Background
Underground mines are highly dangerous working environments in which employees are exposed to fires, floods, explosions, falling rocks, and deadly gasses. The introduction of an autonomous inspection drone into the mining industry will save hundred of lives every year.

Objective
Design and manufacture an autonomous drone with collision resilience and video recording capability, for underground mine inspection.

Product Specifications
- Protective shock-resistant cage.
- Autonomous drone with payload capabilities.
- Connection of drone to the protective cage.
- Lights and obstacle avoidance sensors.
- Ability to add additional modular sensors.
- Rotational recording and live feed camera.

Final Joint Design
The joints use a pressure lock system combined with the elastic material of TPU to hold the carbon fiber rods together in the spherical cage.

 реализовать оставшиеся датчики на раме кабины.
- Провести тестовое полет.
- Программировать автопилот.
- Разработать процесс обратной связи в режиме реального времени для ГЛОНАСС-затруднений.

Drone Connection
The drone body is secured onto the modular ring. The drone arms were recreated as a part of the connection ring to increase the overall stability and cohesiveness of the design.

Flight Tests
There have been numerous flight tests of the drone. So far the tests have shown that the drone can lift the weight of the cage. There are a few stability issues that are stemming from the motors or the flight controller.

Future Work
- Implement remaining sensors on cage frame
- Conduct test flight
- Program autopilot
- Design live video feedback process for GPS-denied areas

REFERENCES