Mass and Inertia

Montag, 9. April 2018 09:22

Whole system, with 2x 3800 mAh batteries
(excluding props from analysis)

Values for control:

Mass = 3.828410916
Center of Mass = 0.137051577, -0.097319287, -7.669804170 mm

Moments of Inertia (WCS)
Ix, Iy, Iz = 78832.857233992, 82271.616582466, 152407.951145980

Moments of Inertia (Centroidal)
Ixc, Iyc, Izc = 78607.611272534, 82046.334970496, 152407.842977376

Products of Inertia (WCS)
Iyz, Ixz, Ixy = -3.882565650, 24.695463703, -34.167325449

Products of Inertia (Centroidal)
Iyzc, Ixzc, Ixyc = -6.740167627, 28.719731356, -34.116263017

Average centroidal inertia
Ixc, Iyc, Izc =
Iyzc, Ixzc, Ixyc =

Moments of Inertia (WCS)
Ix, Iy, Iz = 77885.396887181, 81324.156235654, 154302.871839602

Moments of Inertia (Centroidal)
Ixc, Iyc, Izc = 77659.954278725, 81098.677976687, 154302.763670998

Products of Inertia (WCS)
Iyz, Ixz, Ixy = -3.882565650, 24.695463703, -34.167325449

Products of Inertia (Centroidal)
Iyzc, Ixzc, Ixyc = -6.741414945, 28.721487913, -34.116263017

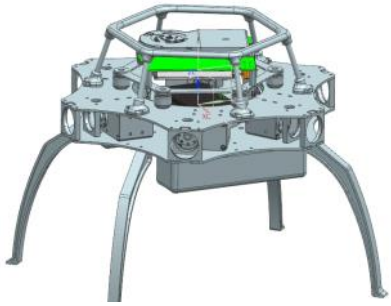
Values for model:

Body:
Mass = 2.166562421 **(2.30 from real measurements)**
Center of Mass = 0.242176153, -0.171967452, -13.570526021 mm
Moments of Inertia (WCS)
Ix, Iy, Iz = 7500.003560409, 10938.848193227, 13694.808991418

Moments of Inertia (Centroidal)
Ixc, Iyc, Izc = 7100.947137780, 10539.728774579, 13694.617852746

Products of Inertia (WCS)
Iyz, Ixz, Ixy = -3.882565649, 24.695463703, -34.208492595

Products of Inertia (Centroidal)
Iyzc, Ixzc, Ixyc = -8.938648064, 31.815779643, -34.118263035

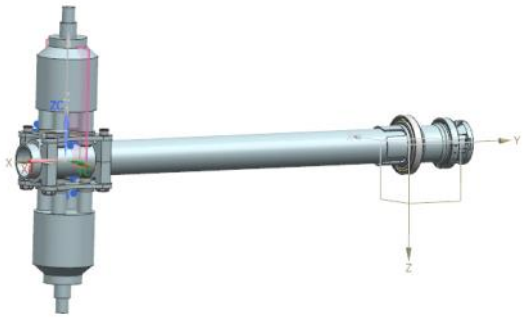


Arm:
Mass = 0.276873455
Center of Mass = -20.166271401, -0.000002331, -0.008106995 mm
Moments of Inertia (WCS)
Ix, Iy, Iz = 342.573579034, 1320.496521578, 1003.663869752

Moments of Inertia (Centroidal)
Ixc, Iyc, Izc = 342.573560837, 1207.898021452, 891.065387823

Products of Inertia (WCS)
Iyz, Ixz, Ixy = -2.042536869, -0.002499531, 0.000127660

Products of Inertia (Centroidal)
Iyzc, Ixzc, Ixyc = -2.042536874, -0.047764979, 0.000114647



Prop (for comparison):
Mass = 0.006034265 kg
Center of Mass = -0.000002699, -0.000000196, 2.095295569 mm
Moments of Inertia (WCS)
Ix, Iy, Iz = 0.873549334, 20.758444131, 21.537067688

Moments of Inertia (Centroidal)
Ixc, Iyc, Izc = 0.847057321, 20.731952118, 21.537067688