Finite State Machine (FSM) based testing methods are gaining acceptance by software/systems developers. One of the main driving factors is the fact that testing from formal specifications offers an elegant, structured and more rigorous approach to the development of functional test cases than standard testing techniques. FSM based testing have a history of over half a century, starting in 1956 with the works on machine identification. This was then followed by works checking the conformance of a given implementation to a given specification. Since a fault detection sequence is constructed once but used many times, the importance of having short fault detection sequences is obvious. In this talk we explore current advances towards calculating shorter fault detection sequences and present current bottlenecks in FSM based testing spectra.