

Human Needs 'Archaic' in C

Dr. Berry

SPACE CENTER, Houston (AP) — Of all the complex systems in the Apollo spacecraft, the most mistreated and least pampered is that most complex of all systems—the crew.

Since America started space exploration in earnest, space hardware has evolved comparatively from the complexity of a bow and arrow to that of a machine gun.

Yet there have been no basic changes in the water system, the waste disposal system, or the food system for the astronauts who ride the hardware. And the pressures and the work load on the astronaut have increased many fold.

The American astronaut must drink water that reeks of chlorine, eat unappetizing food, suffer sore throats and runny noses caused by a pure oxygen environment and adjust his sleep hours to meet the demands of space and machine.

He flies for days without a bath or shave. The smell of dirty bodies and body waste fouls the cabin's atmosphere.

The waste disposal system in Project Apollo is basically the same as that used since America first put men into space. The crews hate it.

Yet, while they have solved immensely complex problems of navigation, propulsion and communications, spacecraft designers still are unable to satisfy basic human needs adequately.

Dr. Charles Berry, chief of the medical flight operations branch, says man cannot go



much longer than 14 days in space under current conditions. Longer periods, he said, will require special consideration to the needs of man.

"Everybody gets involved in a lot of things that seem to have more importance to them than the common everyday necessities," the doctor said.

Dr. John Zieglschmid of NASA says the slowness in resolving "human engineering" problems should be no surprise.

"It seems historically speaking that the design of aircraft, automobiles and what have you often neglects the human engineering and integrates the man into the system as an afterthought," he said.

When NASA had a weight problem with Apollo 7, Dr. Berry said, one of the first things it looked at were crew supplies. The amount of food was reduced and even the number of pills from the medical kit was cut as weight-saving measures.

Early in the Apollo 7 flight, when crewmen developed headcolds, decongestant pills had to be rationed because there were only 24 aboard.

Apollo 7 also has demonstrated how engineers and data collectors tend to

push the crew to its limits to serve the demands of the machine.

Dr. Berry said that early in the Apollo design the medical people requested an automatically rotating system for monitoring the crew's heartbeat and respiration.

Somehow this request evolved into a non-automatic system that must be swithed from man to man by the crew itself—one more burden for the astronauts. It also meant vital heart-respiration data

could be obtained from only one man at a time, a less efficient system than that used on the two man Gemini space flights of 1964-66.

The Apollo drinking water system operates as a mechanical back-up for other systems aboard the spacecraft. Water from the fuel cells is bled into the potable water supply.

But engineers worried that the fuel cells would produce more water than the crew could drink.

To solve this, they also led a bleed off pipe into the waste water. This pipe opened an avenue for bacteria to migrate from the urine disposal system. A one-way valve prevents the whole waste water from getting into the potable water. But doctors

apsule

say the bacteria could get through.

The final solution, as usual, was hung on the crew. The plan was for them to inject chlorine into the potable water.

During Apollo 7, the crew found the water had too much chlorine and made the food taste bad. The solution, again, was left to the crew. In essence they were told that if the water tastes bad, don't add chlorine. If it tastes okay, then make it taste bad—add chlorine.

Dr. Berry calls the waste disposal system "archaic."

Basically, it requests that the crew deposit body waste in a bag, seal the bag and stow it. This system saturates the cabin for a time with odor.