BOUNDED GENERATION IN $\text{SL}_n(\mathbb{F}_q[x])$

It is a well-known fact from fundamental linear algebra courses that every matrix of determinant 1 over a field can be transformed to the identity using $O(n^2)$ operations. We say that over fields, $\text{SL}_n$ is boundedly generated by its elementary matrices. The question of what happens when moving to the world of classical matrix groups over rings has been the subject of extensive study. In the most general context, even generation itself cannot be guaranteed. Our focus will be drawn to establishing bounded generation in the case of $\text{SL}_n$ over $\mathbb{F}_q[x]$, the ring of polynomials over a finite field. We prove the existence of a theoretic bound which is uniform to all congruence subgroups of $\text{SL}_n(\mathbb{F}_q[x])$, using tools from model theory and the theory of Menicke symbols. We finish by introducing two applications of this result to word-uniform width and to Ulam stability in $\text{SL}_n(\mathbb{F}_q[x])$. 