

TO: A&PS-MS-H/Mr. Sharpe  
FROM: S&E-QUAL-DIR/Mr. Grau  
SUBJECT: Saturn History

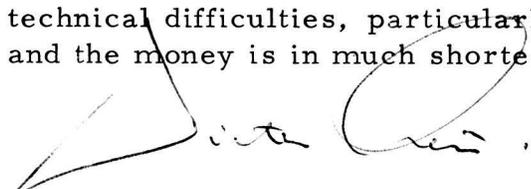
December 12, 1973

In response to your note of December 11, 1973, I would like to tell you that I belonged to the group of people who had reservations about the all-up concept of Dr. Mueller.

In any new project for which there is no precedence case you have to expect some technical difficulties which nobody can foresee. In the Jupiter missile the designers learned about sloshing and the effect this can have. Only the cautious planning which provided for two extra vehicles to be launched before Jupiter 1 made it possible to overcome this difficulty and make Jupiter 1 a success. If such a difficulty already develops for a comparatively simple vehicle you have to anticipate something for a much more complex vehicle such as Saturn with a configuration of several stages on top of each other. That was the reason which prompted me to vote in favor of a cautious approach which would have provided for launches with successively more complicated configurations for which the hardware could have been made available without impacting the overall schedule. I still think that we would have detected the Pogo effect of the configuration earlier if we would have gone that route. With the all-up concept, the Pogo effect was detected late, required tremendous effort to overcome it, and almost developed into a show stopper.

I am not aware that a consensus was obtained on this subject in favor of the all-up concept although I know that Dr. von Braun went on record for the Center supporting this concept eventually. Just as Dr. Mueller could not guarantee that this concept would succeed, the opponents could not guarantee that it would fail. Dr. Mueller wanted to eliminate the additional costs which a more cautious approach would have required and Dr. von Braun decided MSFC should share the risk with him.

I believe similar decisions can be expected for the Shuttle where the technical difficulties, particularly in the Orbiter area, are sizable and the money is in much shorter supply than in the Saturn days.



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