GREENWOOD MILITARY AVIATION MUSEUM

Flight Education Reference Manual

FLIGHT CONTROLS AND SURFACES

GMAM FltEd Program
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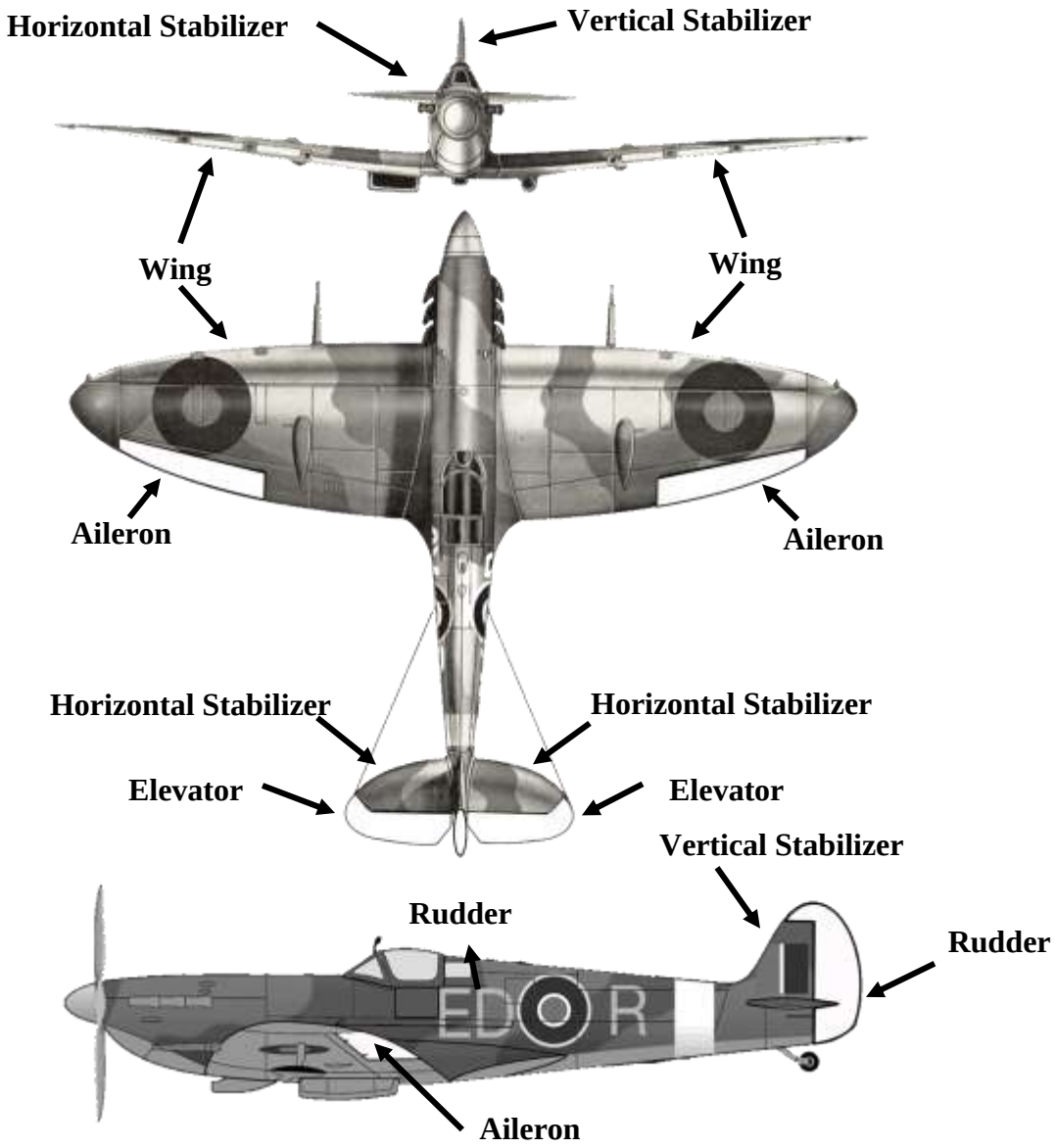
FLIGHT CONTROL / MOTION
(Flight Controls and Surfaces)

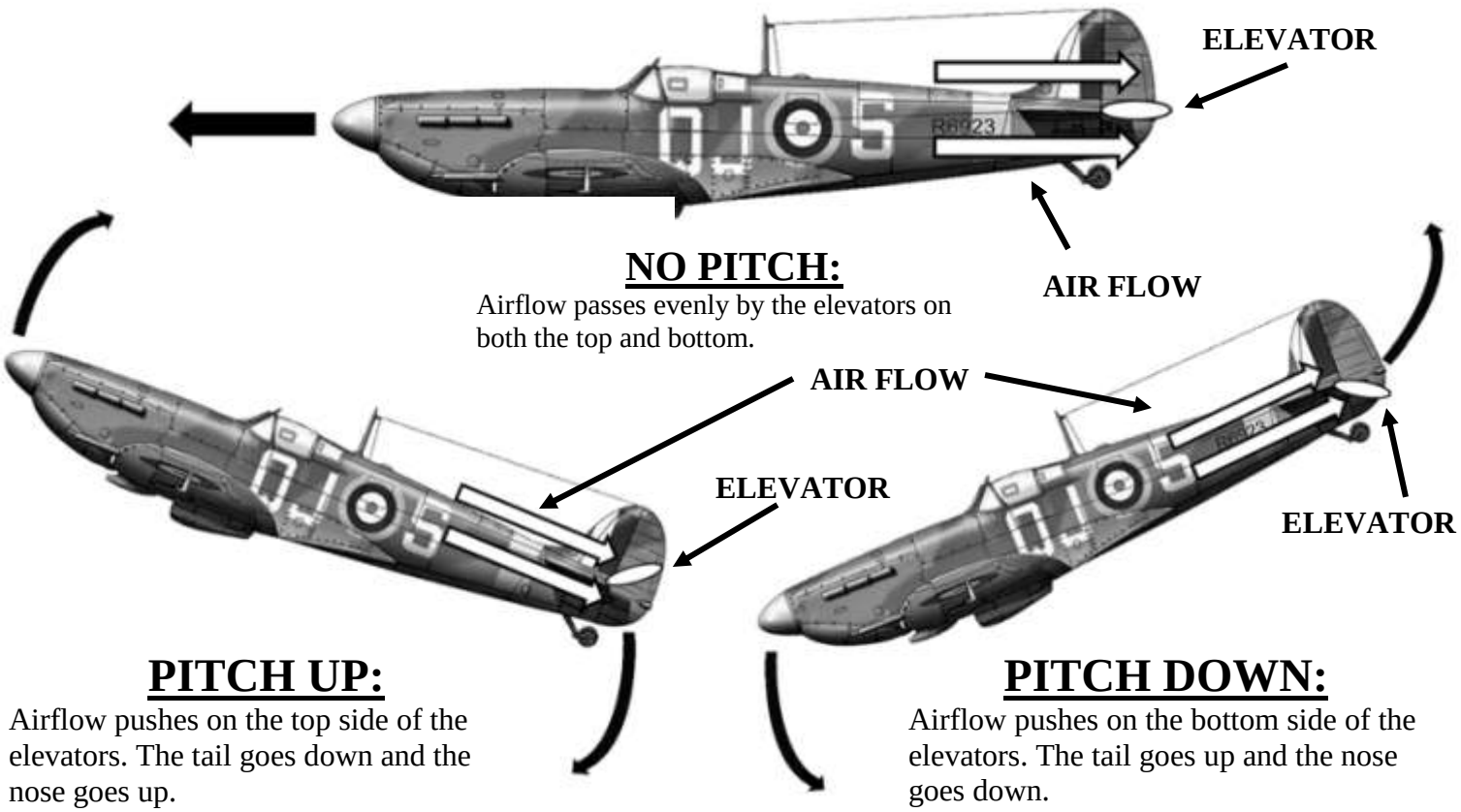


1. The primary flight controls on an aircraft are**:** ***"AILERONS"*** , ***"RUDDER"*** and ***"ELEVATORS"*** . These are the moveable surfaces on an airframe that enable the pilot to make the airplane go where he wants it to go.

2.The primary flight surfaces on an aircraft are: ***"WINGS"*** , ***"HORIZONTAL STABILIZER"*** and ***"VERTICAL STABILIZER"***. These are fixed (non moveable) surfaces that provide both flight and directional stability for controlled flight.

PITCH

The movement of an aircraft's nose up or down.
Controlled by the *"ELEVATORS"*.



NO PITCH:

Airflow passes evenly by the elevators on both the top and bottom.

PITCH UP:

Airflow pushes on the top side of the elevators. The tail goes down and the nose goes up.

PITCH DOWN:

Airflow pushes on the bottom side of the elevators. The tail goes up and the nose goes down.

NO PITCH: Airflow passes evenly over both the top and bottom of elevators. Aircraft will continue flying straight until the elevators are moved by the pilot.

PITCH UP: When the pilot pulls back on the control yoke, the elevators will rotate upward. The airflow pushes on the top surface of the elevators forcing the tail to go down. When the tail goes down, this makes the nose go up.

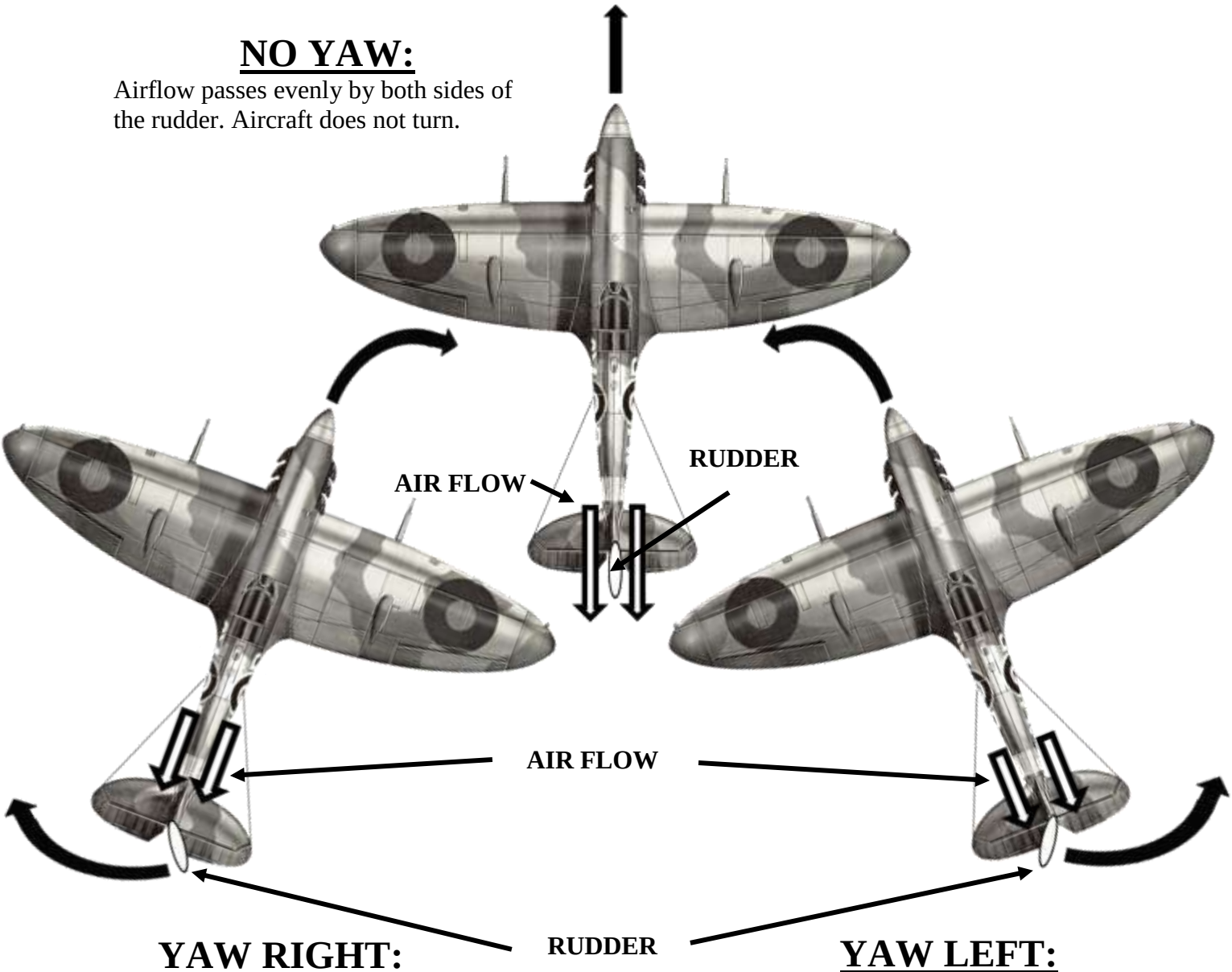
PITCH DOWN: When the pilot pushes forward on the control yoke, the elevators will rotate downward. The airflow pushes on the bottom surface of the elevators forcing the tail to go up. When the tail goes up, this makes the nose go down.

YAW

The movement of an aircraft's nose left or right.
Controlled by the *"RUDDER"*.

NO YAW:

Airflow passes evenly by both sides of the rudder. Aircraft does not turn.



YAW RIGHT:

Airflow pushes on the rudder making the tail move left. When the tail goes left, the nose moves right.

YAW LEFT:

Airflow pushes on the rudder making the tail move right. When the tail goes right, the nose moves left.

NO YAW: Airflow passes evenly by both sides of the rudder. Aircraft will continue flying straight.

YAW RIGHT: When the pilot pushes on the right rudder pedal, the rudder will swing right. The air flow will push on the rudder forcing the tail to move left. When the tail goes left, the nose will move to the right.

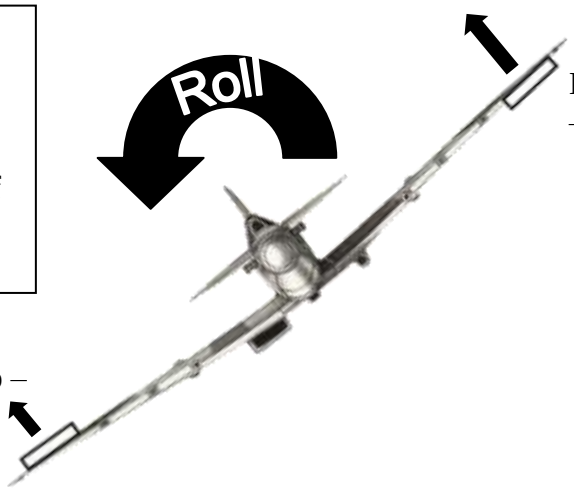
YAW LEFT: When the pilot pushes on the left rudder pedal, the rudder will swing left. The air flow will push on the rudder forcing the tail to move right. When the tail goes right, the nose will move to the left.

ROLL

The movement when an aircraft tilts (banks) to the left or right. Controlled by the ***"AILERONS"***.

The left and right ailerons are located on the trailing edge (rear edge) of the wings near the wing tips. When an aileron moves down, the "LIFT" over that wing will increase (become more). When an aileron moves up, the "LIFT" over that wing will decrease (become less). To move the ailerons, the pilot moves his control stick to the left or the right depending on which way he wants to roll the aircraft. When one aileron moves up the other one always moves down automatically. The left or right in an airplane is from the point of view of the pilot sitting in the airplane.

ROLL RIGHT: Pilot moves control stick to the right. The right aileron moves up while the left aileron moves down. Lift will be increased over the outer part of the left wing and reduced over the outer part of the right wing. The aircraft will roll to the right.



NO ROLL: Both ailerons are in the "NEUTRAL" position. Airflow passes evenly over the wings creating equal "LIFT" on both wings. Aircraft does not roll in either direction.

ROLL LEFT: Pilot moves control stick to the left. The right aileron moves down while the left aileron moves up. Lift will be increased over the outer part of the right wing and reduced over the outer part of the left wing. The aircraft will roll to the left.