FLYERS ASSOCIATION NEWS

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DUKE FLYERS ANNUAL MEETING

SAN JOSE, CALIFORNIA

Art Lund and Greg Jellinek want to invite the entire membership to attend the 1994 ***Duke Flyers Association*** annual meeting and fly-in which will be held in San Jose, California from Thursday October 6th through Sunday October 9th. The host FBO is the San Jose Jet Center located, at San Jose International Airport.

While the fly in will formally get under way on Friday evening, for those of you planning to arrive early in order to participate in *Flight Review's* courses on Thursday and Friday, several interesting aviation related tours have been arranged.

Our convention hotel is the recently refurbished Hotel St. Claire which is located in the heart of downtown San Jose. The hotel is within walking distance of numerous local attractions, restaurants, and shopping, yet it is less than ten minutes by car from the airport.

Our Saturday maintenance seminar will be held at the FBO rather than in a hotel conference room. With the cooperation of Corporate Air Technology, a shop with extensive Duke maintenance experience, we hope to have a Duke "opened up" so that the members can actually see the various systems as they are discussed by our experts.

As mentioned, *Flight Review, Inc.* of Scottsdale will hold both a two day (Initial) and a one day (Recurrent) proficiency ground school running on Thursday and Friday. You should have already received a mailing from Tom Clements in that regard.

The "bay area" is predictably CAVU in October. If you should want to expand your visit, San Jose can provide a convenient base of operations for numerous other regional sites. San Francisco is a one hour drive to the west. Beautiful Lake Tahoe is a fifty minute flight to the north and is served by two general aviation airports. A little farther along is Reno, *the Biggest Little City in the World.* Going the other direction, the Monterey peninsula, boasting some of the nation's most prestigious golf courses is twenty (Duke) minutes to the south.

We are looking forward to seeing you all out here in sunny California in the fall. October weather in San Jose has daytime temperatures in the 70's and nights in the 40's and 50's. (Leave your thermal long johns at home.). If you have any questions contact;

Art Lund @ (408) 977-0120
or
Greg Jellinek @ (408) 356-0052

Registration forms for fly-in will be included in next newsletter.

Boundary Layer Research, Inc.
"Vortex Generator Specialists"

March 21, 1994

The Duke Flyers Association

SUBJECT: THE EFFECT OF REDUCED STALL SPEED ON BEECHCRAFT DUKE MANEUVERING SPEED

Dear Duke Flyers:

Recently we received an inquiry from a Duke owner/pilot regarding the maneuvering speed, V_A, of the Beechcraft Duke when it is equipped with the Boundary Layer Research Inc. (BLR) vortex generator kit. Since the installation of the vortex generators on the wing result in reduced stall speeds, the owner wanted to know why the V_A speed was not also reduced.

The certification basis for the Beechcraft series 60 (Duke) airplanes is Part 23 of the Federal Aviation Regulations (FAR). The FAR Part 23 regulations dealing specifically with design maneuvering speed, V_A, are principally contained in Subpart C - Structure, and Subpart G - Operating Limitations and Information. The most significant reference to V_A is contained in Subpart C, specifically FAR 23.335 Design Airspeeds, 23.423 Horizontal Tail Maneuvering Loads, 23.441 Vertical Tail Maneuvering Loads, and 23.455 Ailerons. Subpart G regulations (23.1507 and 23.1583) simply require that the V_A speed be published in the Airplane flight Manual (AFM)

It is important to recognize that in the context of the FARs, V_A is defined as the design maneuvering speed and that it is based on a computed stalling speed, V_S. FAR 23.335 states, in part "...V_A may not be less than $V_S\sqrt{n}$ where V_S is a computed stalling speed with flaps retracted at the design weight, normally based on the maximum airplane normal force coefficients..." For purposes of this discussion, maximum airplane normal force coefficient is equivalent to maximum lift coefficient, $C_{L_{MAX}}$, the lift coefficient at which the airplane stalls.

By regulation, an airplane is designed to a limit load factor and in the case of the Duke, the limit load factor is 3.5. V_A is equal to or greater than the speed associated with $C_{L_{MAX}}$ achievable at the maximum weight at the limit load factor. In the case of the Duke, this speed is 160 knots. The Duke AFM states that V_A = 161, therefor, the criteria of FAR 23.335 is satisfied by the basic airplane.

When a BLR vortex generator kit is installed on the Duke, the maximum lift capability of the airplane wing is increased and a lower stall speed is achieved. At maximum gross weight the stall speed (flaps up) for the basic Duke is 85 knots and the stall speed for the BLR modified Duke at the same weight is 81 knots.

The minimum design V_A for the BLR modified Duke is $V_S\sqrt{n} = 81\sqrt{n} = 152$ knots. However, FAR 23.335 allows for a higher V_A and BLR has chosen to substantiate the airplane structure to V_A = 161 KCAS.

Sincerely,

Robert J. DesRoche
President

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Perhaps there should be two Maneuvering Speeds. The first one—for *design* purposes—would be used by the designers in substantiating structure. It must be *at least* equal to *computed* stall speed times the square root of the limit maneuvering load factor. The second one—for *operational* purposes—would be adhered to by pilots to ensure they don't risk the airplane being permanently deformed. It must be *not greater than* the *actual* stall speed times the square root of the limit maneuvering load factor.

Until convinced otherwise, here are the speeds I calculate to be safe "operational" maneuvering speeds for both a standard and a VG-modified Duke.

Operational Maneuvering Speeds (IAS)		
Weight	**STD**	**VGs**
6965 lbs	---	151
6775 lbs	157	150
6400 lbs	153	146
6000 lbs	148	142
5600 lbs	143	138
5200 lbs	138	133

If anyone would like to discuss this further, please feel free to call. I have received assurance from the FAA's Aircraft Certification Branch in Wichita that they will examine this issue in light of our input. We will let you know if we learn more.

Best Regards,

Tom

Thomas W. Clements
President

TWC/dmg

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