

Global
Material
Security



Applications of Emerging Technologies in
Transport Security of Radioactive Material
Regional Series for Transport Security in the Caribbean,
Central America, and Mexico

Office of Global Material Security

U.S. Department of Energy
National Nuclear Security
Administration



Presentation Overview



- Transport security
- Emerging technologies in nuclear security
- Drone uses and threats in transport security
- Looking ahead

Introduction—What is Transport Security?



- Transport security is protection of nuclear and radioactive material while in transit
- Crucial aspect to ensure material properly arrives to destination
- Radioactive material is most vulnerable when mobile

Introduction—What is Emerging Technology?



- Something which can have significant impact in area of interest within short timespan
- New technology/methodology
- Improvements on previous technology/methodology



- Cyber
- Modeling, simulations
- Unmanned aerial systems (drones)

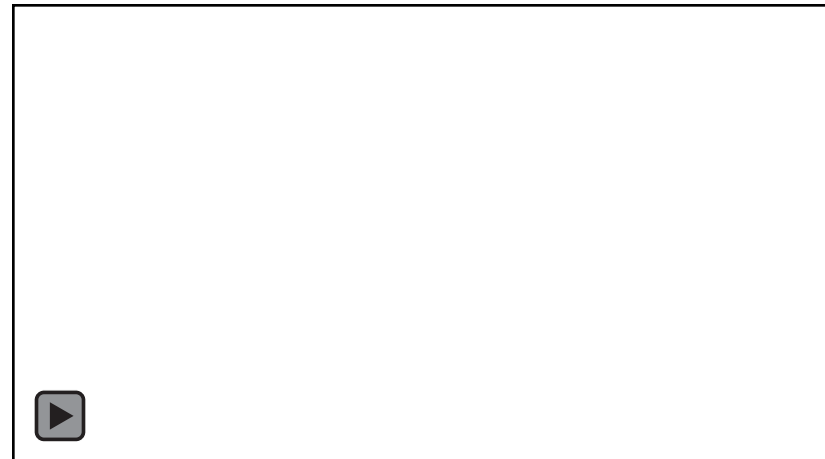
Drone Discussion



Commercial Drone Use 1



Commercial Drone Use 2



Emerging Technologies in Nuclear Security- Drones



- Small unmanned aerial systems (drones) developing more prominent roles in nuclear security
- Increased capabilities
- Increased availability



Drones in Transport Security



- Adds aerial dimension to security
- Offers additional advantages to bolster security
 - Remote monitoring
- New adversary threats during transport constantly developing
 - Drones provide additional tool for attacks

Proactive Use of Drones in Transport Security–Route Monitoring



- Wider view of surrounding area
 - Check for suspicious activity along or around route
- Provide visual communication for material location



Proactive Use of Drones in Transport Security–Material Inspections



- Constant view of material while in transit
 - Can also provide constant view of escort vehicles
- Adds security during breaks or emergency stops

Drone Threats in Transport Security— Surveillance



- Drones can be used by adversaries to follow route during transport
 - Can use this info to time ambush on shipment
 - Use info to monitor accompanying vehicles, personnel
- Can look for patterns during repeat transports from site

Drone Threats in Transport Security-Payloads



- Attach small explosive devices to drones to disable vehicles
- Cause distraction, disrupt operations
 - Give adversaries window of opportunity to approach on foot
- Direct collision with vehicles

Drone Threats in Transport Security— Material Retrieval



- Drones can be used to quickly retrieve material during security incident during transport
 - Ground forces obtain material and remotely use drone to quickly move material away from scene



Drone Threats in Transport Security-Swarming



- Unleash multiple drones in coordinated attack to meet objective
- Autonomously share information
- Drones may play different roles in swarm attack



- Optimize drone use during transport
 - Quantity of drones used
 - Battery life consideration while in operation
- Develop new methods for drone use in transport security
 - Communication improvement
 - Counter adversary drones



- Drone mitigation
 - Develop protocols early to prevent significant adversary impact
 - Assess and neutralize potential adversary drones





Questions?

