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変形可能なプロペラの開発に関する研究の紹介

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Soft Robotics Lab

since 2017

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ソフトロボティクス

柔軟な素材

ロボティクスが展開できる
フィールドが拡大

柔軟な動き

周囲の環境が大きく変化しても
「動作」を提供

NEW SCIENCE

未知が多い

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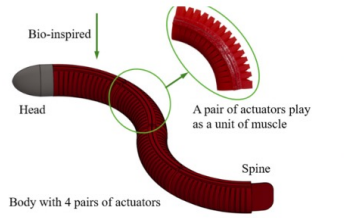
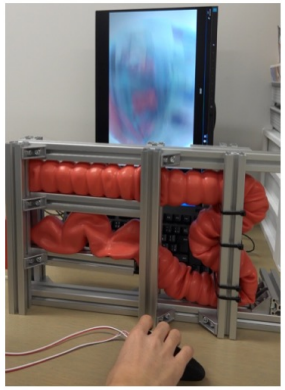
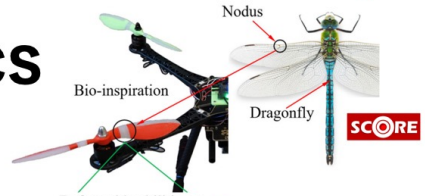
Main topics

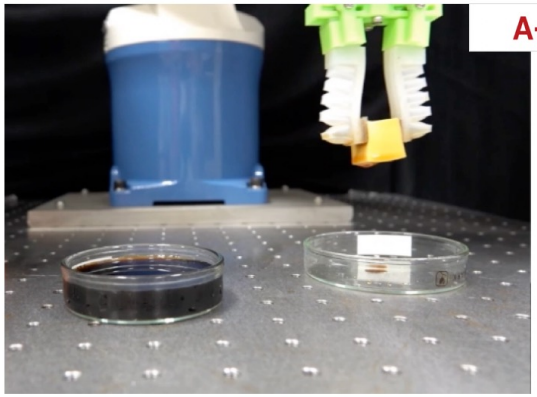
Biomimetics



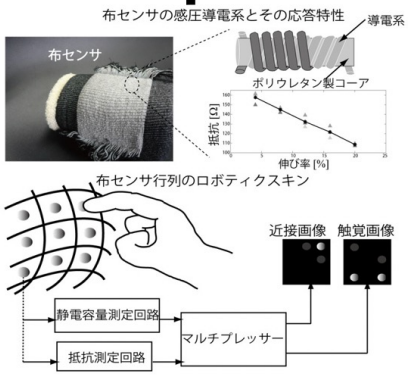


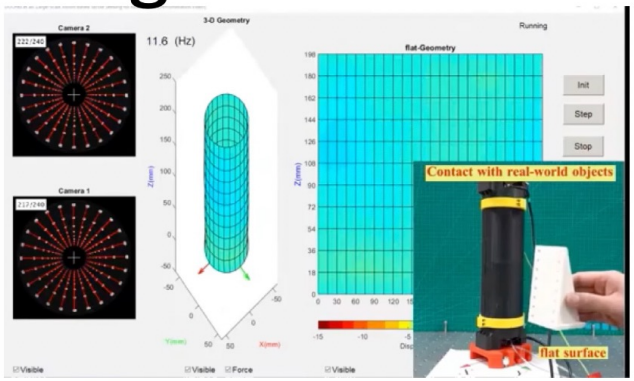


Soft robotic hand

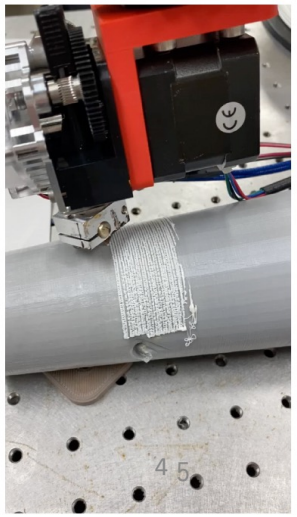


Haptic sensing





Control



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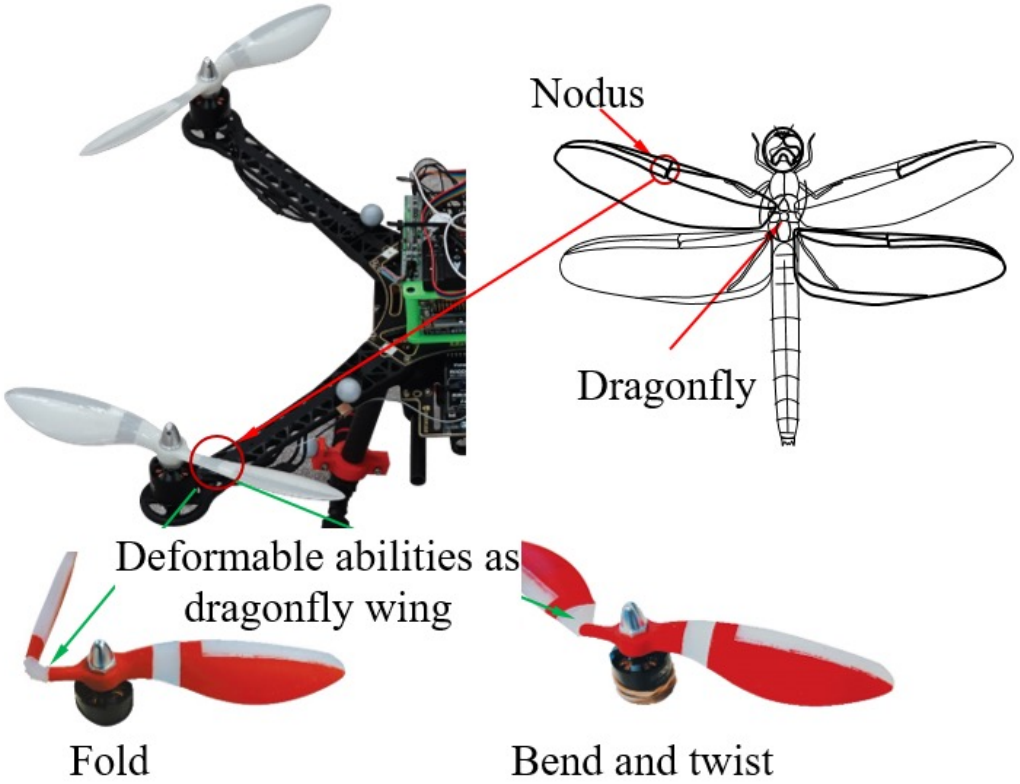
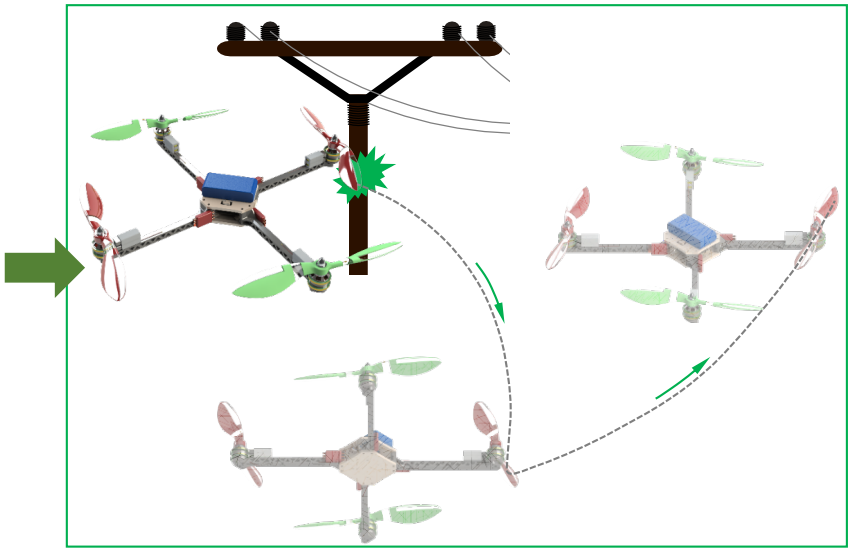
JAXA

NOVEL DEFORMABLE PROPELLER

Bio-inspiration again

トンボプロペラ



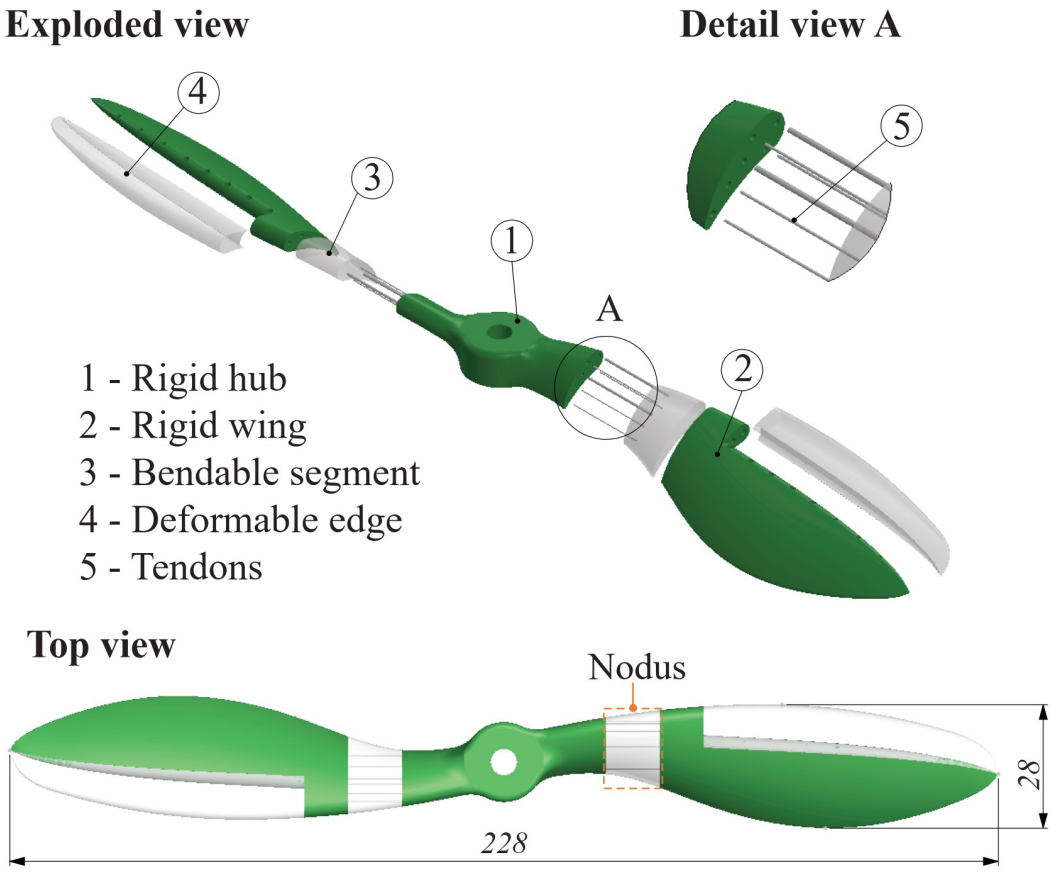


DEFORMABLE PROPELLER DESIGN

- **Rigid parts** are made by rigid plastic (1 and 2) plays as propeller's frame.
- **Soft parts** are made by silicone rubber and nylon fiber

Bendable segment (3) works as dragonfly wing nodus.

Deformable edge (4) can partly absorb impact force when collision.



9-inch deformable propeller design

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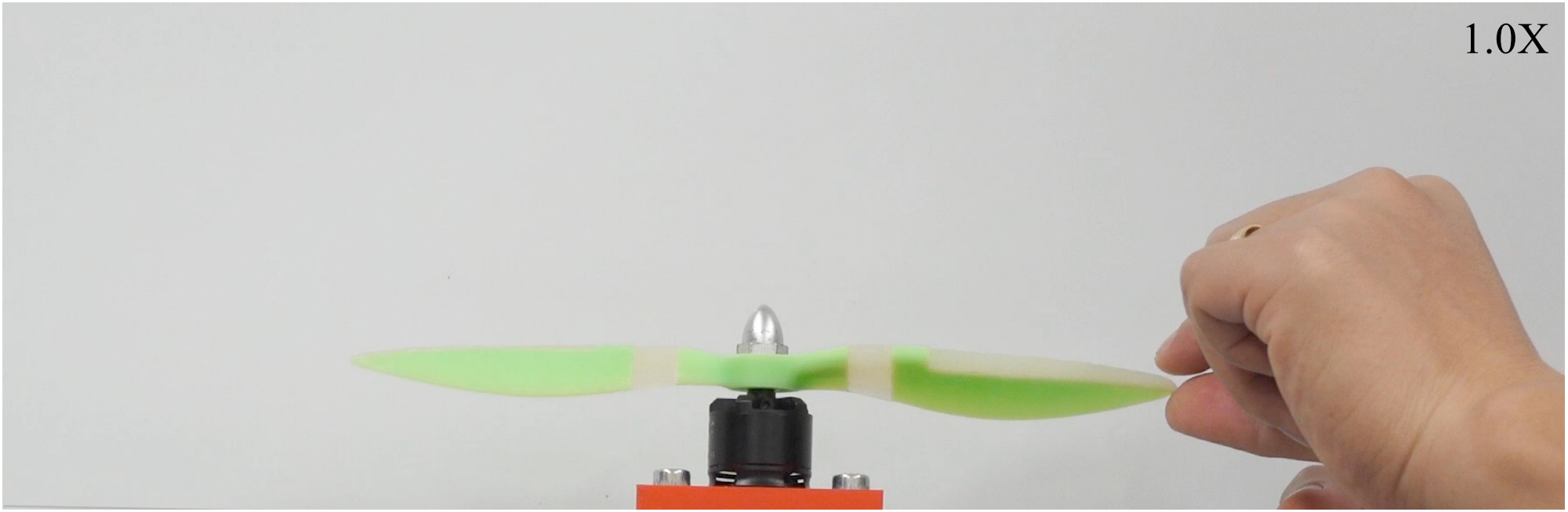
DEFORMABLE CAPABILITY



Deformable propeller can bend, twist and fold

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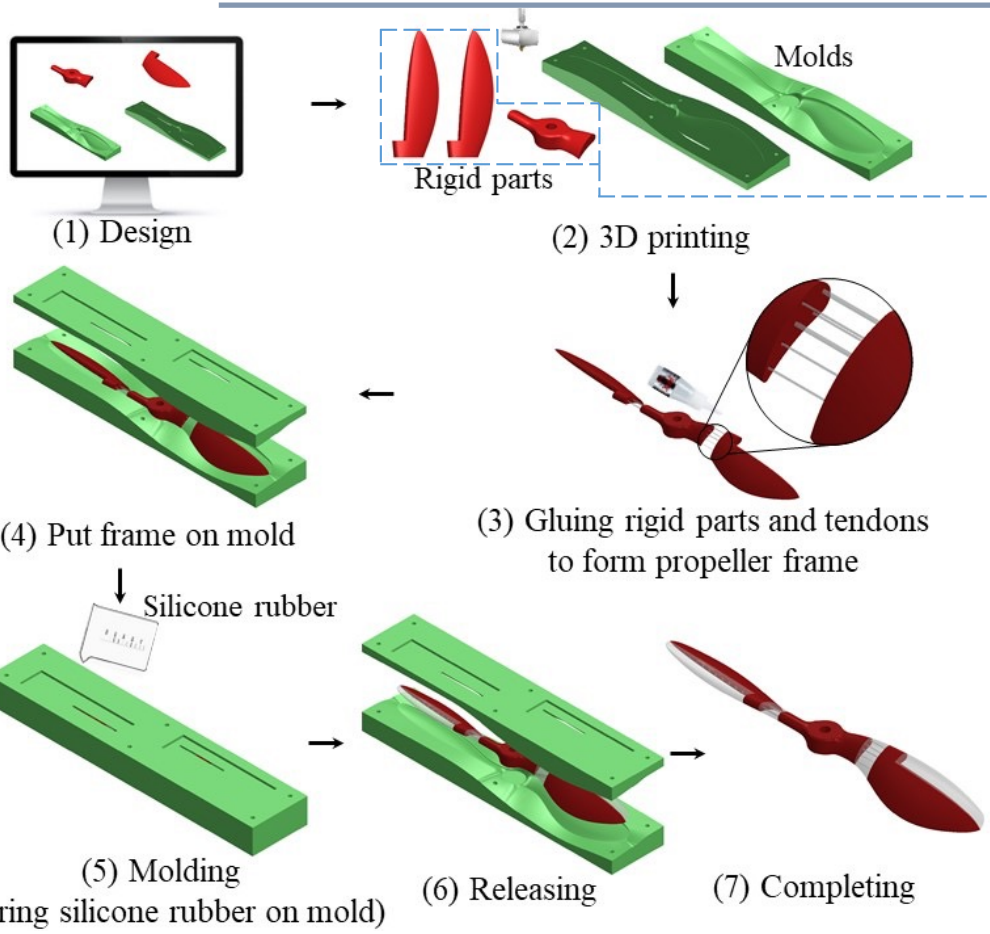
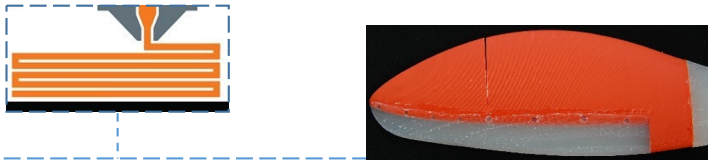
FABRICATION PROCESS



Fabrication process basing on 3D printing technique



The 3D printed propeller easily break due to layer to layer structure

Injection rigid parts for tougher propeller

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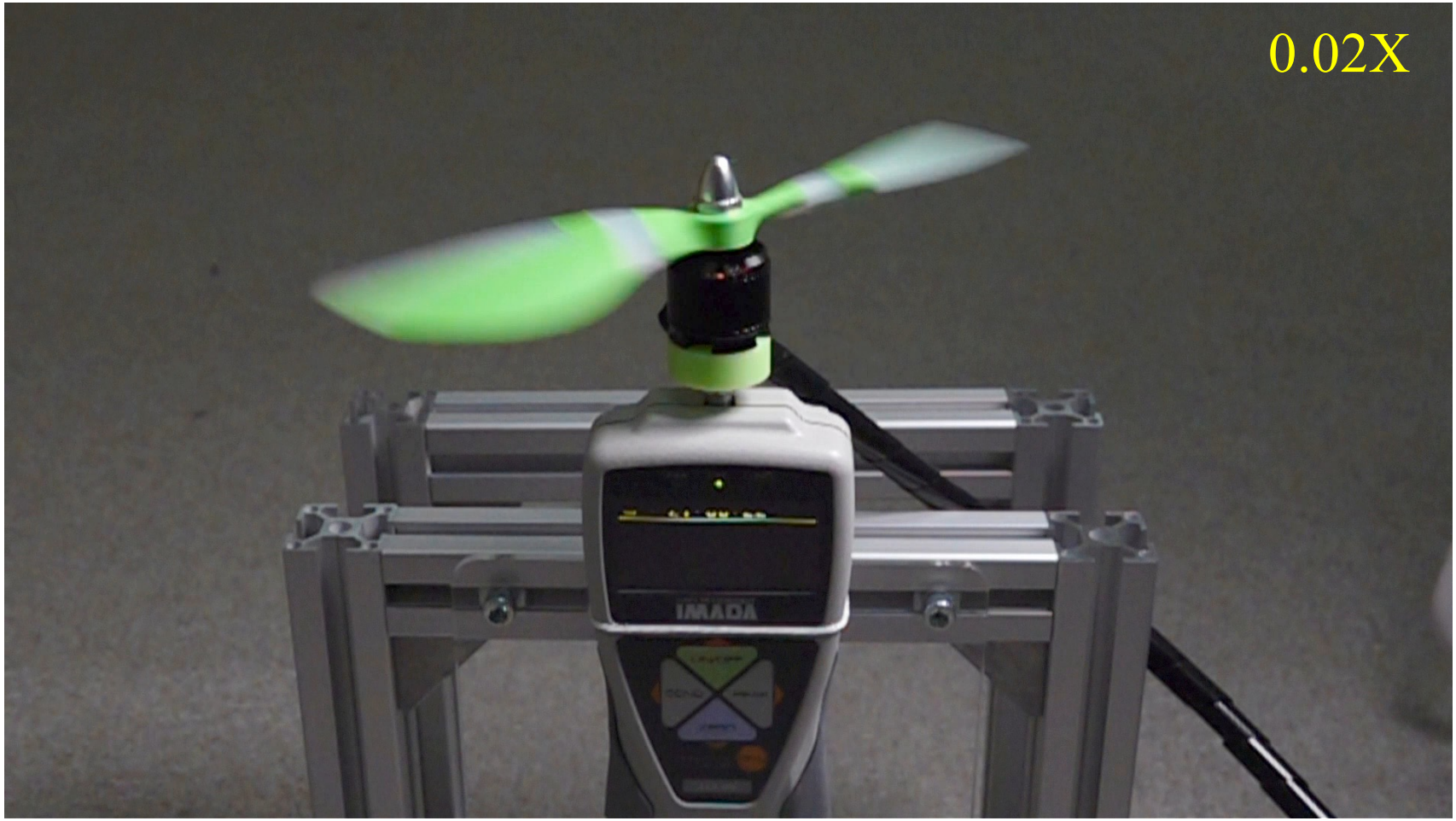
SELF-RECOVERY CAPABILITY



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MODELING AND SIMULATION

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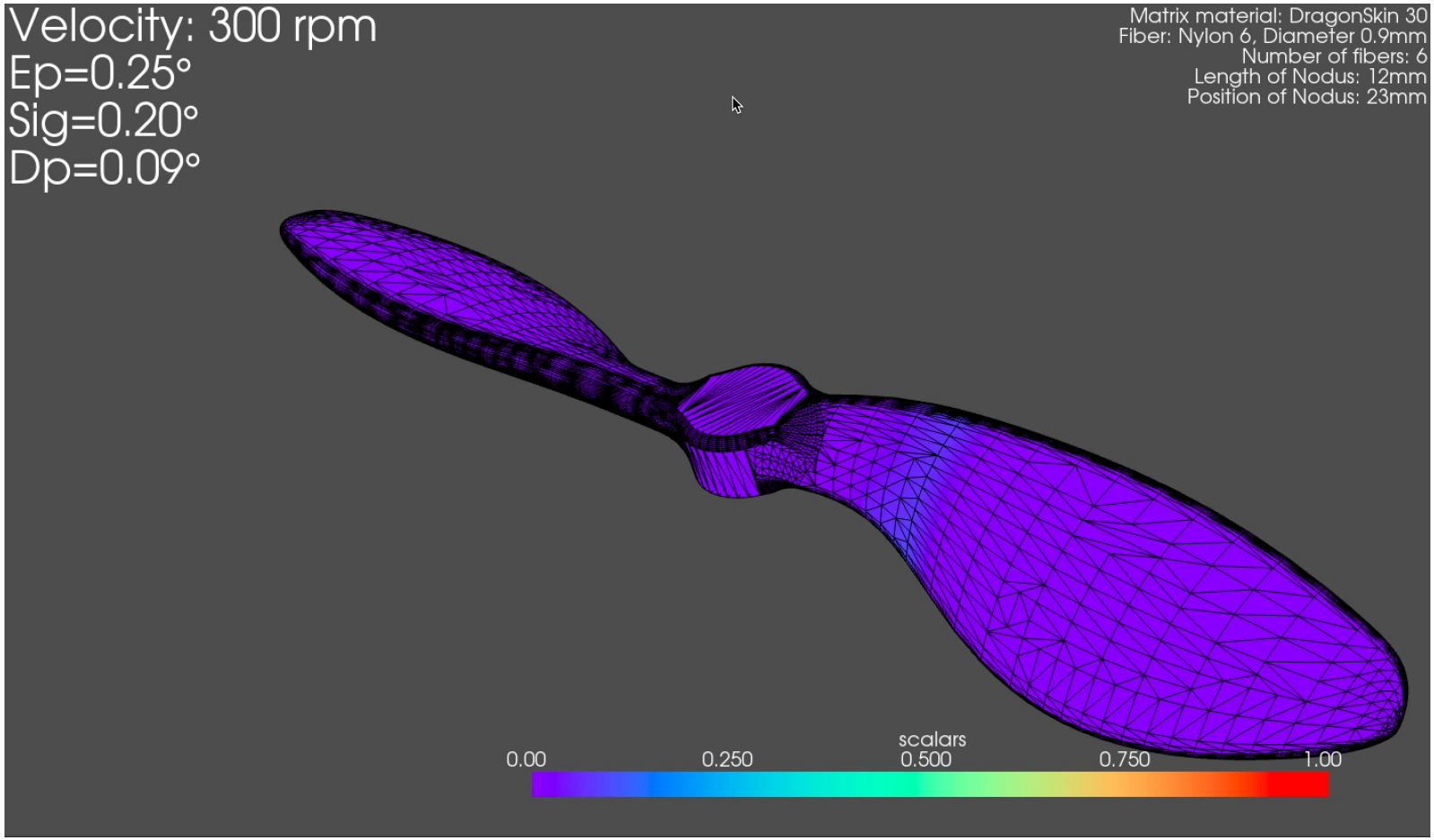
VISUALIZATION OF DEFORMATION



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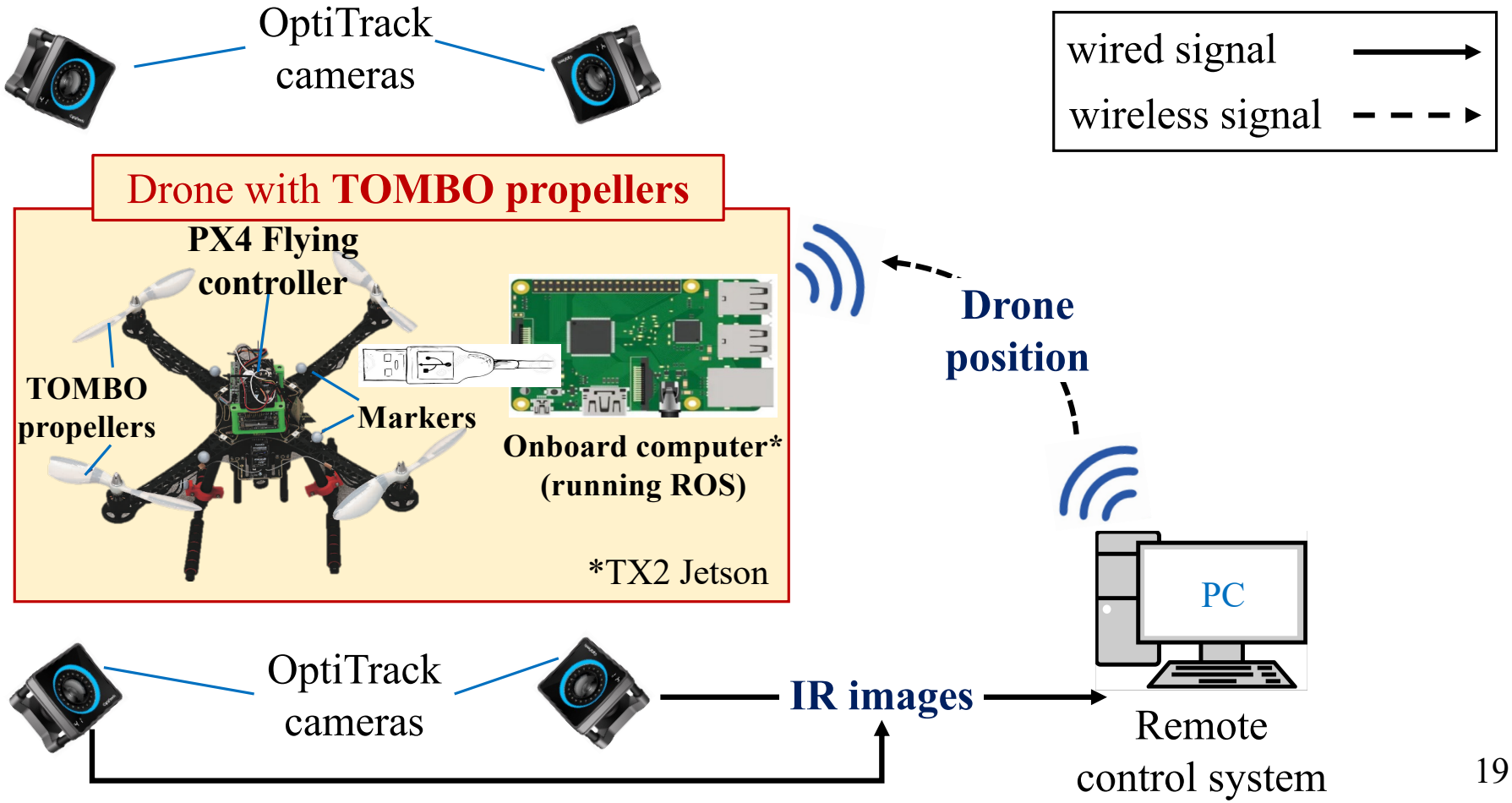
CONTROLLER, FLIGHT ABILITY AND COLLISION EXPERIMENT

FLYING SYSTEM OVERVIEW



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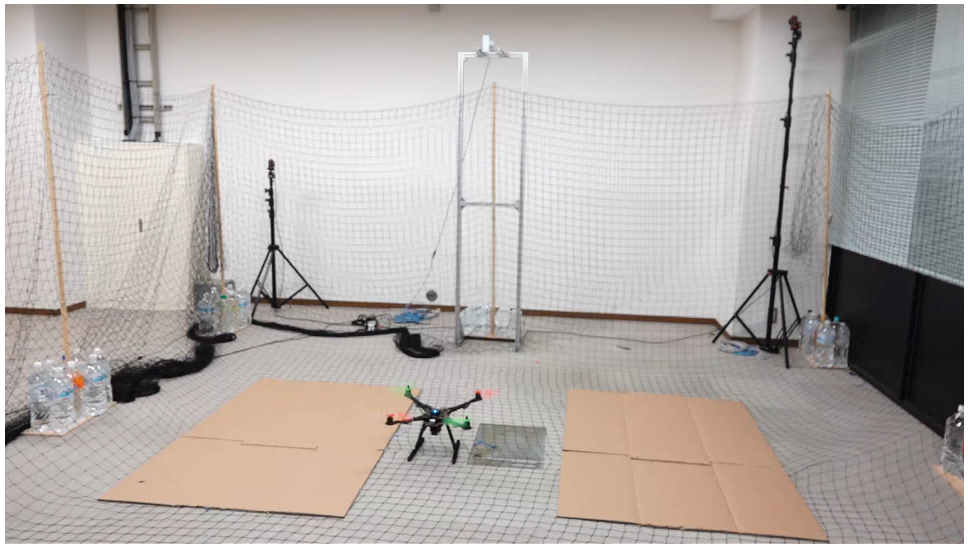
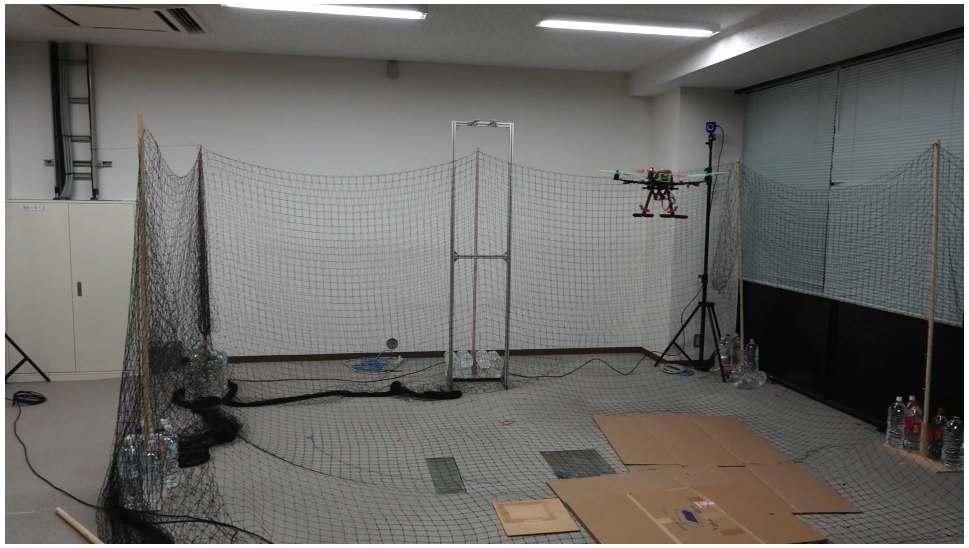
FLYING TEST

Flying test with TOMBO propellers (9-inch)

Average flying speed



Fast flying speed



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RESULT (Video)

Drone recovery after collision

Without recovery control

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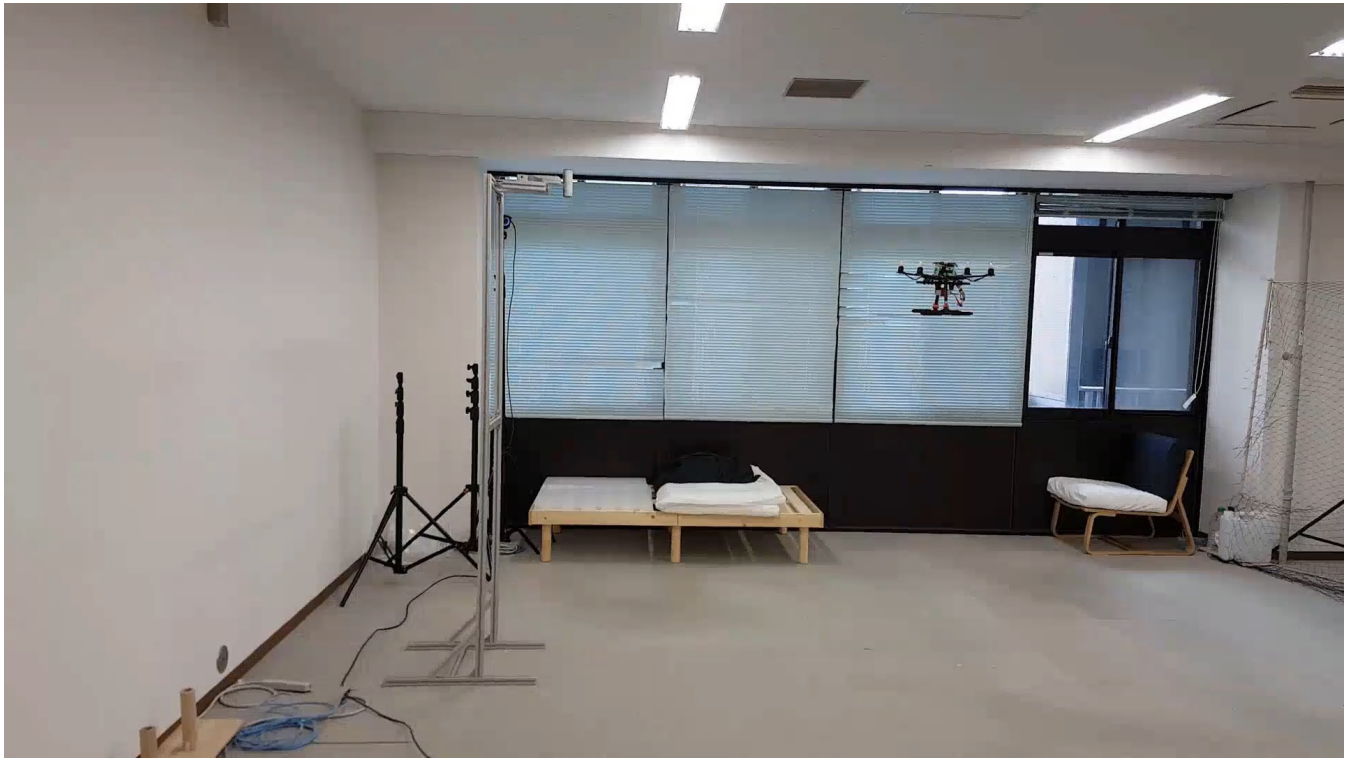
RESULT (**Video**)

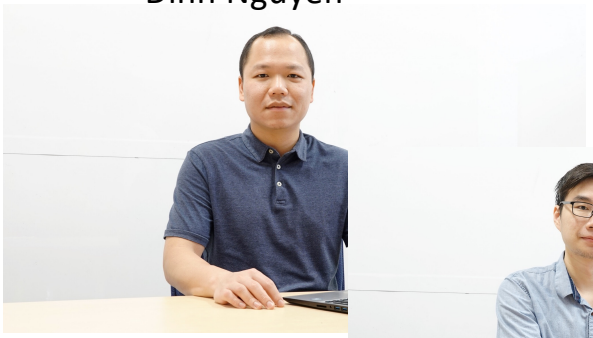
Drone recovery after collision

With recovery control



Acknowledgement

Dinh Nguyen



Quan Luu

Son Bui

木村様

SCORE
program of Start-up incubation from COre REserch

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