The Test Tower at the Stennis Space Center and the J2X Rocket Engine

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This article is in reference to the article titled "NASA's $349 Million Monument to its Drift" in the Washington Post dated December 15, 2014, by David A. Fahrenthold (http://www.washingtonpost.com/sf/national/2014/12/15/nasas-349-million-monument-to-its-drift/). The following observations are intended to help clarify some of the points raised in this article, with the hope that this will provide insights into how decisions regarding NASA projects are often made, how such decisions can be better managed, and how one NASA project seems worthy of reconsideration.

The contract for the construction of the test tower at the Stennis Space Center was awarded to the Jacobs Engineering Group of Mississippi for an estimated $119 million dollars. The tower was intended to support research directly related to NASA's Constellation Program, namely for testing the J2X rocket engine. Unfortunately, the Constellation Program was cancelled in 2010, by which time the tower was originally scheduled to have been completed. When the program was cancelled, the ranking Senator from Mississippi would not agree to stop construction on the test tower, even though it was clear that it could not be placed into service for its intended mission, since funding to develop the J2X rocket engine was not going to be approved by Congress. Due to unforeseen schedule delays and increases in cost of labor and steel, the final cost of the test tower at the Stennis Space Center was $349 million. As of today, with funding to develop the J2X rocket engine still not approved, there is no stated clear purpose for the tower. The cost to maintain the tower in the hopes that it may yet have a purpose is estimated to be $700,000 per year.

The article by David Fahrenthold suggests the construction of the test tower at the Stennis Space Center is evidence of a decision making breakdown at NASA, implying that NASA was given a clear mission and a time frame within which to complete the project. The article goes on to mention five other NASA programs since the Apollo programs, among them, the International Space Station which was budgeted at $8 billion and ended up costing $100 billion, and the Webb telescope which was budgeted at $1 billion and has by now cost almost $8 billion.

It is not generally well understood that NASA is limited to completing projects under guidelines that Congress specifically authorizes, which means restrictions from Congress on how projects are funded and where and how they are to be completed, and even whether they are to be completed. Many of the delays in NASA projects and their cost overruns are a direct and clear result of changes that are required by Congress and the Administration, which means that they are not under the full control of NASA.

Due to insufficient funding, NASA does not have an adequate independent technology research and development program. A project like the J2X rocket engine is a fine example of a project that should not have been placed within a program like Constellation that was at risk of changes or cancellations that are out of NASA's control.

Rocket engine development takes years and if a project is not completed ahead of its intended application, this will cause a mission to take longer and cost more. For example, the long lead time needed to develop the technology for the Space Shuttle vehicle caused approximately a two year delay in the first Shuttle flight and a negative cost impact on the overall development of the Shuttle program.

NASA's technology development strategy needs to be redefined, in that presently the program only allows for the development of the technology through the TR-L 6 level. This leaves the technology not quite ready for inclusion and implementation in new missions, since this requires that the technology be flight demonstrated, which is above the TR-L 6 level. Several new technologies are presently stalled at the TR-L 6 levels. Examples include the controls technology (electro-mechnical or electro-hydraulic actuators) to be used for flight control or mechnical valve control and electric power generating technology (turbo-alternator). It is clear that these new technologies could reduce the operational cost and increase safety of space flight, if they were included in new missions, but, because they are not flight demonstrated, they are not included in new missions The absence of a better way to fund technology research and development and to keep such funding separate from the intended application of that technology in new missions results in the continued high cost of space transportation.

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The J2X rocket engine is an important one, since experts have concluded that it will most likely be required for long range space transportation. I think the development of the J2X rocket engine should be funded through the NASA technology program and its development should take advantage of what the new test tower at the Stennis Space Center offers.

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