APOLLO

Troubles With Apollo . . . .

The moon program's troubled history may now be catching up with it.

Even without the Black Friday of Jan. 27 which cost the lives of three astronauts, the Apollo program has compiled an unenviable list of failures and malfunctions. To add to its troubles, several past oxygen fires that may have been similar to the one aboard Apollo have suddenly been thrust into public view, and the moon is not getting any closer.

The long thread—or barbed wire—of difficulties that has accompanied Apollo since it inception is finally taking its toll. President Kennedy's dream has almost certainly faded from mid-1968 into 1969, and perhaps it will be delayed even beyond the end of the decade.

The National Aeronautics and Space Administration's team investigating the accident had no inkling last week of when they would finish their task.

The chairman of the two Congressional space committees, Sen. Clinton P. Anderson (D-N. Mex.) and Rep. George P. Miller (D-Calif.), prefer to wait for NASA's findings before demanding a Congressional investigation, but Anderson was adamant that someone should make an exhaustive study of pure-oxygen vs. two-gas spacecraft atmospheres.

Only five days after Black Friday, the pressure for a long look increased when two men were killed in an oxygen fire almost incredibly similar to the one at Cape Kennedy. It took place in a space cabin simulator at Brooks Air Force Base, Tex., where several other similar, but nonfatal, fires had taken place in the past few years. Other military installations and even a hospital have had similar experiences, and Brooks is suspending its oxygen tests. A House subcommittee will investigate both the NASA and USAF accidents.

Apollo's troubles have been many. The command module, center of the action for the lunar mission, has also been a focal point for troubles: some 20,000 part or other failures were recorded during its half-decade transition from drawing board to hardware.

Most of the difficulties were trivial and easily remedied. Others, however, could have produced catastrophe. Scientists were unnerved, for example, when, with their design largely finalized, they discovered through computer simulations and wind tunnel tests that if the wind was wrong, the spacecraft could land upside-down. Considerable shuffling of weight distribution and aerodynamics was necessary to "build the problem out."

A year ago, a dummy capsule was launched to make sure the heat shield would be able to protect human passengers from the searing heat of reentry through the atmosphere. A tiny flaw in the shield allowed the blazing air to "get a grip," and three holes were promptly burned through the spacecraft's outer wall. More redesign.

Apollo officials themselves have admitted that more than 200 individual failures have been found in Apollo's life-support system alone. Besides the oxygen supply, this includes water supply, waste processing, communications and about 100 other components.

Nor has the rest of the spacecraft been immune to bugs. The service module, which carries the course-correction motors, the engines for the return trip, the electrical system and part of the environmental control system, has produced singular headaches. Last October one blew up during a water-pressure test for leakage. A month later part of another one exploded so violently that it damaged a fuel tank in an entirely different test stand.

One of those damaged service modules was to have been mated to an Apollo spacecraft now being used as a comparison model by the investigators. Using the service module that survived the tragedy at Cape Kennedy could add months of delay for additional checkout time—unless the decision to convert Apollo to a two-gas life-support system makes the delay still longer.

Such a system could reduce Apollo's fire hazard, but the redesigning necessary to do it could easily take more than a year including man-rating and checkout procedures. The Apollo Applications Program will have a two-gas system in 1969; the Soviet Union has one now.

Successful experiments have been conducted with two-gas atmospheres including half nitrogen-half oxygen (earth's atmosphere is about 79 percent nitrogen) and even a helium-oxygen mixture containing no nitrogen at all. The aquanauts in the Sealab underwater station breathed a helium-oxygen mix for as long as a month with no ill effects, although helium has the peculiar effect of raising the effective pitch of the voice until it sounds like Donald Duck—and just about as intelligible.