ENCLOSURE I

TECHNICAL INFORMATION

FORCES ON AN AIRFRAME

The dynamic pressure on an airframe is defined as the maximum pressure force available in a flow field relative to the true airspeed. These forces are defined by the equation: $q = \frac{1}{2} \sigma V^2$ with "σ" defined as air density on a vehicle and "V" as the velocity in ft/sec.

An example of force (pressure) acting on the forward facing surfaces of a typical model jet such as a BVM Ultra Bandit is:

25.2 lb/sq ft at 100 mph

56.7 lb/sq ft at 150 mph

100.8 lb/sq ft at 200 mph

157.5 lb/sq ft at 250 mph

226.8 lb/sq ft at 300 mph

308.8 lb/sq ft at 350 mph

The effect of speed and radius of the turn on "G" forces is:

$F = \frac{mv^2}{r}$ where "F" is force, "r" is radius, "m" is mass and "v" is velocity

As the true airspeed of an aircraft doubles from 150 mph to 300 mph, it experiences four times the "G-loading" when performing a simple level turn of a similar radius. This means that even a large ¼ mile radius (1320 foot) turn requires a hefty 4.56g "pull" at 300 mph under standard, sea level conditions while it's only 1.14g at 150 mph. Additionally, when this turn radius is halved to 1/8 mile, the load factor doubles to 9.12g! Thus it is easy to envision how more aggressive maneuvering required to keep a 300 mph aircraft in comfortable visual range or to set up for speed runs can easily impact huge aerodynamic loads on a structure.

Every control surface has a critical flutter speed dependant on its area, weight, hinge moment, and electro/mechanical control system.

Every flying surface has a deflection resistance to a control input that is velocity and "G" dependant.

Full scale aircraft are properly funded to afford professional engineering and wind tunnel testing. This data and flight testing establish the VNE (Velocity to Never Exceed) and maximum positive and negative "G" limits. These vehicles are then safe to operate as published.

Model jets are sporting vehicles that do not have these advantages nor are the assemblers, pilots, and maintenance crews similarly trained.

For a model company to be able to honestly publish a V.N.E. of 300+ mph, the product would not be affordable as a sporting device. Model airplane developers rely primarily on comparative and intuitive engineering; therefore, the end product is just a model airplane with corresponding performance limitations.