

# Robots: Separating Fact from Fiction & Potential Business Uses

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# ComEd/IIT Testing of Substation



# The Basics

# What is a Robot?

Most definitions do not cover the whole story...

A machine capable of carrying  
out a series of complex  
actions automatically

[oxforddictionaries.com](http://oxforddictionaries.com)



# What is a Robot?

Most definitions do not cover the whole story...

A machine that  
operates automatically  
with human-like skill

[reference.com](http://reference.com)



# What is a Robot?

Most definitions do not cover the whole story...

A machine that resembles a human and does mechanical routine tasks on command

[reference.com](http://reference.com)



# My Definition

A machine that interacts with its environment and changes its behavior based upon sensory feedback  
(external or internal)



Autonomy

# Autonomy



Teleoperated

Semi-Autonomous

Fully Autonomous





Why Use a Robot?

# When, Where, Why do we Want to Use Robots

- Dull
- Dirty
- Dangerous



Dull



# Dirty (and a little dull)



RapidView IBAK Lateral Launch Sewer Inspection Camera

Dangerous (and a little dirty)



# State of the Art



# Unmanned Aerial Vehicles “Drones”

# Unmanned Aerial Vehicles (UAVs) – Why Now?





# The Quad(Hex, Octo,...)copter



# Research Platforms



# Lily – Consumer Platform



# DJI – Professional Platform



# Major Issues

- Battery life vs payload

# HyTAQ – Research Platform

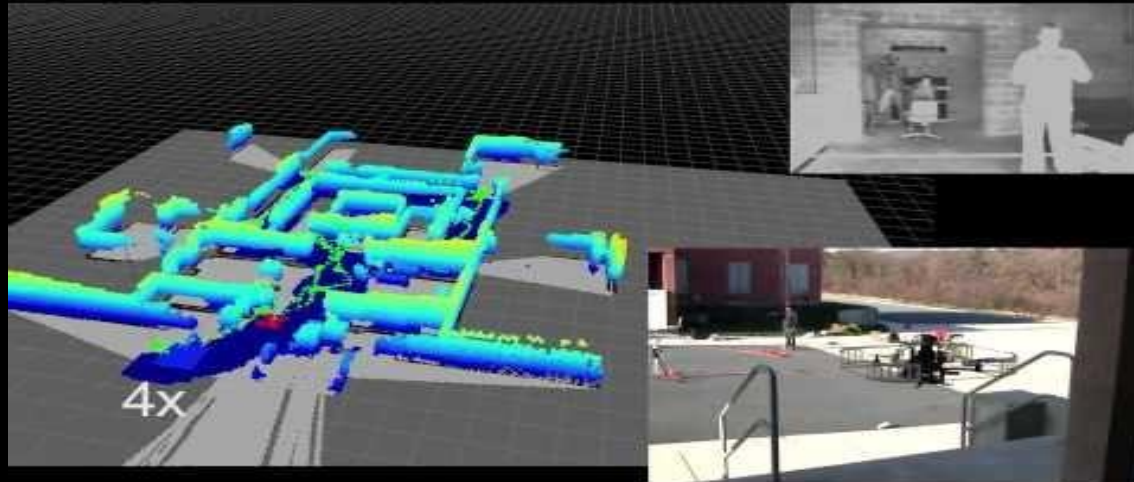


# Benefits to Real Estate

What currently is dull, dirty, and dangerous?

What would you love to do, but it's too dull, dirty, or dangerous?

# Some Ideas – Mapping



- New construction - previously inaccessible views
- Replace tripod and laser mapping done by architect
- Supplement map as use changes



# Some Ideas – Travel Avatar

- Reduce site travel
- Perform seat-counts
- Monitor occupancy
- Provide virtual tour

# Some Ideas - Perching

- Time-lapse video



# Regulatory Hurdles

- Hobbyists can legally fly
- Flying a UAV outside as a representative of a company is illegal!
  - Non-public Certificate of Authorization (COA) for Section 333 Exemptions by FAA
  - Licensed UAV
  - Licensed pilot
    - Sport recreational pilot license (ComEd)
    - Case-by-case basis
  - Visual line of sight only
  - 400 ft ceiling
  - Daytime only
  - 2 months – 1 year (typically < 4 months)

# Why Regulatory Hurdles?



# Again...

- What currently is dull, dirty, and dangerous?
- What would you love to do, but it's too dull, dirty, or dangerous?