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function p = default_params()

% Chief orbit and CW mean motion
mu = 3.986004418e14; % m^3/s^2
Re = 6378e3; % m
h = 500e3; % m
r0 = Re + h; % m
p.n_radps = sqrt(mu / r0^3);

% Simulation time
p.dt_s = 0.1;
p.t_final_s = 30*60;

% Fly in
p.R_init_m = 100; % start range
p.T_approach_s = 180; % approach duration
p.flyaround_omega = 2*pi/300; % one lap per 300 s

% Inspection reference
p.standoff_m = 25; % desired standoff distance, meters
p.flyaround_period_s = 600; % seconds per loop
p.flyaround_plane = "xz";

% Control limits for translation
p.a_max_mps2 = 2e-3; % m/s^2

% LQR weights
p.Q_lqr = diag([50 10 50 5 5 5]);
p.R_lqr = diag([1 1 1]) * 2000;

% Range band constraint for inspection standoff
p.R_min_m = 15; % minimum allowed range to chief
p.R_max_m = 70; % maximum allowed range to chief
p.band_margin_m = 5; % soft margin where constraint terms
start blending in
p.band_k_rep = 8e-3; % repulsion gain for band
```

enforcement

p.band_k_damp = 5e-3; % radial damping gain

% Dwell requirement

p.required_dwell_s = 10*60; % time the deputy should
remain inside the band ✓

p.max_outside_s = 30; % if outside longer than this, mark
as failed ✓

% Attitude and wheels

p.J_body = diag([0.22 0.18 0.25]); % kg m²

p.Kp_att = .25;

p.Kd_att = .5;

p.tau_w_max_Nm = 0.013; % wheel torque limit per axis

p.Iw = 3e-4; % wheel rotor inertia kg m²

p.wh_max_radps = 6000 * 2*pi/60; % 6000 RPM in rad/s

% secondary axis for pointing

p.lvlh_z_ref = [0; 0; 1];

% LOS requirement

p.los_max_range_m = 50; % maximum range for valid LOS

p.required_los_time_s = 10*60; % required time with valid
LOS ✓

% Coverage requirement instead of time

p.required_coverage_pct = 70; % of surface imaged

% Camera specifications

p.camera_fov_deg = 20;

p.chief_radius_m = 2.5;

end