**Frequency and Aspect Angle Dependence of Non-Specular Trails**

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When a meteoroid penetrates Earth's atmosphere, it forms a high density ionized plasma column immersed in the ionosphere between approximately 70 and 140 km altitude. High-power, large-aperture (HPLA) radars detect non-specular trails when VHF or UHF radio waves reflect off structures in a turbulent meteor trail. These trails persist from a few milliseconds to many minutes and the return from these trails is referred to as non-specular trails or range-spread trail echoes. In this presentation, we show results from non-specular trails detected with ALTAIR, which is an HPLA radar operating simultaneously at 160 MHz and 422 MHz on the Kwajalein Atoll. First, we investigate the aspect sensitivity of non-specular trails and show that as the angle between the radar beam and the background magnetic field increases, the signal strength falls off 3 to 4 dB per degree at 160 MHz. For ALTAIR, this means that the aspect angle must be within approximately 12 degrees in order to detect non-specular trails using the chosen waveforms. Second, we compare and contrast the meteoroids that form non-specular trails and find that the meteoroid energy causes much of the variability in the non-specular trail's signal-to-noise ratio (SNR) for a given aspect angle. Finally, we determine the dependence of SNR on wavelength and show that the maximum non-specular trail SNR scales as approximately $\lambda^6$ and depends upon altitude.