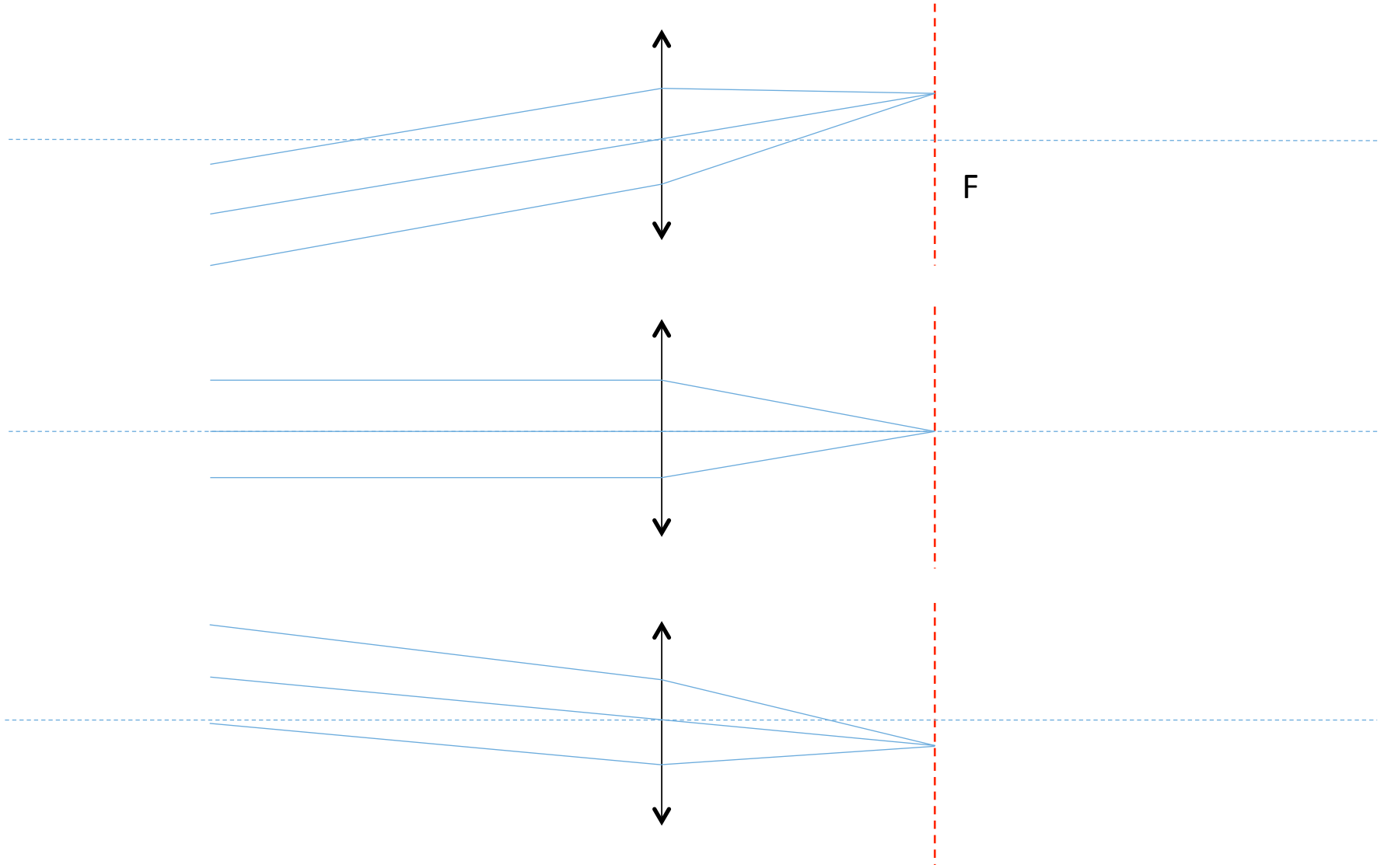
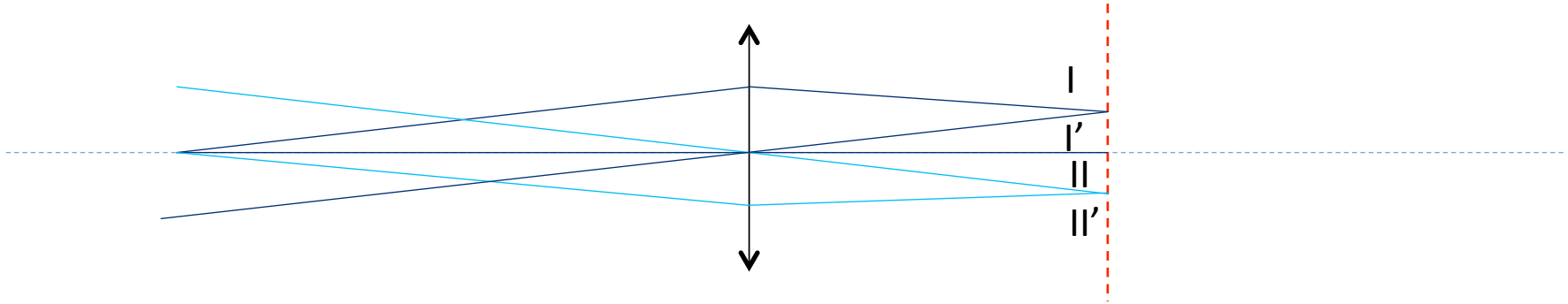
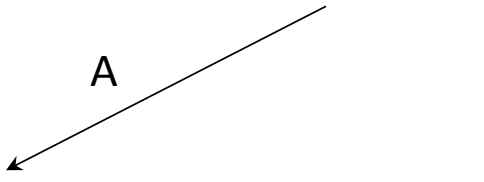
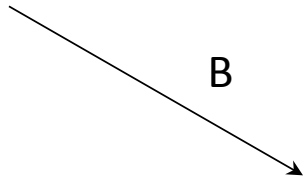
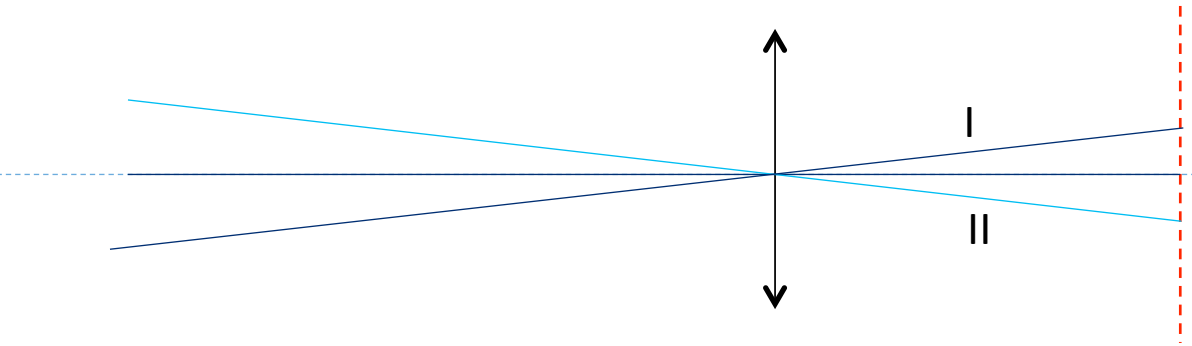


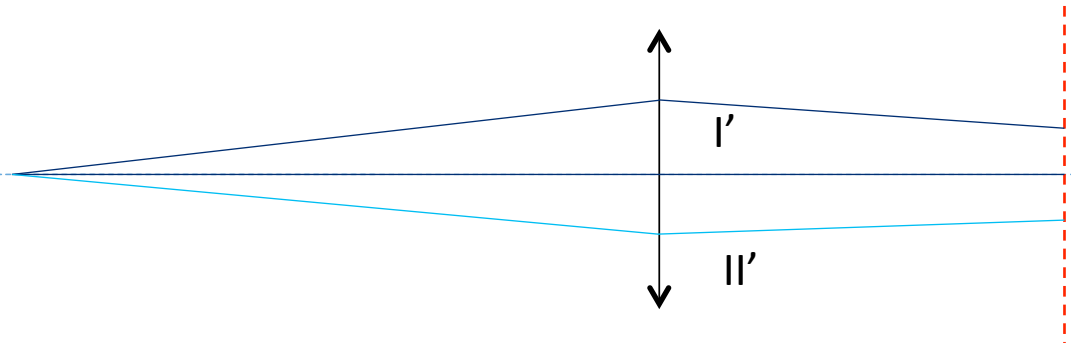
Parallel beams will be focused on the same position on the focal plane. Therefore, when the sample is on the focal plane, the laser beam position is only dependent on the incident angle, and is independent of incident position.



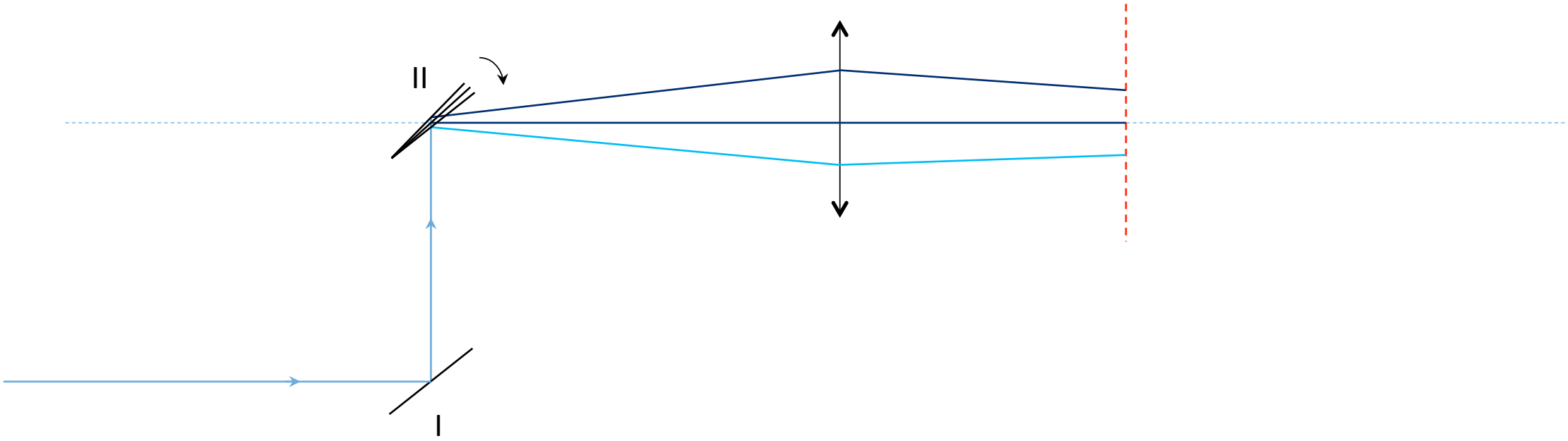






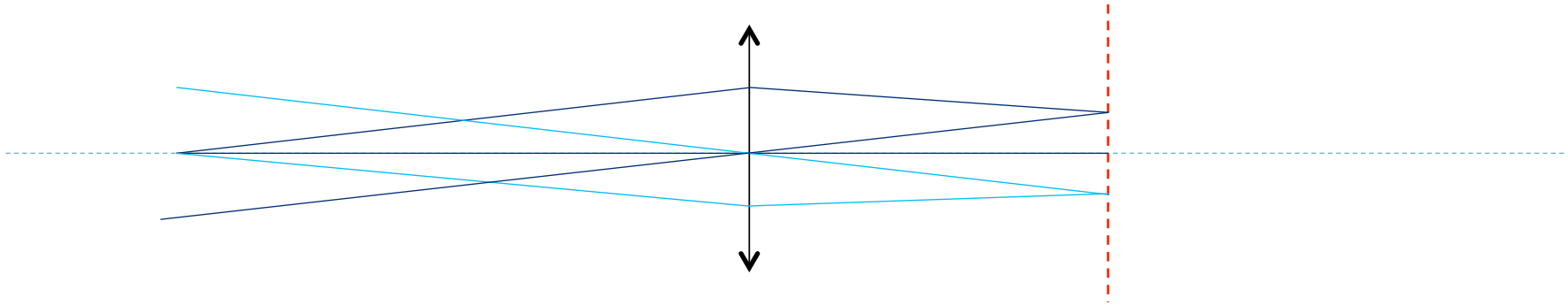


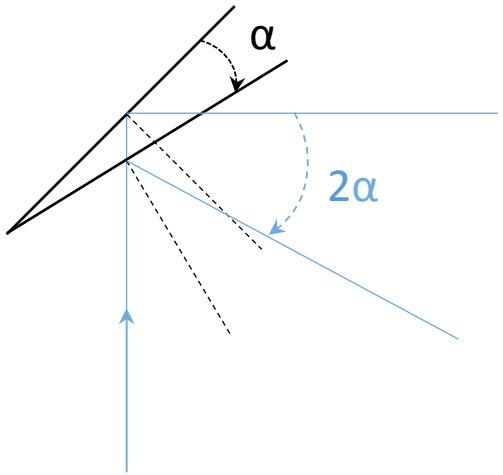
Beam position on the canvas / focal plane is only incident-angle-dependent (if the beam can always pass through the aperture). These two setup for canvas scanning will have the same results if I and I’, II and II’ are parallel.

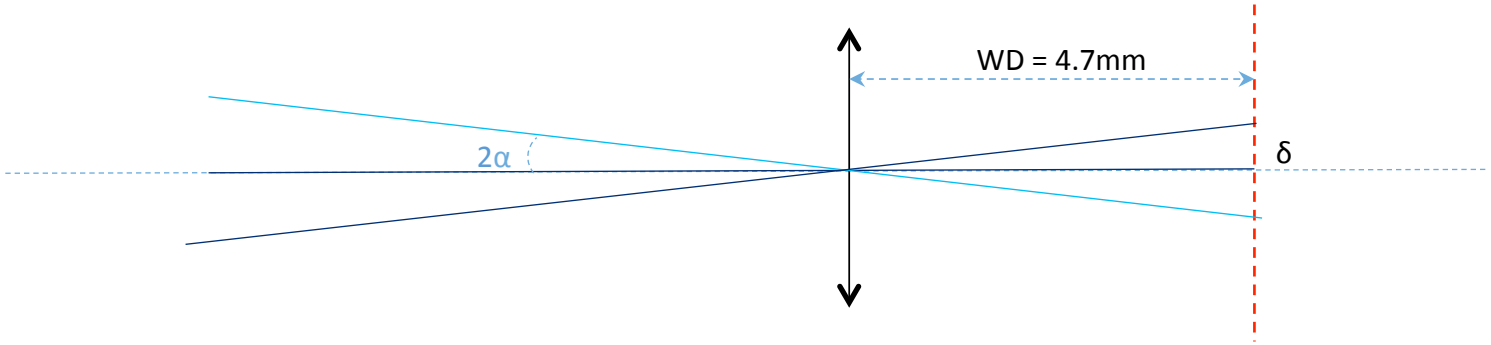


Only the incident angle matters, so if the angle change of mirror is small (like when scanning a 35 micro canvas) and if beam can always pass through the aperture, then only one mirror needs to be rotated to scan the canvas

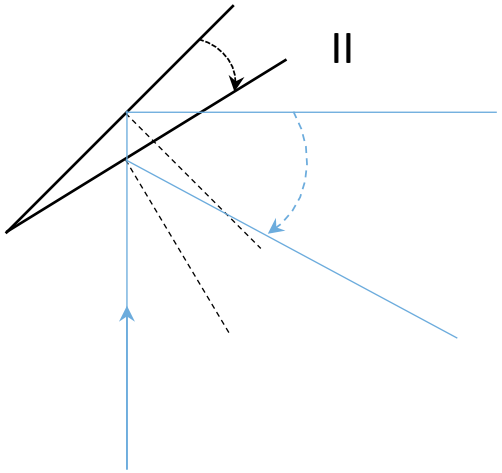
Considering the setup with beams penetrating the center is easier to calculate accuracy.

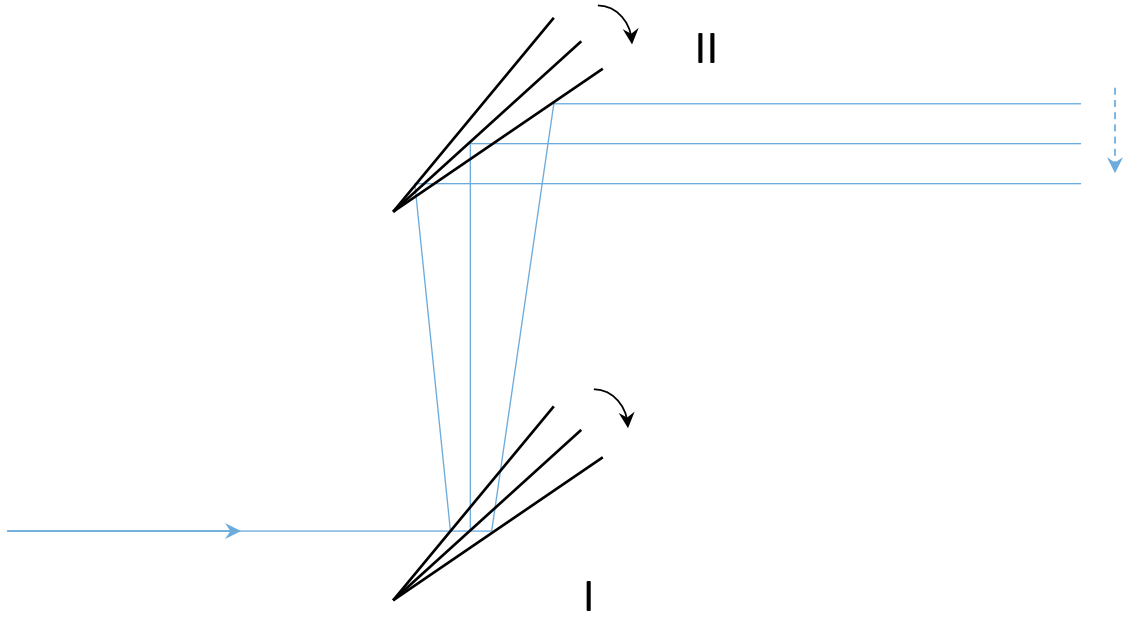






Every time the mirror is rotated by α angle the beam will rotate by 2α. Consider only one mirror is rotated. Accuracy of the mirror mount from Thorlab is α = 30 µrad, then the beam angle accuracy is 2α = 60 µrad. WD = 4.7mm, so the accuracy on the canvas is of the order of δ = 2α*WD = 0.282µm, smaller than the beam spot size.





When adjusting the beam, we can change the angle by rotating II, and shift the beam parallel by rotating I and II with the same angles.

Conclusion: we can adjust two mirrors together to shift the beam to the canvas, then adjust only one mirror for minor beam shifting. Accuracy of Thorlab mirror mount is enough. For small angle scanning the relationship between mirror angle and beam position on canvas will be linear.