

# Development of a Robotic Module Coupled to a Drone for Installation of Spacers in High Voltage Cables

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## 1. Background & Motivation

- Risky manual installation of spacers
- Technicians exposed to hazards (heights, electric fields, helicopters)
- Need for safer and more efficient installation methods

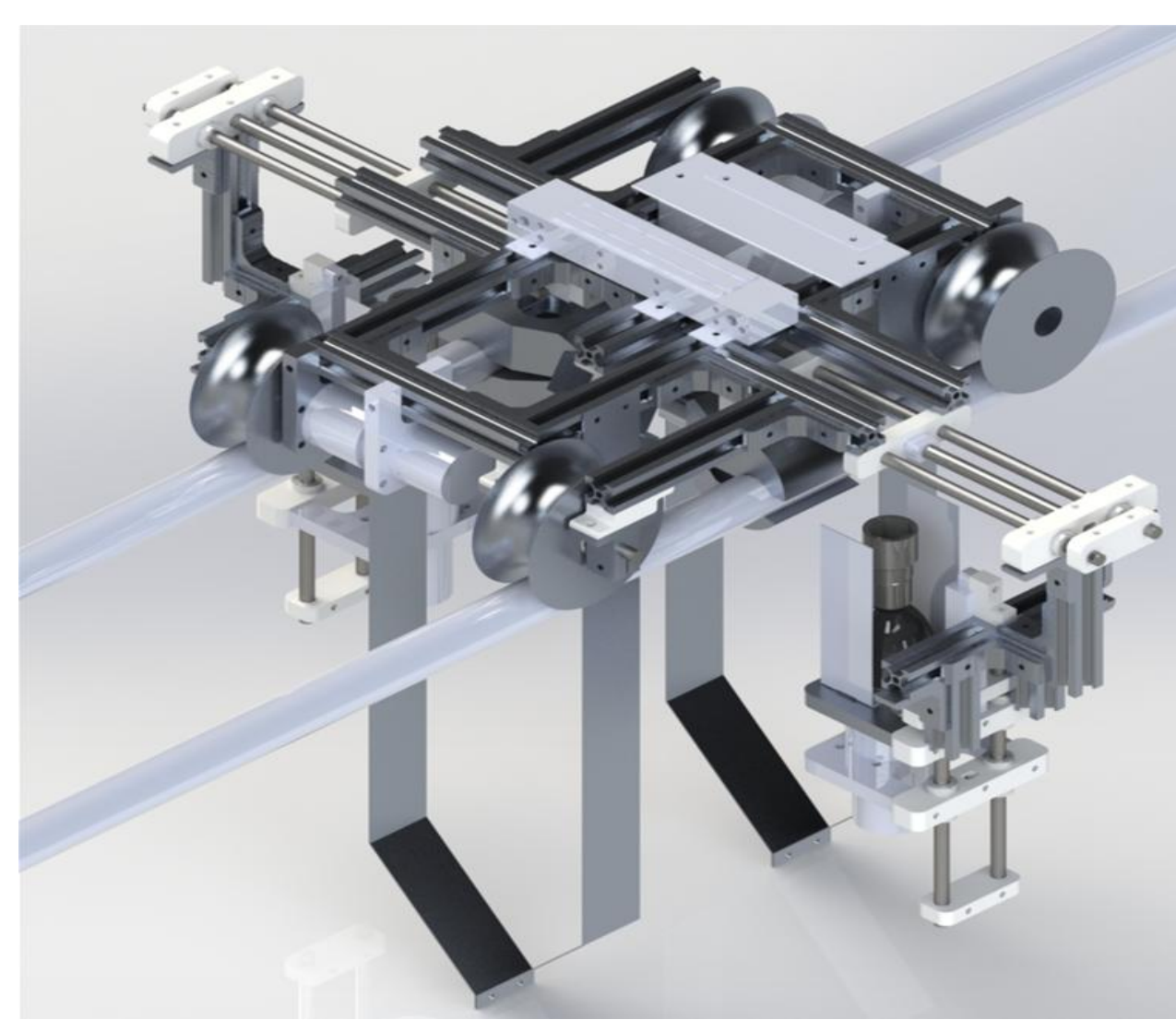


## 3. Mechanical & Design Approach

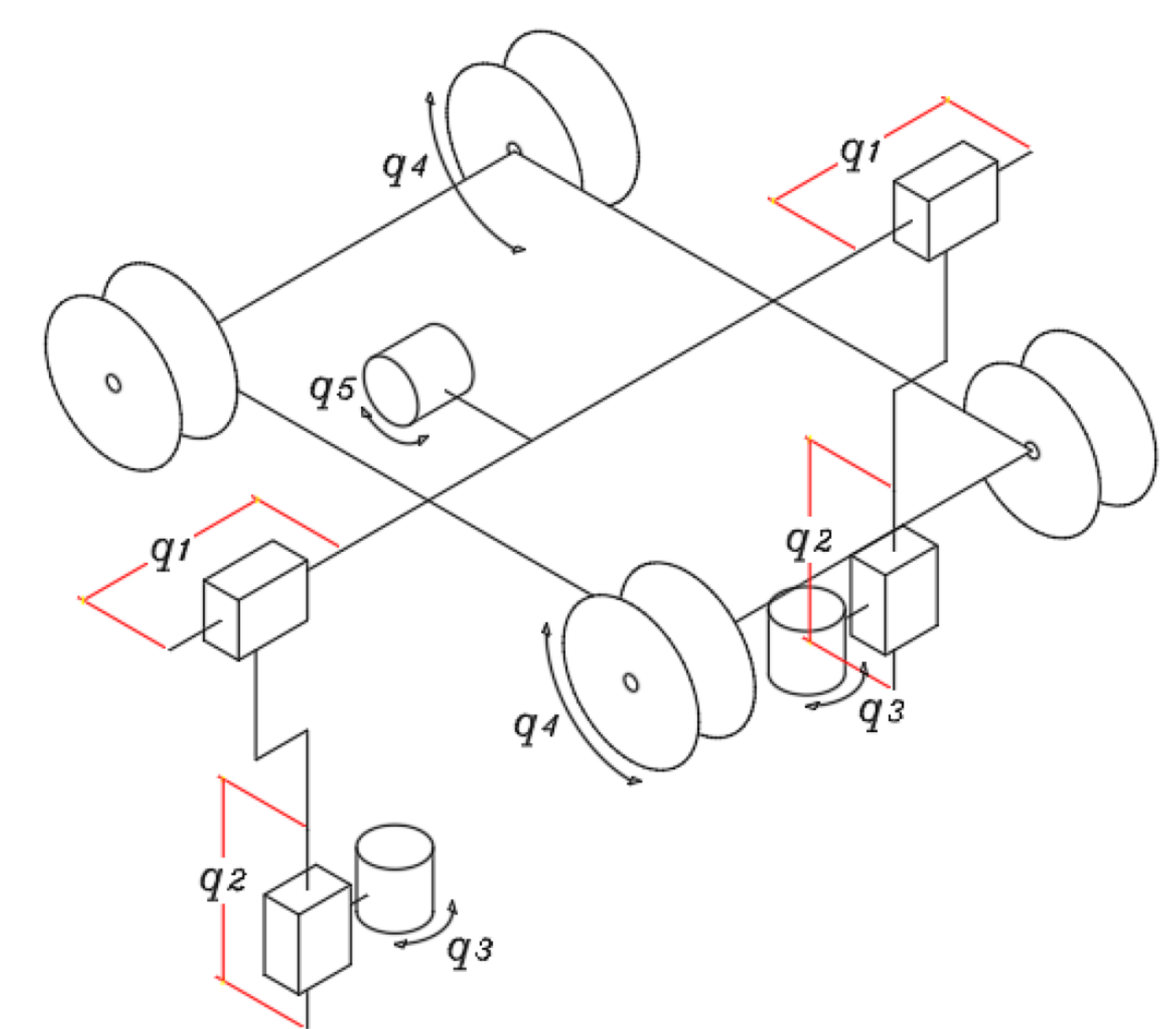
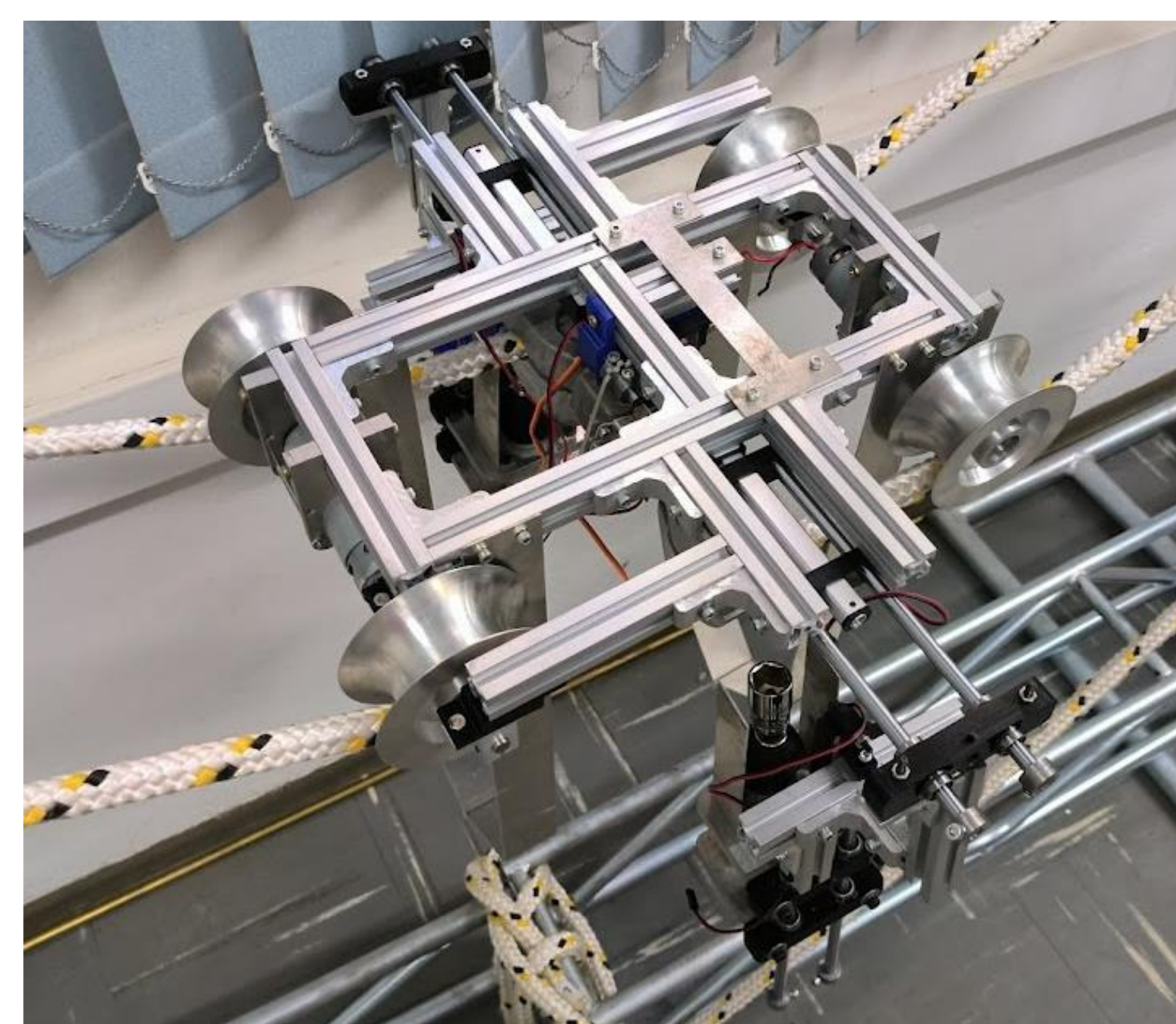
- Mathematical modeling of the system
- CAD/CAE-based design development
- Structural and kinematic analysis

## 2. Proposed Solution

- Development of a robotic module coupled with a drone
- System designed to install and remove spacers remotely
- Reduces direct human interaction with energized lines



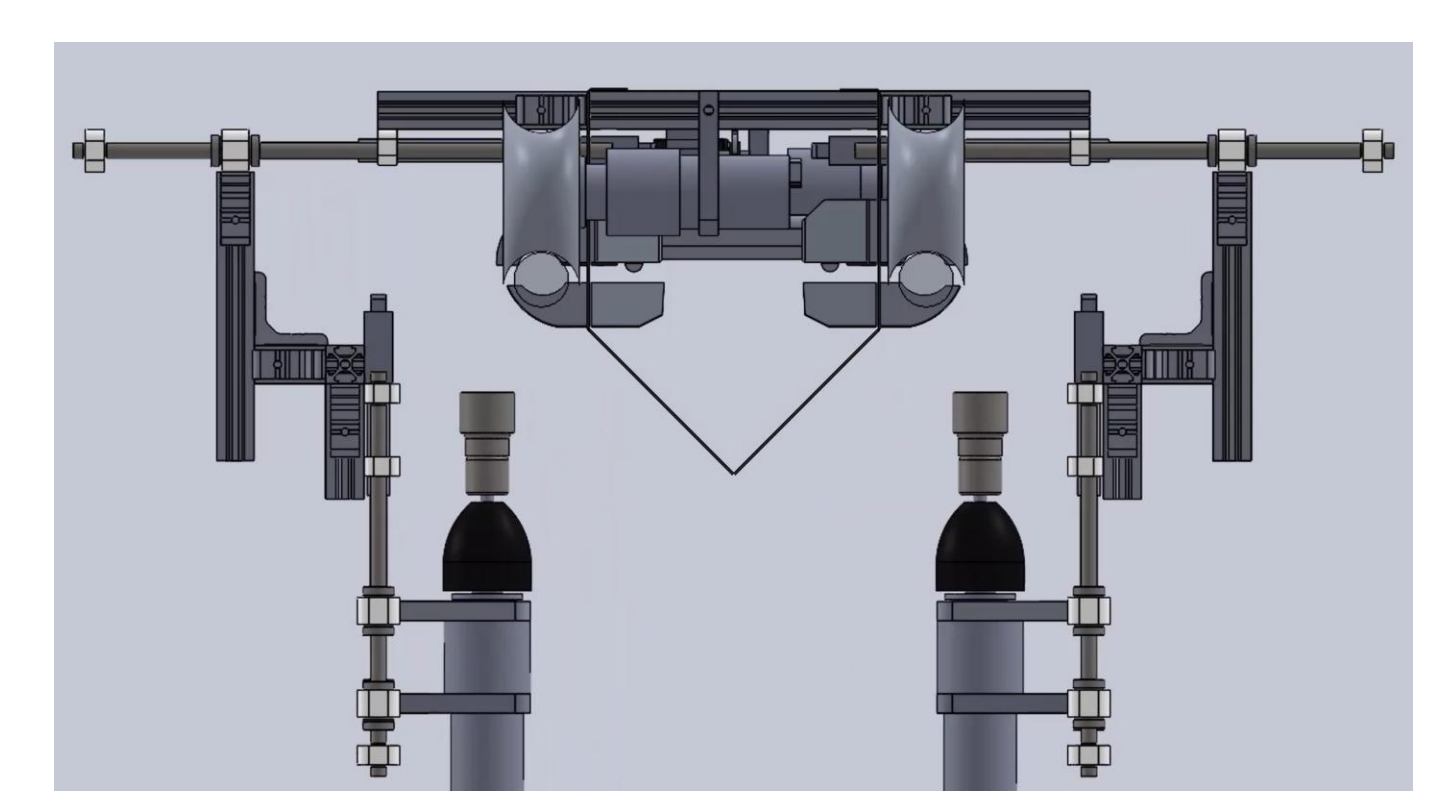
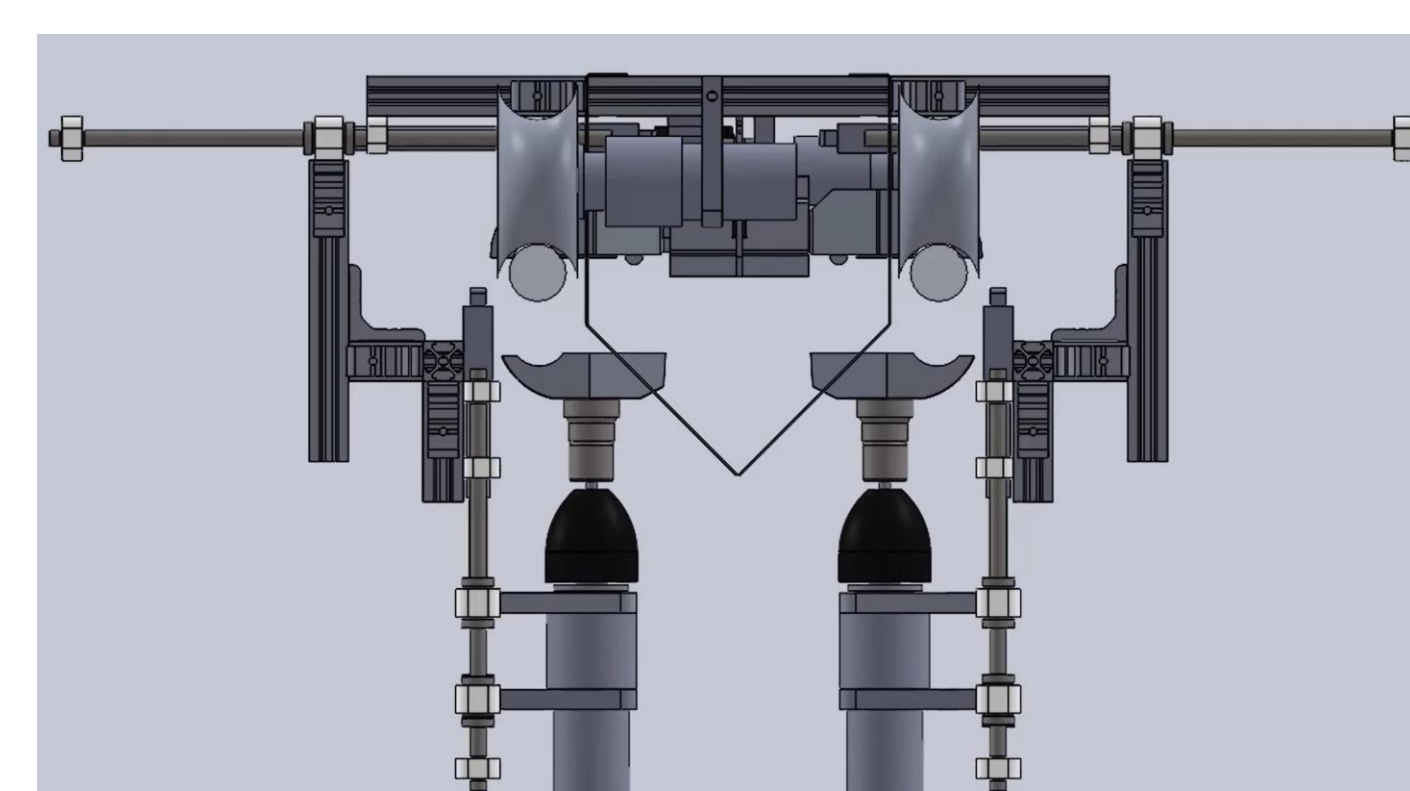
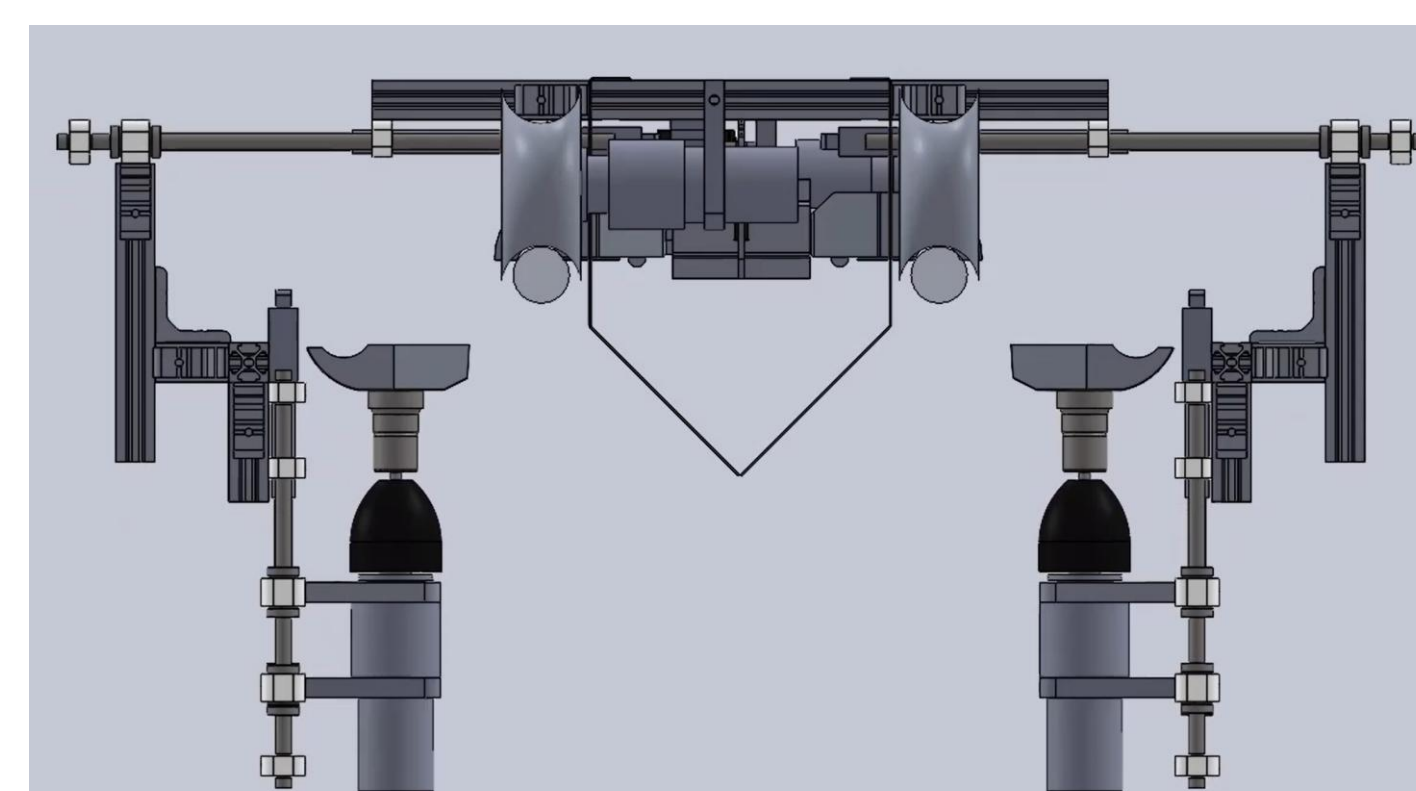
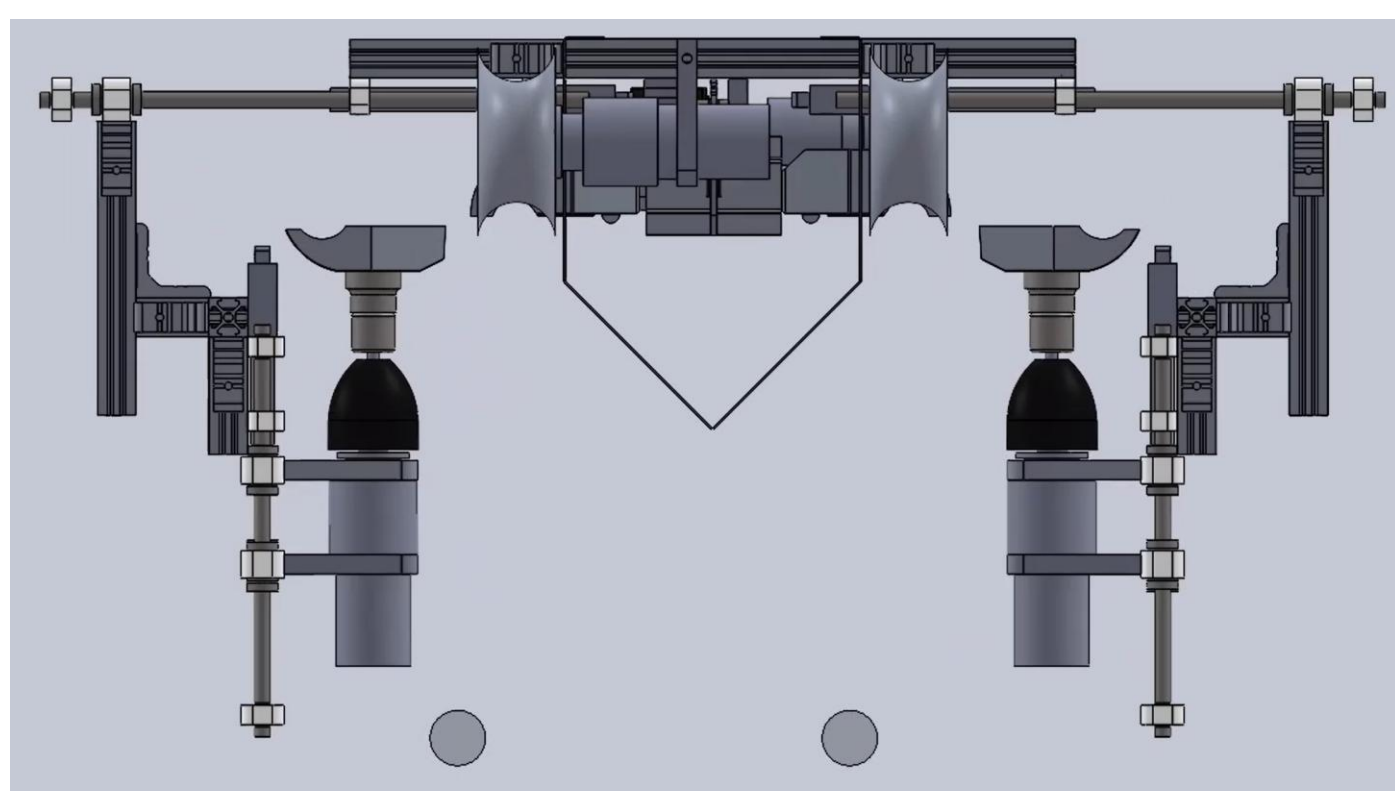
## 4. Prototype



- Drone transports the robotic module to the cables
- Robotic module attaches and moves along the line
- Remote control operation for spacer installation/uninstallation
- Drone retrieves the module after task completion

## 5. Simulation & Validation

- Computer simulations performed
- Verified feasibility of spacer installation
- Demonstrated system effectiveness



## 6. Key Advantages

- Increased safety for technicians
- Reduced operational risks
- Improved efficiency and repeatability
- Minimizes need for climbing or aerial platforms

## 7. Conclusion

- Drone-robot system provides a safe, efficient, and innovative solution
- Promising approach for modernizing power line maintenance

## Acknowledgment

