



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF AEROSPACE ENGINEERING

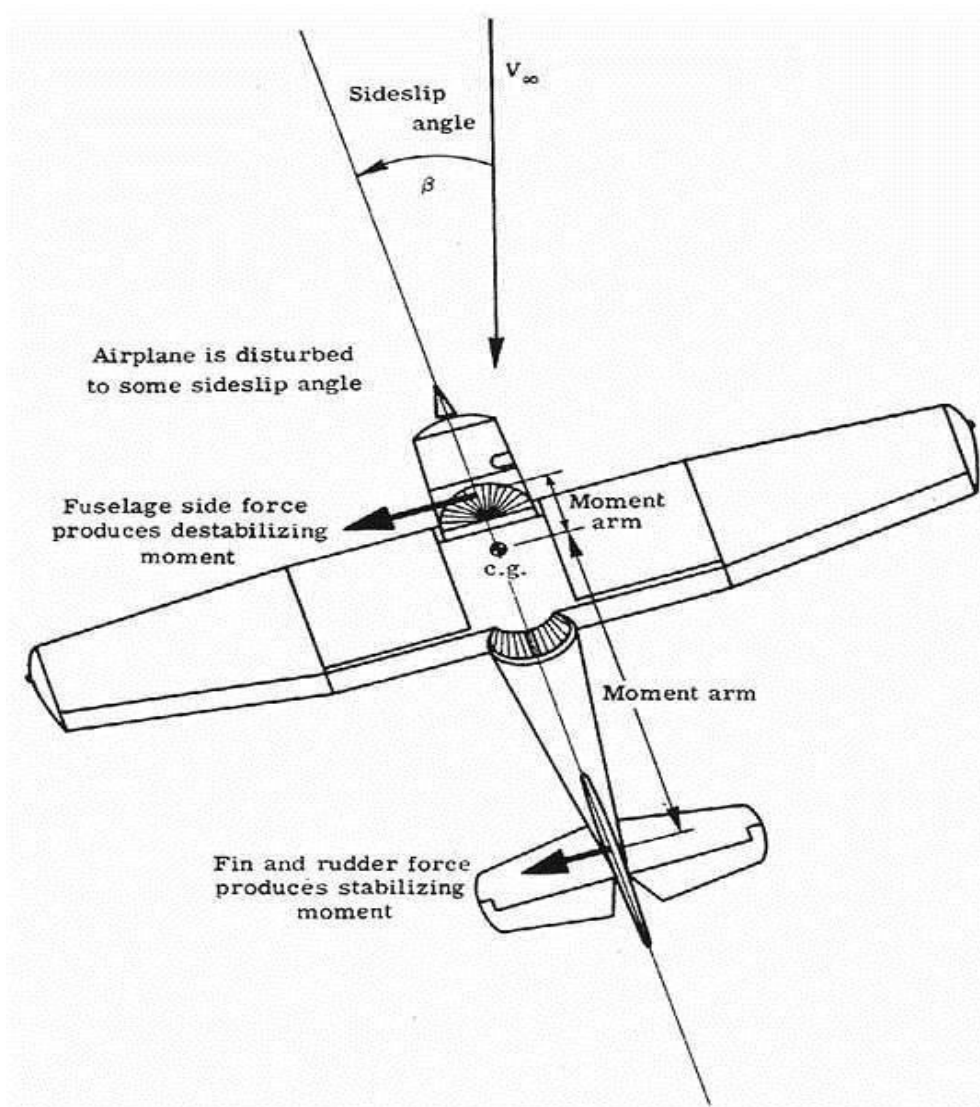


Subject Code & Name: **19AST302 FLIGHT DYNAMICS**

Date:21.10.23

DAY:31 TOPIC: **STATIC DIRECTIONAL STABILITY - RUDDER FIXED**

Directional stability is stability of a moving body or vehicle about an axis which is perpendicular to its direction of motion. Stability of a vehicle concerns itself with the tendency of a vehicle to return to its original direction in relation to the oncoming medium (water, air, road surface, etc.) when disturbed (rotated) away from that original direction. If a vehicle is directionally stable, a restoring moment is produced which is in a direction *opposite* to the rotational disturbance. This "pushes" the vehicle (in rotation) so as to return it to the original orientation, thus tending to keep the vehicle oriented in the original direction.



Directional stability is frequently called "weather vanning" because a directionally stable vehicle free to rotate about its center of mass is similar to a weather vane rotating about its (vertical) pivot.

With the exception of spacecraft, vehicles generally have a recognizable front and rear and are designed so that the front points more or less in the direction of motion. Without this stability, they may tumble end over end, spin or orient themselves at a high angle of attack, even broadside on to the direction of motion. At high angles of attack, drag forces may become excessive, the vehicle may be impossible to control, or may even experience structural failure. In general, land, sea, air and underwater vehicles are designed to have a natural tendency to point in the direction of motion.

