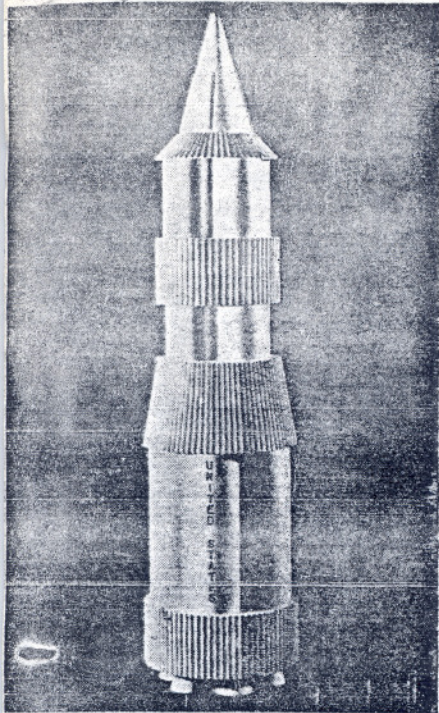


NASA Plans Push To Get Three-Stage Nova

Congress willing, first industrial contracts for vehicle may be let after July 1; reports of scrapping discounted



ARTIST'S CONCEPT of three-stage Nova configuration now being planned for.

AFTER MUCH deliberation NASA is planning to move ahead with hard-core development of the *Nova* super-booster in 1962.

Prospects for the multimillion-dollar moon rocket—long considered dubious—now seem measurably improved. But the actual commitment of funds still must await congressional approval of NASA's FY '63 budget.

If present plans hold firm, NASA expects to award industrial contracts for the *Nova* vehicle sometime after July 1. The booster will have three stages, requiring development of two brand-new multimillion-lb.-thrust upper stages, as well as the first stage.

No final stamp of approval has been given to the vehicle's design. But Milton R. Rosen, director of launch vehicles in the agency's Office of Manned Space Flight, told MISSILES AND ROCKETS in an interview that *Nova's* configuration now shapes up like this:

—**First stage**—Eight Rocketdyne F-1 engines with a thrust of 1.5 million lbs. each or a total thrust of 12 million lbs.

—**Second stage**—Either two or four M-1 liquid hydrogen engines which will have a thrust of from 1 to 1.5 million lbs. each (M/R, Jan. 1, p. 10). Another possibility, although slight, calls for the use of eight J-2 engines, 200,000 lbs. thrust each.

—**Third stage**—One J-2 engine, for a total stage thrust of 200,000 lbs. This is the same as the third stage of the *Saturn C-5* vehicle for which the Douglas Aircraft Corp. has the contract.

Nova would be used to send the entire *Apollo* spacecraft—which may weigh as much as 150,000 lbs.—directly

to the moon and back.

For that mission, Rosen said, *Nova* as presently planned would not be marginal, but would have more than enough capability.

• **No scrapping**—Rosen effectively discounted published reports that NASA intends to scrap *Nova* and place all its hopes for achieving a manned lunar landing on the *Saturn C-5* and orbital rendezvous. He said *Nova* definitely is needed and that the U.S. space program cannot be pushed without it.

He said that while orbital rendezvous may be the best bet for the lunar landing flight, any follow-on programs will require a *Nova*-class vehicle.

He added that it is a necessity if the U.S. intends to establish a moon base or undertake manned exploration of the planets.

The selection of a contractor for *Nova's* first stage will be made following industrial competition similar to that for the recent *S-1B* award, approximately 30 firms will be invited to a pre-proposal conference. Interested firms will then submit bids.

The same procedures may not be followed in the development of the new M-1 engine, because NASA feels far fewer firms are qualified to build it. While Rosen said that no final decision had yet been made, informed sources report that the go-ahead announcement for the engine is imminent.

• **Engine choice**—The number of engines which will be used in a *Nova* second stage will depend upon a final decision as to the total thrust of each engine. If a 1-million-lb. or slightly higher thrust engine is built, four would

be clustered. If the engines' thrust approaches the 1.5 million range, only two would be needed.

An engine-out capability would also require four engines. Total second stage thrust could run from 3 million to 4 million lbs.

Rosen also said that if the *Nova* stages are built at NASA's Michoud plant—which appears likely—plant extension and additional facility construction will be required. He indicated that if any other plant site is chosen, it will have to be in a 100-mile radius of the New Orleans area, where NASA is presently concentrating big launch vehicle development and test-firing.

The thrust of the *Nova* booster could also be sharply upgraded if nuclear upper stages are added later on. NASA officials now estimate that the *Rift* nuclear stage will be test-flown in 1966-67, but it is almost certain that it will not be ready for manned flight until 1968-1969.

NASA, however, is moving ahead with procurement procedures for the vehicle. January 8 is the deadline for submission of proposals by industrial firms who want to be considered in the selection of a prime contractor. In about two to four weeks, NASA will announce the firms invited to submit detailed development bids.

Also expected in the near future is the announcement of a contract for further development of the *Nerva* nuclear engine which will power the *Rift* stage. Westinghouse Electric Co. and Aerojet-General Corp. have the current contract and it is likely they will be awarded the new extended contract. ■