

Aleksandra Mozdzanowska

ESD.85

Response 2: Columbia Accident Investigation

The authors of the Columbia accident report do a very thorough job of pointing out that finding the technical source of the accident and blaming the individual most closely tied to that technical source is not sufficient to explain why things went wrong during the mission of Columbia. The report repeats numerous times that the historical context of NASA and the space program, as well as the culture at NASA have to be taken into consideration to properly explain and rectify the causes of the Columbia accident. One of the topics that is not explicitly discussed, but clear from the report is that Congress and the White House must also take a significant amount of the blame for the shuttle accident.

The culture of NASA did create a situation where shuttle debris was over time seen as normal and not a threat to safety, a culture where it was difficult for individuals to bring safety considerations to the attention of managers, and a setting where meeting deadlines and budget cuts was more important than being safe and thorough. However, many aspects of that culture, in particular the importance of meeting deadlines and budget criteria, were created by Congress and the White House. To survive as an agency NASA needs the approval and funding of Congress and the White House. As a result, it has to prove to these institutions that their work is delivering results at a reasonable cost. It is precisely the use of cost and mission completion as a metric for success that lead to a NASA culture where meeting the deadlines is more important than safety. The government needs to realize that there are more ways to measure success and that institutions should not lose their funding for putting safety above meeting a schedule. NASA can implement a number of changes to improve culture and practices to ensure that future missions will be carried out with more attention and care to safety; however, these changes will not make a difference unless the employees at NASA can feel secure that missing a schedule will not mean the end of their program.

After reading the first half of the report I came away thinking that perhaps the Columbia accident was just an accident. It wasn't until reading the second half of the report that I realized that the problem could have and should have been avoided. Even though I totally agreed with the statement that more than the technical aspects of the failure have to be taken into consideration, I still didn't realize how important these were until reading the second half of the report.

The amount of uncertainties associated with the mission are apparent in the first half of the report. In particular as the count down to the mission is detailed there are many places when things go wrong; valves don't work, pipes are rusted... This pattern is repeated once the ship was in space. During the experiments problems are recorded almost daily. The treatment of these issues makes them seem routine. Even though different things go wrong, there is a sense that things are expected to go wrong. I attributed this expectation to the high complexity of the system and the experimental nature of the program.

The fact that so many things went wrong made me think that there cannot possibly be an expectation that one of these, such as a debris strike, could be predicted as fatal and corrected. In addition, the description of foam testing showed that virtually no non-destructive tests exist reinforcing my belief that what occurred could not have been anticipated.

These facts led me to believe that not only was the disaster an accident, it was an unpredictable one and not much could have been done. The uncertainties simply seemed to high to be able to predict and prevent seemingly random events. I also assumed that since foam strikes have occurred on numerous past missions and not corrected, they must have already been studied and determined as acceptable.

It wasn't until I read the second half of the report that my view changed drastically. It became clear to me that the possibility that the foam strike was fatal not only should have occurred to those running the mission, but that it did. Reading the emails that were sent between those in charge it is clear that they understood the situation quite well; both the uncertainties and the possible consequences. However, concerns over meeting schedules overshadowed the need to analyze the situation more closely. It was also surprising to me that in a number of discussions, those running the mission acknowledged they may be wrong about the strike not being serious, but dismissed it by saying that there was nothing that could be done anyway. This seems horrible. How can you give up on the crew without even attempting to come up with solutions and scenarios for rescue. Later in the report, it actually seems like someone did, but these were never discussed during the meetings that were deciding what to do about the foam strike.

Thus, the committee authoring the report was able to show that NASA could and should have done something about the debris, given that there were people with NASA that knew of the potential seriousness of the problem. The authors were also able to show clearly that the reasons for inaction were rooted in the culture of NASA and the pressures faced by NASA as an institution. However, the committee fails in terms of making adequate recommendations to stem this problem: by limiting their recommendations to target NASA, they did not make recommendations that would allow the NASA culture to change from one driven by deadlines and cost reduction instead of safety. Despite a direct and honest report, no concrete statements are made regarding the command chain above NASA.

Of course, it would have been difficult for the committee to make recommendations for Congress and the government. Not only would such recommendations have been outside the purview of the committee, since it had only been tasked with looking at the Columbia accident itself, but politically it would be difficult to retain credibility and influence by taking such a step. Yet, it is still important to consider what might need to change at these levels.

The main problem faced by NASA is a need to complete projects according to a preset timeline in order to secure funding. Despite its need to run large scale and long term projects, NASA has not always been given the long term funding necessary to sustain projects with a consistent level of quality. As administrations change, different programs are prioritized resulting in cuts in funding levels while the agency is still expected to

complete missions. The resulting stress and fear of being eliminated or losing funding has resulted in an environment where safety is unreasonably compromised. Instead, incentives should be established that reward honesty and good science. The policy difficulty is in determining how to ensure that projects can be funded consistently and adequately, but at the same time have a structure where things are terminated or scaled back if they are no longer effective or of interest.