

## Who Should Fly To the Moon: Man or Computer?

A concern computers encounter when they enter a field a human traditionally occupied is which is better for the job, a man or machine? The Apollo Guidance Computer which ultimately was of the digital realm became capable of doing much more than guiding the human, including guiding the craft itself, and for the first time with a digital control system a human would be on board. Design decisions had to be made regarding how the human would interact with the computer and who would be in charge. These concerns are relevant because they pertain to the safety of human along computer controlled systems and the trust of computers in critical applications. This paper addresses whether computers or humans are to be more trusted in situations that are difficult for both.

Half way through the era of the cold war and the space race computing came up to speed, meeting the challenge the United States was facing. Precise navigational systems became the next challenge of computers to be tackled with the increasing interest in weapons. Recently developed integrated circuits (ICs) allowed for very light and compact computers of reasonable cost, which could accompany a weapon through its entire flight. President Kennedy learned that the technology for guidance had become available to bring the moon within reach, a technology not available to the soviets, and he decided to play this trump card. This challenge however was different from the Minuteman in that a human would be on board thus leading to the dilemma if whether the human or the computer would be entrusted with the control of the vehicle.

The readings leaned towards the profiling of those involved with the project and the technology behind it, but did dedicate some space to the ramifications of building a computer that would have so much control over people's lives. The head of the Instrumentation Lab, Charles Draper, made a clear argument that the computer could be trusted by offering himself as collateral to the flight (Ceruzzi 1989, p. 97). Since the computer would be interacting with the astronaut's, designing the interaction between the human and the computer was one of the first large challenges the project met (Ceruzzi 1989, p. 99). Training an astronaut in the use of the flight and computer systems occupied about half of their time and while. Engineers such as the lead designer Eldon Hall did come to recognize that ever design consideration they made was in regards with how best to achieve certainty of success with the given resources because success was the safety of the astronauts, and that the review process and reliability checks were brutal (Hall 2000, p. 29). Thus most of the papers discuss the technical marvels that allowed reliability and safety to be accomplished.

It would be irresponsible to argue that computers are failsafe devices, but Charles Draper made the argument that he a pilot and an engineer insider would trust his life to them providing the no fear attitude that gave computers the okay to prove how capable they are. With use of the digital computer, NASA quickly realized this meant that the computer could and should do more than just guide, such as making precise adjustments to the craft and possibly assuming the role as primary pilot. The articles suggested to me that since human beings had such little experience flying in space and were in awe of the magnitude of what they hoped to accomplish that they never doubted that what they

wanted to do required granting the computer almost all the mechanical control. Thus only instructions and emergencies would be left to the human. The disadvantage to this is the extreme danger in the occurrence of a system failure. Humans and computers alike make mistakes but humans don't every "crash" and have to restart, and they can much more easily recognized their mistakes and correct them. When something unexpected occurs only a human knows how to react and in these situations during flight they must be given the capability to react in anyway the craft is capable not those just deemed good choices by computers. I believe that the final check and level of control must be left to humans and that this extends to all life focused fields, one such additional example is medicine. A computer can be used to make a diagnosis based on a blood but if it decides that a man is pregnant or a person without any spots has chicken pox, a doctor can decide that the computer is incorrect that may only be possible with the human experience the doctor has.

For the time being computers can never be given final say on a decision that involves a human's life. Fly-by-wire and autopilot systems are great during expected conditions but the smallest deviation from the accounted possibilities put the system in a state where it can not be expected to behave properly and for that matter is likely to behave irrationally. If computers however become capable of thinking then they would be able to control themselves. But in that case why would you send a man to the moon, for a computer would be able to make more use of the journey than he would.

#### Cited Works:

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