Nomenclature

Cd = Drag Coefficient

M = Mach Number

Cn = Normal Aerodynamic Force Coefficient

Cn/(\alpha) = Derivative of Normal Aerodynamic Force Coefficient with respect to \alpha

a = Semi-major axis of the lifting body

b = Semi-minor axis of the lifting body

\phi = Bank angle

\alpha = Angle of Attack

l = Generic Length

d = Generic diameter

dm = Minimum Diameter

S = Reference surface

Sb = Base surface

h = Generic height of the nose

lB = Body length

lN = Nose length

lEAP = Booster length

hf = Flare length

dEAP = Booster diameter

dEPC = Main core stage diameter

xcp\_EAP = Centre of pressure position of the booster from the nose

xcp\_EPC = Centre of pressure position of the main core stage from the nose

xcp = Centre of pressure of the launcher from the nose

A\_EAP = Booster Surface

Af = Flare Surface

M\_prop = Propellant mass

m\_dot\_prop = propellant mass flow rate

\delta\_EPC = Deflection angle of the main core stage nozzle

\delta\_EAP1 = Deflection angle of the left booster nozzle

\delta\_EAP2 = Deflection angle of the right booster nozzle

T1 = Thrust of the left booster

T2 = Thrust of the right booster

\deltaT1 = Percentage random variation of the left booster thrust

\deltaT2 = Percentage random variation of the right booster thrust

\deltaT = Total percentage random variation of the thrust

T\_EAP = Thrust of the boosters

CG = Centre of gravity position from the base

CP = Centre of pressure position from the base

N = Normal Aerodynamic Force

q = Dynamic Pressure

y (segnato) = distance from symmetry axis to compute the torque

T\_ideal = Ideal Thrust

T\_EPC = Main Core Thrust

A\_ref = Reference Area

m\_fairing = Fairing mass

m\_ESC-A = Second stage mass

(m\_s)\_EPC = Main stage

(m\_s)\_EAP = Booster structural mass

Baseline (geometry)

a = 5.75 m

b = 3.7 m

\phi = 0°

d\_m = 3.075 m

l\_N = 7.5 m

l\_EAP = 30 m

h\_f = 1.02 m

d\_EAP = 3.05 m

d\_EPC = 5.4 m

A\_EAP = 7.306 m2

A\_f = 7.5477 m2

A\_ref = 37.514 m2

m\_fairing = 3210 kg

m\_ESC-A = 4740 kg

(m\_s)\_EPC = 14700 kg

(m\_s)\_EAP = 37000 kg