An interview with
BRIG. GEN. DONALD D. FLICKINGER, USAF
by James C. G. Conniff

CAN MAN

ABOUT THE LAUNCHING of a manned satellite, Washington opinion is firm on two counts: 1) we will orbit a man successfully by 1961, but 2) the Reds will probably beat us to it!

By much? Two months to nearly two years.

How come? The Soviets will risk killing their astronaut rather than let the U. S. be first to put a man in space. This coldly utilitarian mentality of the Russians forces on us the need to answer quickly—and correctly—some sharp questions. Thanks to jet fighters and space probes, along with atomic-submarine cruises, we already have the answers to many puzzles about space travel.

But there is one question nobody can really answer till an American or Russian astronaut does the honors: *can* flesh and blood, *can* man's mind and emotions, *survive* in space?

To learn the odds, FAMILY WEEKLY sent me to Washington to interview Brig. Gen. Donald D. Flickinger, USAF-(MC). General Flickinger is vice chairman of the National Aeronautics and Space Administration's special committee on life sciences. He is also in charge of bioastronautics (the "human factors" in space medicine) for the Air Research and Development Command at Andrews Air Force Base near the capital.

A surgeon and, at 51, an experienced pilot, Don Flickinger was the Air Force expert on the three-man interservice medical team which selected our seven Project Mercury astronauts from 110 volunteers. With Army and Navy colleagues, the general now has the crucial task of grooming the winners for their big adventure.

Q. Frankly, General Flickinger, what chance have these men of coming back alive?

A. They will be in a far better position to accomplish their mission—and live to repeat it—than they are in any of the high-performance jet aircraft they have all flown as career test pilots.

Q. Is this because they are superior specimens, or because the space capsule itself will be so thoroughly tested?

A. Both. Our astronaut trainees *are* superior people, physically and mentally. Before we send them up we will have fully conditioned them to handle and survive anything that will come their way at the altitudes now envisioned. They will carry no space first-aid kits. They will be able to perform their duties, normally and naturally, under all circumstances. On top of that, we will give the capsule itself, with all its equipment, a series of maximum-demand laboratory tests.

Q. When you say the astronaut will perform "normally and naturally," General, do you mean he will not be drugged in any way?

A. Apart from wanting to make clear that we plan to have him at the peak of mental and physical form, that is exactly what I mean.

Q. But hasn't aeromedical research found that a certain "pep pill" effectively combats boredom from prolonged, repetitive tasks—like those in a space capsule—without a letdown later?

A. Yes, but for what we call these "first-generation" space flights, such a compound is unnecessary for two reasons. First, our astronaut is going to be too busy to grow bored or drowsy. When he's not talking to us, we'll be talking to him. Secondly, in line with our plan to let him make only two or three circuits of the earth at 90 minutes each, he won't be up there long enough to *need* drugs.

Q. What about *other* narcotic aids for the physical and mental strain of being rocket-driven into orbit at 18,000 m.p.h. — like tranquilizers, antinausea drugs, bowel-and-bladder inhibitors, and such?

A. We will use none of them. Tranquilizers would dull alertness, slow split-second responses, and imperil man, machine, and mission. Against the danger of nausea and dizziness from concentrated G-forces at launching followed by a sudden eerie weightlessness in orbit, we are going to build into the capsule its own controls to prevent excessive tumbling.

We are also installing tested restraints to keep the astronaut from being disoriented by the "floating-in-air" effects of zero gravity. Bodily excretory problems will be dealt with by a blend of conscious preconditioning and diet, for the most part, rather than by reliance on drugs.

Q. How can you be sure these types of "conditioning" will work at altitudes where man has never been?

A. My answer to that is not intended to detract one iota from the courage of our astronauts or the calculated adventure in store for them. It is a fact, however, that the drama of our national effort to orbit an American airman and bring him back safely makes people forget that we have already encountered practically every difficulty space presents in 1) high-altitude balloon flights and 2) high-performance jet aircraft. Through manned exploratory flights in rocket ships like the X-15, we expect to know even more about the total space-flight picture before orbiting a man.

Q. Does that mean we've licked the radiation problem in space?

A. Unfortunately, no. We are gaining new data on the nature and extent of radiation in space almost daily, but anti radiation shielding of astronauts —and of instruments, too—will probably be a space-medicine headache for some time. The answer to your basic question about man's ability to survive in space must therefore be that, as of this moment, he *cannot*—mainly because of 1) severe limits on the length of time he can safely be exposed to radiation of whatever intensity, 2) the present state and prospects of shielding technology, and 3) our imperfect knowledge of the kinds and degree of radiation to be found there.

However, while all this is regrettably true of higher altitudes and longer trips, what we anticipate for these first flights is something quite different. The estimated 120-150-mile level where our early astronauts will orbit is not saturated with lethal radiation, as outer space may prove to be. Furthermore, the brief duration of the flights (3-18 hours) will result in exposure at the rate of only 45 or so milliroentgens per 48-hour period. Compare this with a single chest X ray, where you get 1,200-1,500 milliroentgens, or with the 300 milliroentgens a week permitted in industry.

Q. Are you saying, General, that in effect these "orbital altitudes" of first-generation space flight are not really outer space but just part of the upper atmosphere?

A. Not at all. For all practical purposes, the altitude of our manned satellite will be *space*, period. Except for intensity of radiation, I assure you as a scientist that it has otherwise the same phenomena as outer space or deep space: no atmosphere, intense darkness, extreme temperatures, utter silence, zero gravity, and so on.

Q. But even at these altitudes and with all your conditioning, won't the first astronaut have to learn the hard way to survive the "break-off phenomenon"?

A. By this you mean panic and disorientation that are supposed to result from being so far above one's home planet in an absolutely weightless state for a prolonged period—especially after having briefly weighed many times more than normal during launch acceleration. It sounds like a one-two punch of formidable dimensions, I agree, but as for its destructive or unbalancing effect on the mind, we are in astromedicine are no longer worried about it.

Our reasons include 1) the reassuring data obtained from more and more extended research into human weightlessness during zero-gravity maneuvers in conventional aircraft, 2) experience in supersonic jets, and 3) perhaps most of all, our intention never to give the astronaut an idle moment to start thinking about how high up and feather-light he is.

Q. But with his internal organs also weightless, along with his food and drink, how will he swallow and keep nourishment down?

A. Again, it will be a matter of careful conditioning assisted by conscious nervous and muscular control over the swallowing mechanism—plus practice in guarding against involuntary regurgitation. Even a belch, in the weightless state, could bring up food particles and cause choking. It will be a rigorous self-discipline, reinforced by tubed-food-paste feeders and aesthetic variety of menu. Long before attempting to put an American in orbit, we doctors will have worked out with the astronauts themselves every last possible hitch in this area, and gotten *proof* that it's been licked. We are practically at that point now.

Q. What about air supply and disposal of waste gases in a pressurized space capsule?

A. We have learned a good deal about this particular problem right here on earth, from long submerged voyages by atomic submarines. They had only the air they took down with them and, through secret reprocessing techniques, used it over and over. The astronaut will have to do the same.

His equipment will also have to "wash" or absorb possibly toxic concentrations of trace gases that would not even be noticed in less confined quarters. But we have solved all such problems.

Q. Suppose a meteorite punctures the space capsule?

A. The threat of this is remote. If it did happen, our man is wearing a full-pressure suit designed to keep him alive and in control till he can effect re-entry.

Q. Is there danger of sending the astronaut into space forever by launching error?

A. Hardly. We will have attained such precision in rocketry as to make this hazard negligible.

Q. But suppose it did happen?

A. We would detect it long before orbital altitude was reached—or rather, exceeded. In such a crisis, we have means of freeing the astronaut and getting him back down safely.

Q. What if the rocket misfires or explodes at launch or before it can get the man-capsule into orbit?

A. There is a sub-rocket mounted on a pylon above the capsule for just such a possibility. The astronaut can fire it on his own or at our signal, depending on who first realizes there is trouble. If the astronaut for some reason cannot respond, we can fire it for him from the ground. The escape device will hurl the capsule free and shoot it high enough for safe descent by parachute. The sub-rocket itself breaks away at a prearranged altitude to avoid encumbering the capsule.

Q. Won't the physical buffeting at launch knock out even a toughened astronaut?

A. We are sure it won't because right now we are putting these men through grueling centrifuge, spin-table, and high-speed pneumatic "jumping-jack" tests that demand of them everything the actual launch will demand. They are standing it just fine.

Q. Haven't there been some less than encouraging psychological reactions to your prolonged confinement, monotony, heat-endurance, total-darkness, and absolute-silence tests?

A. In earlier investigations, there were—hallucinations, anxiety, claustrophobia, irrational hostility—that sort of thing. But our much more refined and intensive studies of the 110 volunteers taught us what we need to know for the elimination of people susceptible to these weaknesses, and for reducing to near-zero the risk of emotional failure in our chosen astronauts.

Q. If for some unforeseeable reason something *did* go wrong with an astronaut's mind, mightn't he refuse to come down at all?

A. You may be absolutely certain that no matter what happens, we can in any given 10- 12-minute period bring man and machine safely to earth.

Q. General, what danger is there of a manned space capsule colliding with one of the satellites already up?

A. We know their altitudes and orbits. Avoiding such disastrous contact is well within our capability.

Q. Finally, there is no question in your mind, General, that we can, and will, solve these problems?

A. No question whatever. We are committed to space, irrevocably. All the evidence indicates that it is a medium in which we can not only survive but in time move freely to enrich human knowledge.

REALLY SURVIVE IN SPACE?

In this exclusive interview, an Air Force expert gives straightforward answers to the toughest questions about human space travel