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Dec 31, 1983

Dear Pete

This being the last day of 1983 I am determined to get off a reply to your interesting letters to me earlier this year. As I am sure that you have perceived I am not a very faithful correspondent.

Before addressing the subject of the Bunnelli design I should fill you in on my professional career in order to alert you to my limitations as an aircraft design specialist.

After leaving Cornell in June of 1941 I accepted a job with the Boeing Company in the Flight Test section as a test engineer and part time pilot. In this job I participated in several first flights of Boeing aircraft such as the B-29 and C-97 (forerunner of the Stratocruiser). During this period, from 1941 to 1946, I was deeply involved in detail aeronautical engineering and design affairs.

Immediately after the war came to a close

I accepted a position in the sales department and shortly thereafter I was sent to Europe to set up Boeing's first overseas office. To make a long story short I have remained in the aircraft sales side of our business up to the time of my retirement in 1982. at the height of my career I was Director of International Sales responsible for all commercial aircraft sales outside of the United States. For the last few years before my retirement I was involved in our government relations as Vice President of Boeing International for international affairs.

So you see, Pete, that except for my first few years in the industry I have not been directly involved in the design side of our business. Accordingly, I feel rather incompetent to speak out authoritatively on the relative merits of basic aircraft design philosophy.

Having said that, I will give you

my offhand reactions to the Burnelli concept. First, there is no question in my mind that an aircraft based generally on the Burnelli design parameters will be built sometime in the next decade. Probably it will be developed with government support as an outsize cargo carrier, perhaps as a successor to the C-5A. I had to go along with Bob Withington of Boeing when he advised that this particular design concept will only prove to be economically viable when produced as a very large or so-called outsize aircraft. It will take a large aircraft to achieve a satisfactory payload to structural weight ratio.

It has been unfortunate that the Burnelli designs often been referred to as a flying wing. Especially since the flying records of a number of highly tested pure flying wings has

been totally disastrous. The difference in the two designs that makes the big difference is that Burrelli had a conventional tail configuration ensuring good stability characteristics.

The big problem the Burrelli advocates face is not acceptance of the design concept as much as how to obtain the financial backing to launch a detailed design and production program. To produce a new commercial transport today costs close to two billion dollars from start of design to production of the first aircraft. No individual private aircraft company can afford to undertake such a project. The only alternatives are a consortium of U.S. and foreign companies or more realistically a design competition sponsored by the Department of Defense. The latter offers the best possibility in my opinion.

In order for the Burrelli design to compete fairly for such a government

it will have to

sponsored by one of the principal aircraft manufacturers such as Boeing, Douglas, Lockheed or General Dynamics. The backers of the Burnelli design have their work cut out for them trying to get one of these companies to propose their design. The N.I.H. factor is formidable amongst aircraft designers!

Before closing I would like to express my own personal thoughts as regards present day aircraft safety. Although it is true that the majority of commercial aircraft accidents are caused by human error (pilots, controllers, mechanics) I do not believe that enough attention has been paid to accident avoidance during the detailed design phase of modern day aircraft development. The engineering departments of the manufacturers do not have separate, identifiable staff groups dedicated solely to a continuous

audit and review of each step of the design process to insure that each and every design decision takes accident avoidance and survivability into full consideration. I believe that many accidents that have occurred during the past few years would never had happened had such surveillance been exercised.

Pete, I'm afraid that I have rambled on for too long with too little substance to do justice to your serious questions on the Burnelli design. I do believe that it deserves a lot more consideration than it has received and I sincerely hope that it gets it.

Please pardon me for waiting so long to write to you, I promised that I will respond more quickly to your next letter.

Happy New Year to you and to your family
 Ken Liblow