scenarios. Emphasis has been placed on the rate of collisions in the geosynchronous orbit and in the higher disposal orbits and on the significance of cross-regime contamination. The sensitivity of the long-term environment on low velocity (0-1 km/s) collision breakup model parameters and on the minimum height of disposal orbits has also been explored. Results are presented in terms of both satellite population and spatial density.