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Rocket Pioneer Had Favored Earth-Orbital Rendezvous Plan -

Von Braun's Move Ended Moon-Bug NASA Dispute

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L.A. Times/Washington Post Service

John C. Houbolt's first presentation of his lunar orbital rendezvous plan was made one stormy afternoon in December, 1960, to members of NASA's Space Task Group. It did not go down well. His calculations simply were not believed.

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After the meeting the group sent someone to go through them, but according to Houbolt he could not follow them properly.

More presentations followed. At one of these early meetings Maxime Faget, the designer of the Mercury spacecraft, is alleged to have shouted "your figures lie." The words sound more appropriate to a Victorian melodrama than to a meeting of American space engineers, but Houbolt himself vouches for the sentiment.

Houbolt spent most of the summer in Washington, talking to the innumerable committees that proliferated at the time. By the end of the season he had given nine briefings without apparently producing any effect whatsoever.

The idea of a rendezvous in orbit around the moon was a nightmare to most people. At least if something went wrong with a rendezvous in Earth orbit any astronauts could be brought back to Earth. A quarter of a million miles away they would not stand a chance.

Almost in despair Houbolt got together with the other members of the group to prepare a detailed report on lunar orbital rendezvous. On Nov. 16, 1961, he sent it to Robert Seamans, NASA's top technical man, with a covering letter beginning "Something as a voice in the wilderness..." But unknown to Houbolt, things were already starting to move his way.

By the end of the year the Space Task Group was definitely hardening on Houbolt's system, and in the meantime the situation at headquarters had changed. To NASA straight from industry, where with RCA he had accomplished the almost unprecedented feat of completing a major military contract (the ballistic missile early warning system) on time. His office came into being on Nov. 1, 1961.

Holmes had no preconceived ideas about the best way of getting to the moon, but he was clearly the sort of man who would make up his own mind. From now on the views of headquarters in Washington became an important factor in the situation.

Soon after Holmes's arrival, North American were awarded the contract for the Apollo command and service (engine) modules. In December Von Braun's super Saturn got the go-ahead, though in a rather more powerful version with five engines instead of four.

This is the Saturn V, the moon rocket that launched Apollo 10 Sunday. Nova was still in the background as a possible alternative, but dying fast.

Direct ascent using Apollo faded with Nova, but this still left Holmes with the difficult task of deciding between Von Braun's earth orbital rendezvous and Houbolt's lunar rendezvous.

Holmes decided he must have a strong systems analysis group at headquarters to help him make his choice. This kind of work was Nicholas E. Golovin's metier, but the man who had headed NASA's part in the launch-vehicle study and Holmes did not get on. Soon after Holmes arrived Golovin left, to rejoin the staff of the president's science advisory committee. To replace him Holmes brought in Joseph Shea from the prestigious Space Technology Laboratories.

One of the first things Shea did on joining NASA was to visit Houbolt at Langley at the beginning of 1962 to find out about his system. He quickly awarded an outside firm a contract to study it in detail, and started his own analysis.

The questions these studies, had to answer were: Which mode was safest? Which gave the best chance of a successful mission? And rather less important: Which would deliver the goods soonest and which would be cheapest?

Working out the chances of failure of rockets and

spacecraft not yet designed, let alone built, and of maneuvers never attempted, sounds rather like a black art. In fact it is a reasonably precise science.

Rendezvous in lunar orbit, for example, was regarded as hazardous in the extreme. But even the perils of this maneuver began to fade under analysis.

Rendezvous depends first on getting into the right orbit and second on making a successful approach. The guidance accuracy required to get into the right lunar orbit turned out to be less than for the return to earth, and the chances of failure during the final approach could be made very small by duplicating radars and other vital equipment and arranging for the main spacecraft to be able to rendezvous with the lunar module as well as vice versa.

As results like these began to emerge in the early months of 1962, opinion at headquarters began to move towards lunar orbital rendezvous. The Space Task Group already favored it, but Von Braun's group at Huntsville were still firmly for earth orbital rendezvous.

Then, quite, unexpectedly, Von Braun changed his

mind. On June 7. The top men from headquarters visited Huntsville for a briefing on their views. Several people spoke before Von Braun and their remarks gave no hint of a change of heart. Von Braun himself wound up the proceedings and came out strongly for lunar orbital rendezvous.

What brought Von Braun around? There was strong pressure from the Space Task Group, and studying the new system in detail was certainly the best way to come to appreciate its advantages. But Von Braun must have been very reluctant to give up the potential toehold in the spacecraft business of his own plan.

It is perhaps no coincidence that in due course Huntsville emerged with something a great deal better: Responsibility for the orbital workshop in which the empty fuel tanks of a rocket will be used as a manned space station.

With Von Braun's conversion the long dispute within NASA was over, but another far more bitter one was only just beginning.

When Golovin left NASA at the end of 1961 he took with him a strong conviction that the space agency did not

know its business when it came to reliability. Back at the White House he worked hard to build up the space activities of the president's science advisory committee.

When he heard that NASA was almost certain to choose the lunar rendezvous method — which he was convinced was most dangerous and least likely to succeed — he involved President Kennedy's scientific adviser, Jerome B. Wiesner.

Wiesner took a strong interest. He did not regard the science advisory committee as a body that gave gentlemanly, generalized advice but as one that should be closely involved in important national decisions. The method for getting to the moon was NASA's most important technical decision yet. He put strong pressure on NASA for full details of their decision.

Now follows one of the most extraordinary incidents in the whole affair, parts of which are still obscure. On June 20 NASA sent over to the White House the results of three analyses of the different modes, one carried out by Shea's group at NASA headquarters, one at Huntsville, one by the Space Task Group.

Golovin went through them figure by figure, equation by equation, and found his worst suspicions confirmed.

According to one set of figures, probably those from Huntsville, lunar orbital rendezvous was considerably more dangerous than the other modes. Golovin told Wiesner, who went to James E. Webb, the NASA chief. On the evening of July 3, Webb called Shea and asked him to go over and calm Wiesner down.

Shea checked the calculations and found, he says, a simple arithmetical error which, when corrected, left lunar rendezvous no more dangerous than the other methods. Wiesner tells a different story: He says NASA did not correct an arithmetical slip but changed a basic assumption in the calculations.

One of the most puzzling aspects of the affair is how NASA ever came to send figures containing such an important discrepancy over to the White House, which they knew to be hostile. The explanation seems to be that things were by now moving so fast that a decision was needed urgently and the figures simply were not checked.

Whatever the explanation of this incident it confirmed Wiesner's and his committee's opposition to lunar orbital rendezvous. The committee started to fight the decision as hard as it could, but NASA maintained a united front. On July 11 they announced the decision publicly. Their system, NASA claimed, provided a higher probability of success than the other modes with "essentially equal" safety. It would cost 10-15 per cent less and the first attempt could be made some months earlier.

In the meantime, direct ascent had re-emerged as a competitor, in new form. North American, the contractors for the Apollo spacecraft, did not like the thought of the actual landing being made with a lunar "bug," built by an entirely different manufacturer. They saw an opportunity in the split between NASA and the White House and in June started to push a scheme for a scaled-down Apollo with a two-man crew that could make a direct ascent with Saturn V.

Wiesner and members of his committee, one of whom was a consultant to North American, went to California

for a briefing and started to back the scheme too.

In face of this odd alliance between its principal contractor and the White House, NASA pushed ahead with its plans. Further delays would hold up the whole program. NASA called for bids on the lunar module, but as a palliative measure, placed a contract with an outside firm for yet another study of the different modes.

Throughout the summer the dispute dragged on, NASA maintaining a united front, Webb, although highly sensitive to political pressure, staunchly backing his own engineers. The dispute flared briefly in September during the president's visit to Huntsville.

The end came in October. Webb, armed with the re-

sults of the latest analysis, went to Wiesner in the White House and told him that NASA was going ahead and placing a contract for the lunar module. Wiesner could oppose it if he wished.

The date was Oct. 24. The Cuban missile crisis was at its height. The president could hardly be bothered with the moon. Nikita Khrushchev had ensured that opposition to lunar orbital rendezvous was finished.

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