Learning from Other People's Mistakes

"Experience keeps a dear school, but fools will learn in no other."

- *Ben Franklin*

"Sometimes when you innovate, you make mistakes. It is best to admit them quickly, and get on with improving your other innovations."
- *Steve Jobs*

"Fear helps me from making mistakes, but I make lot of mistakes."
- *Steve "Crocodile Hunter" Irwin*

Learning from Other People's Mistakes - Example

Genesis Spacecraft:
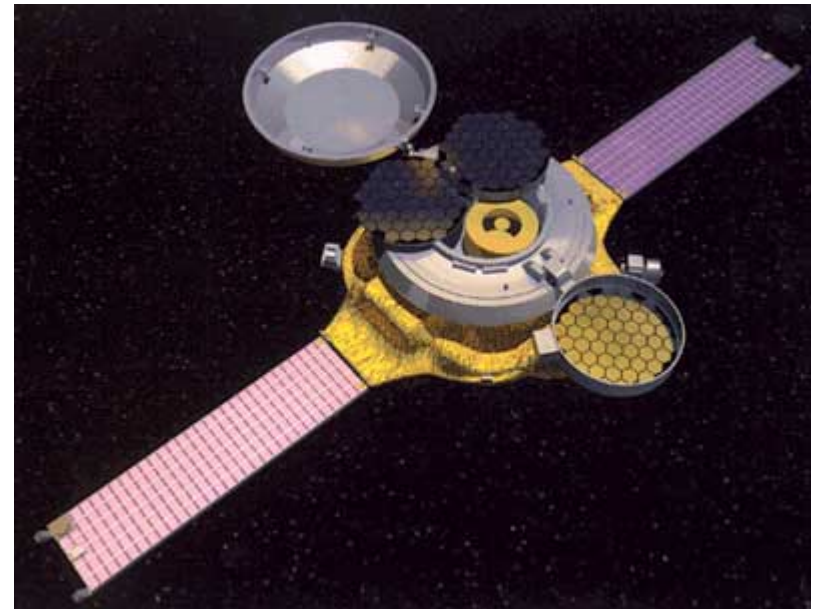
- Launched in 2004 to retrieve solar wind samples.

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Genesis Spacecraft:

- Genesis deployed in space (artist rendering)

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Genesis Spacecraft:

•Genesis capsule embedded in the sand in Utah after reentry. (unsuccessful)

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Genesis Spacecraft: *Postmortem*

•During reentry, deceleration was supposed to cause a parachute to unfold.

•Genesis's avionics design based on an earlier simpler, HW package (Stardust)

•Genesis designers cut and pasted Stardust schematic into new, more complex HW design. The Stardust HW had been (spin) tested, but the new HW design was very difficult to test (and more expensive).

•So, believing the design was flight proven, Genesis engineers simply verified the new assembly by visual inspection and assumed the assembly would operate as it had in Stardust.

•Unfortunately nobody knew that a pair of deceleration sensors were direction-sensitive. The sensors were turned sideways in the new HW layout, and as a result, the parachute could not open.

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**Genesis Spacecraft: Lesson learned?
NEVER ASSUME!**