NASA's Deep Impact Mission: Decision Making

Clarifying the Issues

SUMMARY INTERVIEW SHEET

Question: Please tell us about your involvement with the Deep Impact mission and your thoughts about optimizing the data being received during the impact of Comet 9P/Tempel 1 in July of 2005.

Interview of: John Marriott
Job Title: Ball Aerospace, Deep Impact Program Manager
Institution: Ball Aerospace
Interviewer: John Ristvey
Date: July 5, 2001
Conducted by phone at Ball Aerospace in Boulder, Colorado

John Marriott

John Marriott
Ball Aerospace, Deep Impact, Program Manager

Ball Aerospace is responsible for the design and building of the Deep Impact flyby spacecraft, the impactor spacecraft, and three science instruments: a high-resolution imager, a medium-resolution imager, and the impact target sensor. The first two of these instruments are onboard the flyby spacecraft, and the last one is part of the impactor. As program manager, I oversee the development of this hardware and work with the Jet Propulsion Laboratory (JPL) and the University of Maryland to develop the mission operations and critical sequences of the Deep Impact mission.

The Deep Space Network (DSN) is the primary means of communications for robotic space missions. The principal investigator along with the mission planners at JPL are the primary people responsible for choosing the time of impact and which facilities will be used. We will need to work the actual mission sequences based on the current impact scenario. Since no one knows a whole lot about comets, we are going to be learning right up until launch. Other missions that are looking at comets will serve to inform our mission. This information could change the impact sequence of events up until shortly before the time of launch, in which case we would have to build a new sequence. The folks at Ball and JPL would get together and lay out exactly what the sequence needs to look like and then take this information to the software engineering group. The software group develops the new sequence, which is then tested, and verified. This software is then uploaded to the spacecraft through the DSN, causing the spacecraft to implement this new software at a particular time. This software is very complex, particularly with a spacecraft that does its own thinking. We have to be careful to develop comprehensive test programs for this software before it is uploaded to the spacecraft.

It is hard to tell at this point the other facilities that will be available during impact. We are looking very closely at the Hubble Space Telescope (HST); we are looking at the Solar and Heliospheric Observatory (SIRTF), as well as the Chandra X-ray facility. We are evaluating the availability of observatories based on orbit patterns of space-based facilities, as well as the position of several ground-based facilities to determine where the best viewing is going to be. There are a lot of people right now working on exactly what the time sequence will be for the impact of the comet.

The data collection method itself is tried and true. The only thing that is different here is that we are using the latest and greatest software computers. The science team met recently at Ball and was delighted with the increased memory of this computer. However, the memory of the computer will fill up very quickly as we take more and more images. These computers are real enablers of science. The only concern I have is that as a deep space mission, Deep Impact has a rigid launch date. The comet is not going to wait for us. We have to make our deadlines. We have a lot of work to do in a short amount of time. Everything we have to do has been done before and done many times. But, we have to be there.