

### **The Description of Additional Supplementary Files**

**Supplementary Video 1.** Real-time recordings of buckling tests on single CFRP columns, illustrating Euler instability and failure modes.

**Supplementary Video 2.** Compression tests of SC and FCC unit cells with synchronized force–displacement curves showing progressive lattice collapse.

**Supplementary Video 3.** Scanning electron microscope zoom-throughs highlighting kink bands and buckling fracture morphology in CFRP lattices.

**Supplementary Video 4.** Demonstration of drone frame comparison: weight measurement and hover endurance test contrasting nylon, CFRP, and lattice designs.

**Supplementary Code 1.** Python script implementing a genetic algorithm to compute shortest continuous fiber paths in SC and FCC lattices from 3D node coordinates, used for fabrication path planning.

**Supplementary Code 2.** Optimization code for lattice beam stiffness using experimental SC, DC, and FCC bending slopes, identifying lightweight (<8 g) configurations with target performance.

**Supplementary Code 3.** LibrePilot settings export including PID gains, stabilization modes, and flight control parameters used for quadcopter validation experiments.