

## Title: NASA Space Flight Vehicle Fault Isolation Challenges

The Space Launch System (SLS) is the new NASA heavy lift launch vehicle and is scheduled for its first mission in 2017. The goal of the first mission, which will be uncrewed, is to demonstrate the integrated system performance of the SLS rocket and spacecraft before a crewed flight in 2021. SLS has many of the same logistics challenges as any other large scale program. Common logistics concerns for SLS include integration of discrete programs geographically separated, multiple prime contractors with distinct and different goals, schedule pressures and funding constraints. However, SLS also faces unique challenges. The new program is a confluence of new hardware and heritage, with heritage hardware constituting seventy-five percent of the program. This unique approach to design makes logistics concerns such as testability of the integrated flight vehicle especially problematic. The cost of fully automated diagnostics can be completely justified for a large fleet, but not so for a single flight vehicle. Fault detection is mandatory to assure the vehicle is capable of a safe launch, but fault isolation is another issue. SLS has considered various methods for fault isolation which can provide a reasonable balance between adequacy, timeliness and cost. This paper will address the analyses and decisions the NASA Logistics engineers are making to mitigate risk while providing a reasonable testability solution for fault isolation.