moved; the constraints—natural, man-made, political and human—involved, and the performance required in terms of comfort, convenience, safety and cost. Out of the model should come information on the kind of system that would meet those requirements.

In another mode, characteristics of a particular transportation system could be fed in, and its safety, cost and convenience determined.

With this tool, says Peter J. Mettam of Booz-Allen Applied Research, Inc., which is developing it, the planner should have some deeper insight into the areas that need technological advancement.

There has been virtual stagnation in innovation in ground transportation, says Mettam, with most technical efforts aimed at marginal improvements in present products. Part of this comes from the expense of trying out ideas; another cause is the big public and private investment in present systems that, despite the investment, could soon become obsolete.

Another problem planners face lies in designing a transport system for existing conditions, knowing very well that new means of transportation can change those conditions radically. Here AFT should also help, making it possible to predict the effect of changing conditions on system performance.

But AFT, Mettam emphasizes, is only in the first generation stage. "It won't do anything very sophisticated for some time," he says.

Dr. Harry Weingarten, BPR science advisor who is running the AFT program, says he hopes the Bureau will be able to offer planners, by the end of the year, a tool to make rational decisions on alternative solutions to transportation problems.

Until it does, Russian roulette is likely to gain—if not in popularity, at least in frequency—among transportation officials. ◇

SENSORY DEPRIVATION

A new breed of explorer

To volunteers confined alone to a small room in complete darkness and silence for seven days, even a recording of an old stock market report played over and over may provide a grip on sanity.

Two hours into the latest of the Navy's Project Argus isolation experiment, members of the original 40-man experimental team began dropping out. By the end of the week, those who stayed—21 of them—were listening to that record most of the available time.

The 19 dropouts were pretty well shaken when they came out, says Dr. William W. Haythorn, director of the behavioral sciences department at the Naval Medical Research Institute. Their stress, he says, was roughly equivalent to that of soldiers under artillery fire. Those who stayed were more likely to enter a contemplative state of mind.

Actual conditions, of course, will never be this severe. They will, however, last longer, and Project Argus is proceeding on the theory that complete deprivation only accelerates reactions that should occur eventually in the monotonous, confined environment of a research submarine or spacecraft.

Ironically, the men most susceptible to stress seem to be those most likely to volunteer for the experiment. They are the thrill and sensation seekers who value a wide variety of stimuli, notes Dr. Haythorn. Although they readily volunteer, they tend to be quitters.

Men who stick out the deprivation are more down-to-earth and self-reliant, depending less on stimulation from outside sources, he says. This may be the best type for the next generation of space and ocean explorers.

Dr. John Zubek, director of the sensory deprivation laboratory at the University of Manitoba, adds to this description a biochemical difference between the dropouts and those who stick.

Quitters show an abnormally low level of adrenaline, he says. Successful volunteers normally average an output of nine micrograms of adrenalin a day, while quitters average only five. It could be, says Dr. Zubek, that men with low adrenaline levels are less able to cope with the stress.

The Canadian psychologist has little faith in personality tests and believes that research will produce a biochemical profile of the successful volunteer.

There doesn't seem to be any clear personality difference between the men, he says, except in creativity—those who last score higher on creativity, indicating perhaps inner resources compensate for the loss of sense impressions.

ASTRONOMY

Occultation of Antares

The bright star Antares will pass behind the moon this week, early on the morning of Jan. 25. The occultation will be visible to those in the eastern half of the country, weather permitting.

At 4:49 a.m. EST, as seen from Washington, D.C., the lower bright edge of the moon, which is moving eastward, will hide Antares. The star will reappear from behind the dark lunar edge at 5:12 a.m.