

The Komplast Experiment: Space Environmental Effects after 12 Years in LEO (and Counting)

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The Komplast materials experiment was designed by the Khrunichev Space Center, together with other Russian scientific institutes, and has been carried out by Mission Control Moscow since 1998. The purpose is to study the effect of the low earth orbit (LEO) environment on exposed samples of various spacecraft materials. The Komplast experiment began with the launch of the first International Space Station (ISS) module on November 20, 1998. Two of eight experiment panels were retrieved during Russian extravehicular activity in February 2011 after 12 years of LEO exposure, and were subsequently returned to Earth by Space Shuttle “Discovery” on the STS-133/ULF-5 mission. The retrieved panels contained an experiment to detect micrometeoroid and orbital debris (MMOD) impacts, radiation sensors, a temperature sensor, several pieces of electrical cable, both carbon composite and adhesive-bonded samples, and many samples made from elastomeric and fluoroplastic materials. Our investigation is complete and a summary of the results obtained from this uniquely long-duration exposure experiment will be presented.