Images of the complex circumstellar nebula associated with the famous red supergiant VY CMa show evidence for multiple and asymmetric mass loss events over the past 1000 yrs. Doppler velocities of the arcs and knots in the ejecta showed that they are not only spatially distinct but also kinematically separate from the surrounding diffuse material. In this paper we describe second epoch HST/WFPC2 images to measure the transverse motions which when combined with the radial motions provide a complete picture of the kinematics of the ejecta including the total space motions and directions of the outflows. Our results show that the arcs and clumps of knots are moving at different velocities, in different directions, and at different angles relative to the plane of the sky and to the star, confirming their origin from eruptions at different times and from physically separate regions on the star. We conclude that the morphology and kinematics of the arcs and knots are consistent with a history of mass ejections not aligned with any presumed axis of symmetry. The arcs and clumps represent relatively massive outflows and ejections of gas very likely associated with large -- scale convective activity and magnetic fields.

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