Achieving diffraction-limited imagery through atmospheric turbulence over a field of view larger than the isoplanatic angle requires that the wavefront aberration be characterized over the three-dimensional (3D) volume between the target object and the instrument. Corrections may then be applied to the image seen through the full telescope aperture either by a series of deformable mirrors or by reconstructing point-spread function (PSF) estimates along each line of sight and removing them from the image numerically. For upward-looking astronomical telescopes, the prevailing turbulence profile is generally well characterized by a comparatively strong boundary layer close to the telescope and a small number of additional layers whose altitudes are relatively stable. Good correction over fields of view substantially larger than the isoplanatic angle can therefore be achieved with a deformable mirror in the pupil and one or two others optically conjugated to well-chosen ranges. Imaging telescopes in other applications, looking horizontally or downward, will find themselves looking through much less clearly defined turbulence structures. Effective adaptive optics systems would be very complex and quite impractical, particularly for mobile platforms. Instead, we may appeal to computational methods to correct the image. In this talk I will describe a new algorithm to estimate and remove the field-dependent PSF, illustrating with simulated results. The computational demand appears manageable for a real system of half a meter or more in diameter.