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View from orbit: cloud formations
over the Earth, as photographed by
John Glenn from "Friendship 7"

Missiles and

Spaceflight

FIRST AMERICAN IN ORBIT by Willia m Hine s

Cape Canaveral, February 20

A

STRONAUT John Herschel Glenn, a 40-year-old lieutenant-
colonel of the US Marines, succeeded in completing three
Earth orbits in Mercury spacecraft Friendship 7 today. This
first manned orbital flight by the USA, a National Aeronautics and Space Administration shot designated Mercury-Atlas 6, began at 9.47 a.m. EST (2.47 GMT) with the lift-off of Atlas 109D from Pad 14, and ended at 2.43 EST when the Mercury capsule descended safely by parachute into the Atlantic some 210 miles north-west of San Juan, Puerto Rico. The capsule, with the astronaut still inside, was recovered from the sea by the destroyer Noa at 3.01 p.m., and Glenn's condition was reported as "excellent."
The launch vehicle performed perfectly, boosting the one-ton capsule to orbital velocity of 17,545 m.p.h. Mechanical trouble with the attitude control system in the spacecraft developed after the first orbit. Col Glenn was able to override a defect in the yaw control jets, however, and continued the mission to its full duration. The flight had two effects on American morale in the so-called space race, one good, one not so good. The good effect came from feeling that manned spaceflight, so long delayed in the USA by bad breaks, bad weather and bad planning, was on the track at last. The depressing effect came from the fact that the width of the space gap was now clearly demarcated: it had been ten months and eight days since the Soviet Major Yuri Gagarin first orbited the Earth.
To those who witnessed the Glenn launching, the cheerful calm of the man was probably the one most striking thing. Voice-tapes of his conversations with the ground at take-off, during weight-lessness and in the course of re-entry betrayed no slightest hint of anxiety or even of excitement. He even vouchsafed himself a joke midway through his third orbit; having completed four hours of flight, he petitioned the Commandant, US Marine Corps for his monthly flight-pay bonus of ?245 (via coOeague Gordon Cooper at the Muchea station in Australia).
Trouble with the attitude control system of the spacecraft had occurred in at least one previous orbital flight in the Mercury series, that involving the chimpanzee Enos in Mercury-Atlas 5 last November. After that mission, which was cut short after two orbits, NASA officials said a man aboard would have been able to override the automatic system and continue the flight. This is indeed what happened with Col Glenn aboard.
Shortly after the beginning of the second orbit, Col Glenn reported that his craft, when on automatic control, was yawing right at a rate of about one degree per second until 20 seconds of right yaw was attained. Then it would correct to zero yaw and begin again. The astronaut diagnosed the trouble as being in the left yaw jet, and decided to override the autopilot so as to conserve hydrogen peroxide.
At 2.20 p.m. the retro-rocket firing sequence was initiated, and at 2.23 the Mercury Control spokesman, Col John Powers, reported: "We have instructed John Glenn to retain his retro-rocket package at least until he gets over Texas. This is a pre-cautionary measure to double-check on the seemingly erroneous switch location indication we had earlier." This alarming indication,

now believed false, appeared to show that the capsule's heat shield had accidentally become detached. If true, this would have had catastrophic results.
The only other malfunction noted during the flight was a small degree of overheating in the cabin. This had occurred in the Enos flight last November, and at that time it was said that such a development could not affect a manned flight adversely. This proved to be the case: Col Glenn's spacesuit maintained a fairly constant temperature of 68 °F even when the capsule temperature rose to 108°.

The flight of Mercury-Atlas 6 culminated in success a lengthy series of misfortunes and delays. It had been hoped by US Govern-ment leaders that the first American manned orbital flight would occur in the same year as the first by Soviet spacemen. Conse-quently, an effort was made to schedule a launching on December 20, hardly more than three weeks after the flight of Enos. This-was too tight a schedule; no two Mercury-Atlas firings have occurred with intervals of less than 77 days.
Mechanical difficulties forced a series of postponements into January, and then into February. Then weather became the delaying factor for an entire week. Today's launch-date was the eleventh scheduled for MA-6; it was only the second time that the countdown had progressed far enough for Col Glenn to enter the capsule.
The countdown—between the time Col Glenn entered his space-craft and the time he blasted-off—was beset by false starts, doubts, delays, mechanical trouble and the capricious mid-winter Florida weather. Some of the repairs and replacements impelled a member of the political opposition to remark that "NASA should have high-level standards, put them into effect and stop things like this." The statement came from Representative James Fulton, Republican, of Pennsylvania, the ranking opposition member of the House Committee on Science and Astronautics.
Actual lift-off of the Atlas occurred at 9.47.30. High in a cloud-less sky the missile could be seen (through binoculars) to perform the staging manoeuvre, in which the two outboard engines cease firing and the skirt containing them drops off. A smaller contrail left by the 60,0001b-thrust sustainer engine continued across the heavens. Final burnout, with orbit having been achieved, occurred roughly 500 miles from Canaveral, approximately 5 minutes after lift-off.
The flight of MA-6 took Col Glenn over the Atlantic to a latitude
of 32° N, then over Bermuda, the Canary Islands, diagonally across Africa over Nigeria to Zanzibar, across the Indian Ocean to 32°, then across Australia over Perth and the Woomera rocket range. The track continued north-eastward across the Pacific over Canton Island and Hawaii, and then crossed northern Mexico and the southern United States.
[See also "MA-6 Flight Programme" and "From Mercury to Apollo" overleaf; "Spacecraft Log" on page 335; descriptions of the Mercury spacecraft (February 8 issue) and Mercury Track-ing and Control Network (February 15); and biography of John Glenn (February 1)].