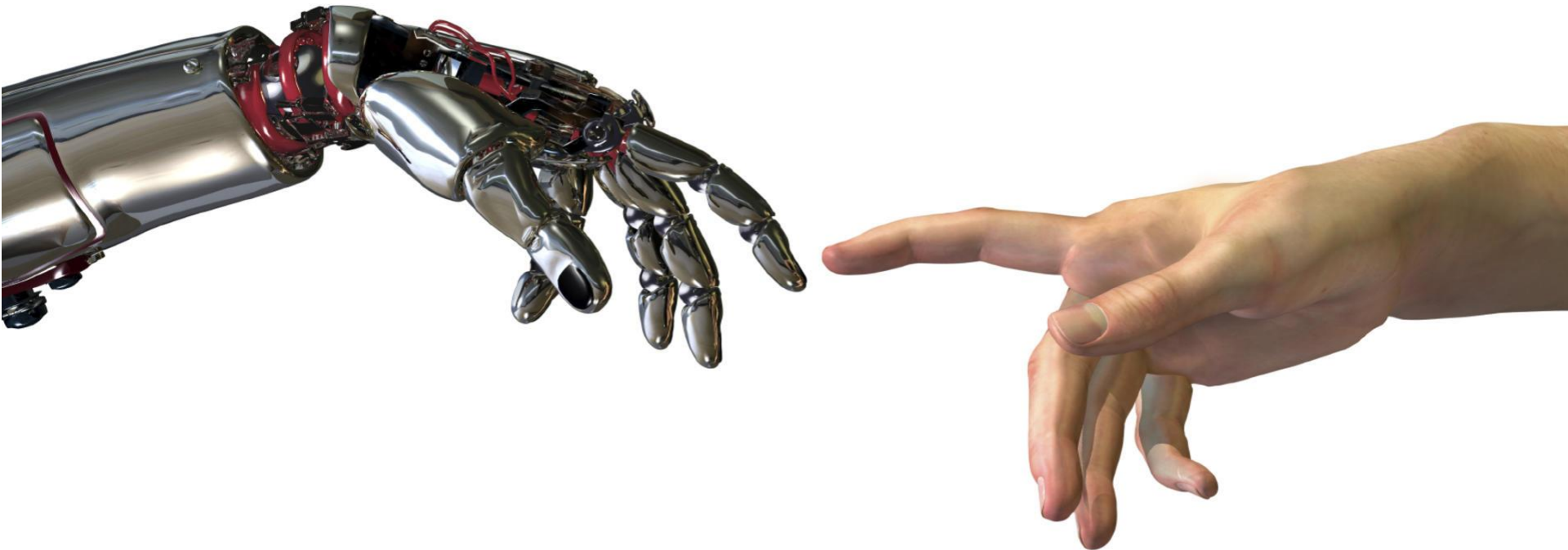


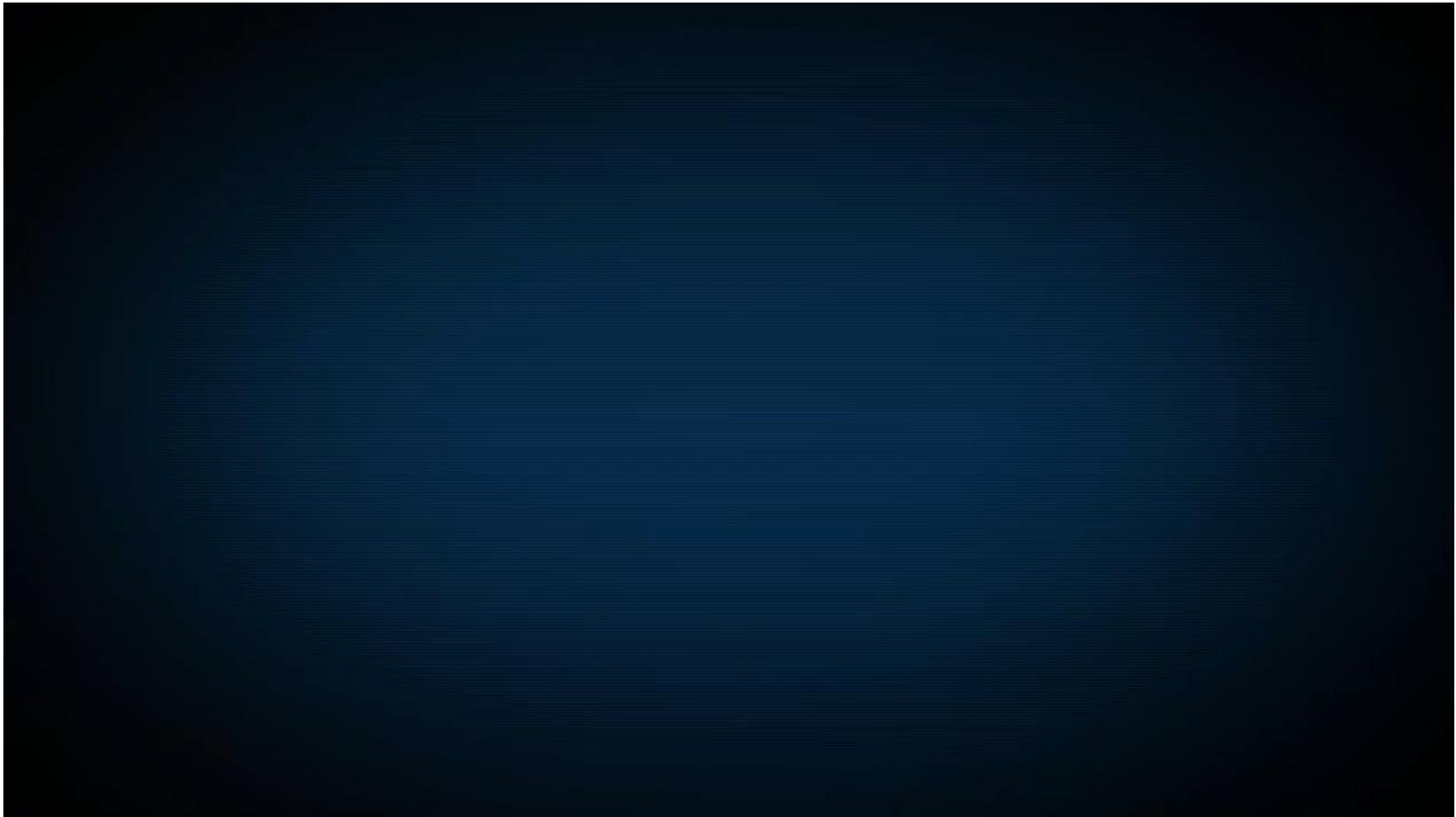


# Explosive Ordnance Disposal (EOD) Robots



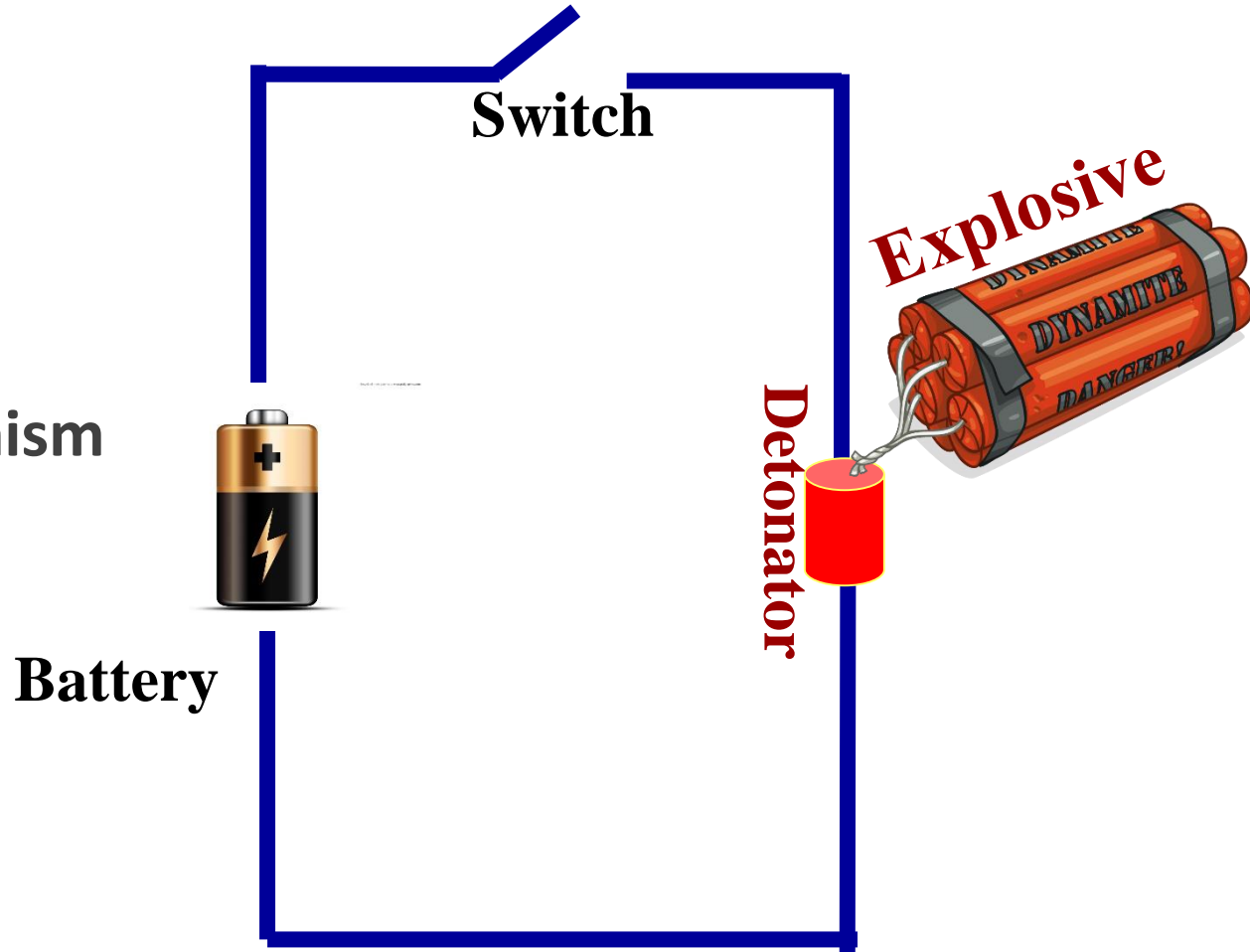


# Recall: Improvised Explosive Devices



# Components of an IED

- Explosive
- Detonator
- Power Source (Battery)
- Initiation Mechanism (Switch)





# Initiation Mechanism

- Types

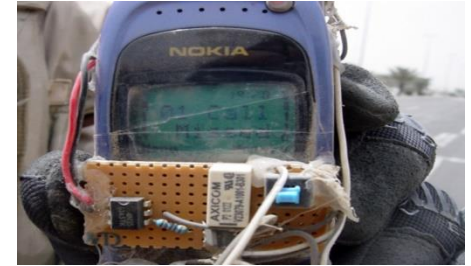
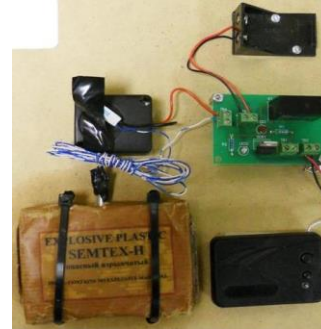
- Anti-handling
- Delay
- Ambient
- Command

- Temperature
- Temperature Timer
- Shock
- Smoke/Gas
- Motion
- Motion Timer
- Sound
- Contact
- Contact Wires
- Proximity
- Cell phone
- Humidity
- Piezoelectric
- Infrared
- Infrared
- Expanding material



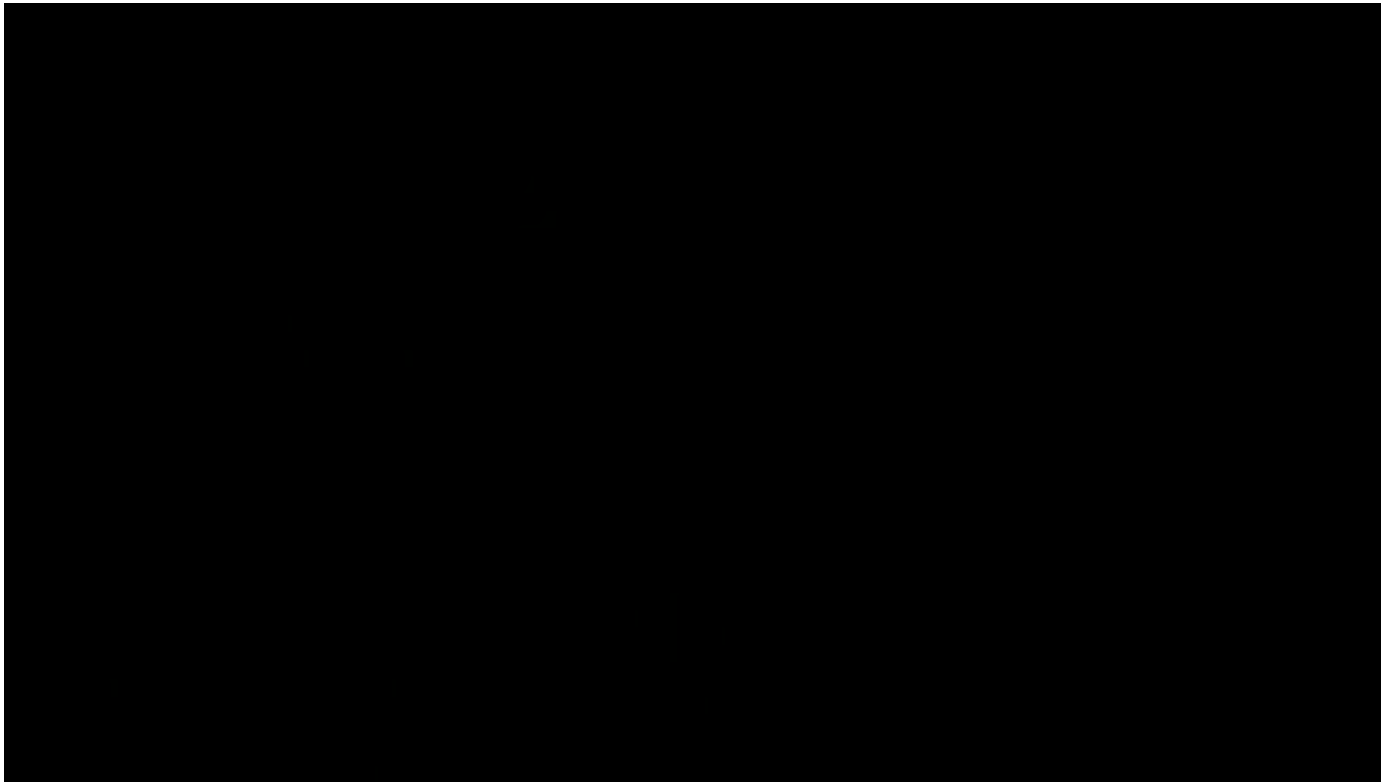
## Typical IED Configurations

- There aren't any



# History of Bomb Disposal Robots

- The father of bomb disposal robots
  - Peter Miller (1972)





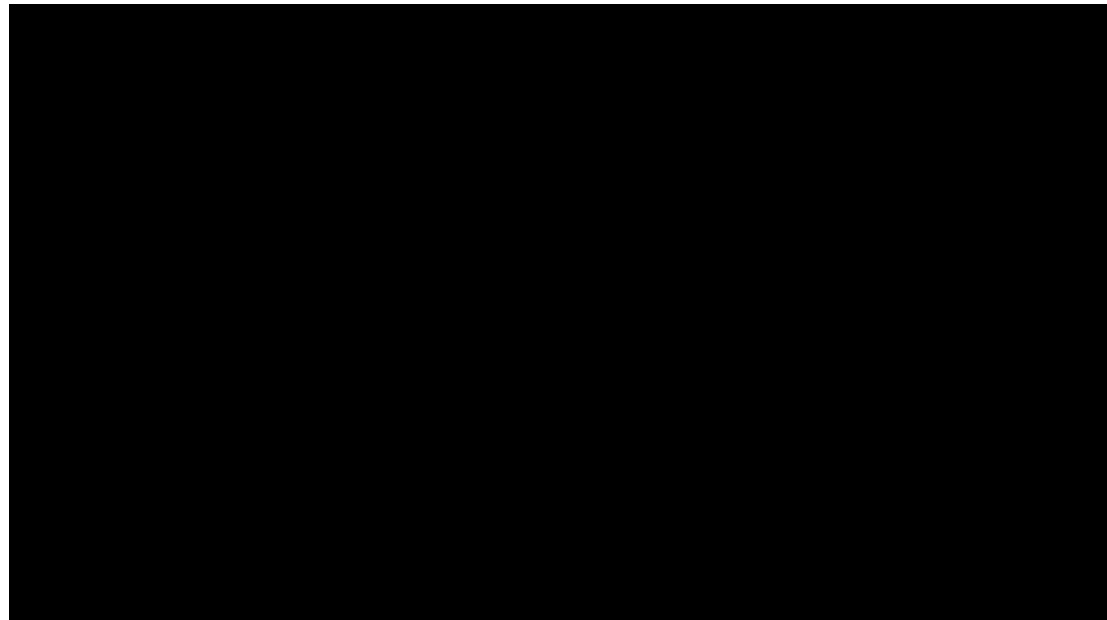
# Today's typical EOD Robot

- Northrop Grumman's Remotec ANDROS F6 robot



## Basic bomb squad activities

- Identify threat
- Examine threat
- Plan mitigation
- Carry out mitigation





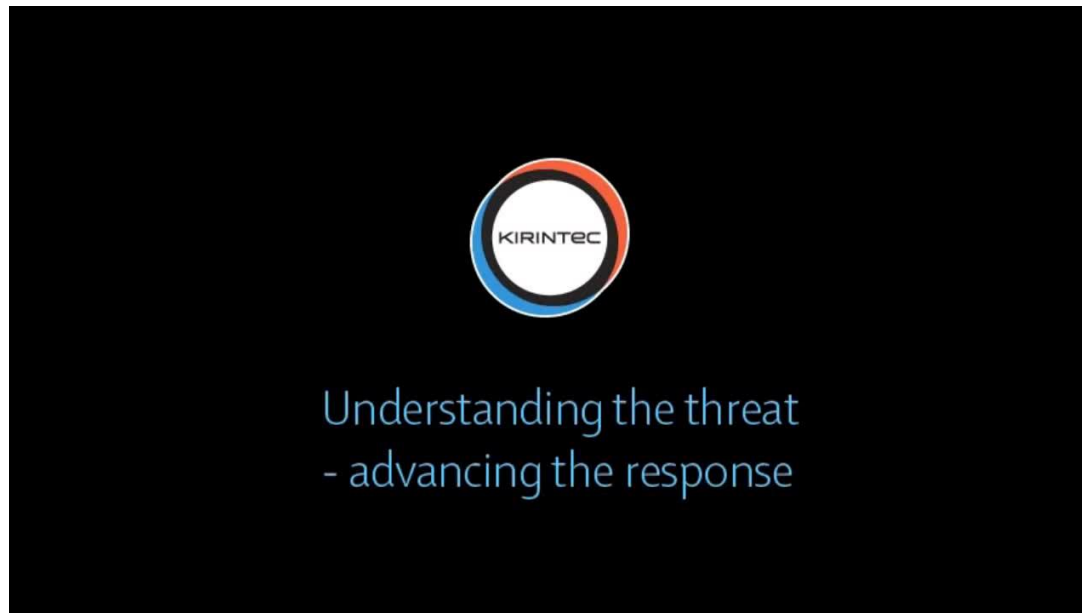
# What to look for in Identifying the Threat

- Saw dust, Brick dust, Wood chips
- Recently disturbed ground
- Greasy Paper Wrappings
- Objects and items out of place
- Tin foil
- window/door/drawers ajar
- Fresh plaster/Cement
- Loose Electric Fittings
- Fish-line, dirty ropes, electric wire
- Cut vegetation
- Military containers
- Concentrated foot prints
- Scratched or new paint



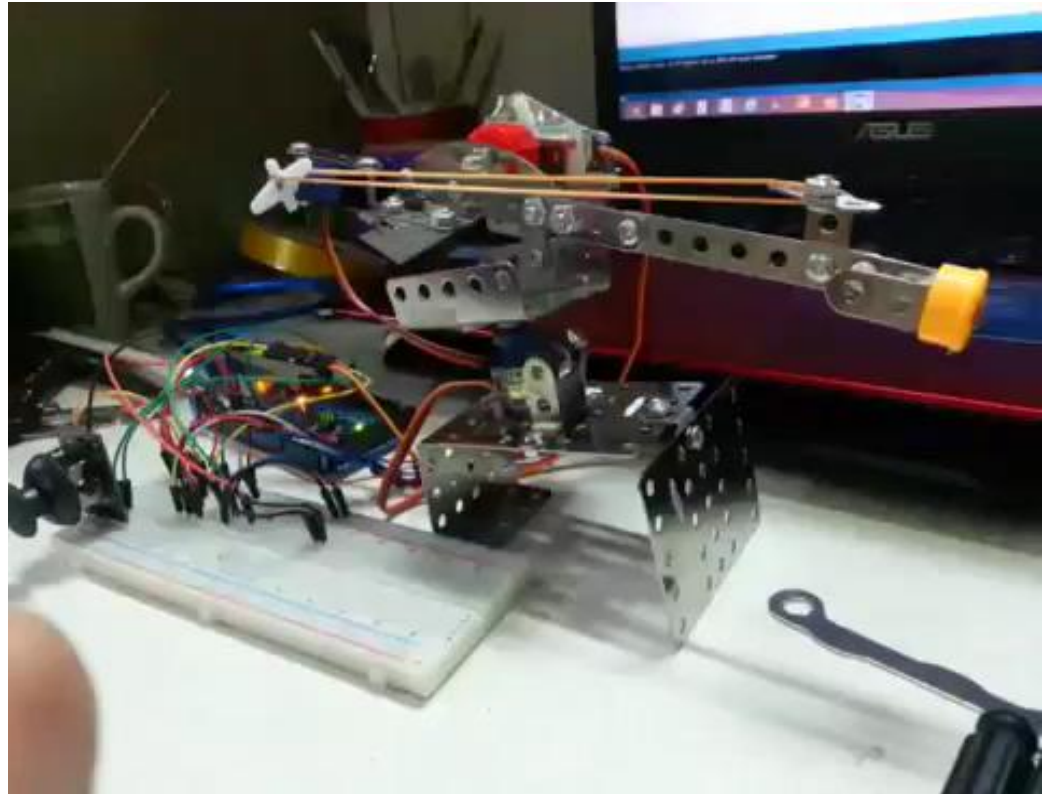
## Projected Water Disruptors

- Utilise a water projectile shaped charge to destroy IEDs by “disrupting” non-explosive components.
- Come in many formats with application decided by the bomb disposal technician.
  - Pigstick, cutter, breaker, etc.



## Making a disruptor

- Elastic band takes the place of a water jet and charge.
- Arduino-controlled



## Final Exercise Preview

- There exists a building surrounded by IEDs
- The building has a single point of access that may be blocked and booby trapped with IEDs
- Inside the building is a container of plutonium dioxide
- Mission:
  - Find and neutralize IEDs blocking access
  - Sketch/map interior of building
  - Find plutonium dioxide and sketch its configuration

