

Technology Readiness Level and N2 Analysis

Achieving a TRL level of 6 before PDR is a good policy for a few reasons. First, the PDR is practically the control gate to the major money needed to begin fabrication of the satellite. A TRL of 6 will ensure that the money spent is on the design finalization and fabrication of a system capable of achieving its mission. It is important to separate money spent on procuring the technology and fabricating and integrating the technology in a mission. In the example of the Webb Telescope, the project is spending money to raise the mirror technology by fabricating and testing the mirror sections all before PDR. The project plans to use the mirror sections that are being fabricated and tested, but the point is to demonstrate the technology's readiness before fabricating and integrating the spacecraft for the mission. If the money is not separate, and there is acknowledgment of the low TRL, then the program can expect cost overruns.

good pt
 often the \$
 for tech are
 kept separate
 from the msn
 so we can
 keep track
 better

Second, there is always a large difference between paper design and actually integrating hardware. If a system/subsystem is experimental but the paper design, all the analysis demonstrates feasibility for a mission and the choice is made not to start fabricating and integrating the experimental subsystem until Phase C and D. Then, the program can expect major design revision and schedule delays because all the bugs may never have been able to be worked out at the "paper" level. Instead, if the subsystem was already at TRL 6 then the initial leg work to prove the actual capability of the subsystem has already been done and the remaining work is in integration with the entire satellite/vehicle.

Last, Phase B is entitled "Preliminary Design and Technology Completion" and thus indicates that the technology level should be at level 6 before Phase C "Final Design and Fabrication". I feel the life cycle sets up PDR to be a control gate to make sure the technology level for the mission is sufficient to enter into Phase C. The TRL of 6 is important because the technology has been integrated and tested in a relevant environment to prove feasibility. Thus, the technology is at a point now to be tested in the actual environment, which in most cases has to be done in space.

yes, understanding
 the goals of
 each phase
 of the life
 cycle is key.
 Letting goals
 from phase B
 bleed into
 C will eventually
 delay necessary
 work in C.

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