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Adaptive Optics for Horizontal Propagation Applications

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Abstract content
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Adaptive Optics (AO) is a well proven technology for imaging systems used for astronomical and Space Surveillance applications. However, the application of these proven techniques to horizontal path imagery is not straightforward, and so far has not been investigated for imaging systems. There are two major problems with extending AO systems for vertical imaging systems to horizontal imaging regime. First, the optical effects of atmospheric turbulence are far more severe for horizontal than for vertical paths. Furthermore, there is now growing experimental evidence that in the horizontal regime the usual wavelength scaling of the strength of turbulence does not hold. This is readily apparent from observing the slight effect of twinkling of stars compared to the pronounced shimmering of objects when viewed across a hot pavement. . Second, horizontal imaging systems generally involve viewing extended sources over relatively large fields of view. Currently no wavefront sensing schemes exist for this application. Primarily for these reasons, the development of an AO system for horizontal imaging systems remains an important unsolved DoD problem. In this paper we will present results and analysis related to our horizontal path imaging and correction effort.

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