Design Considerations for Lethality Packages on Unmanned Ground Vehicle Platforms:

(Making a Killer Robot)

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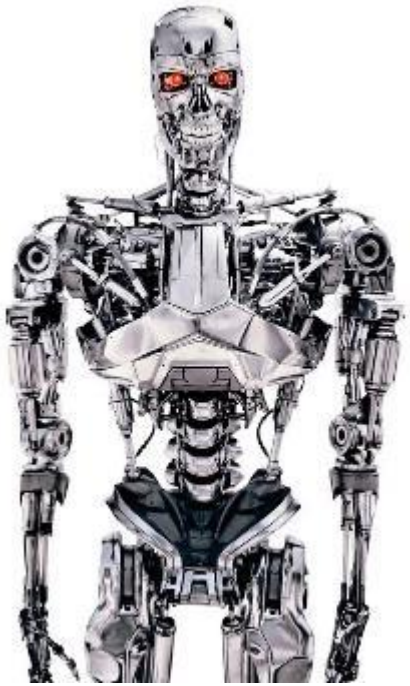
What is a killer robot?

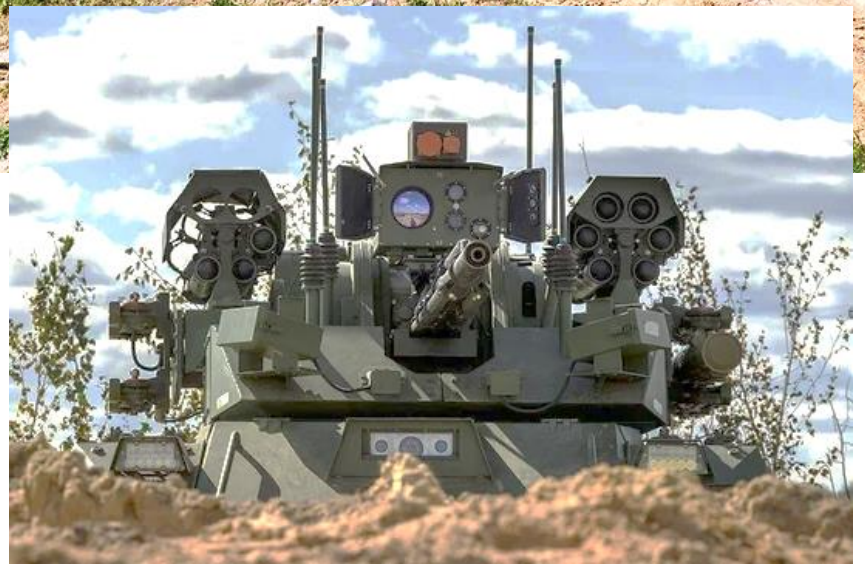


What kind of killer robot?

- **<u>NOT OUR FOCUS</u>**:
  - Employed within view of the operator
  - Wire Controlled
  - Dumb
  - Explosive
  - Flying
  - Swimming
  - Kills Autonomously

What kind of killer robot?

- Propose to Discuss:
  - Ground based
  - Semi- or fully-autonomous
  - Carrying a lethality package
  - Includes sensor package for the lethality solution
  - Provides data to the lethality package
  - Employed as either wingman or semi-independent



Focus Today is on the Lethality Package

What makes a good lethality package for an armed robot?

- Precise
- Lethal
- Smart
- Sustainable
- Modular
- Physical Properties
- Safe
- Secure
- Reliable

Precise

Negate adversary advantages

- Shoot first, hit first, kill first
- Sensor suite is key
  - LRF Accuracy
  - Day/Night

Logistic benefits

- Fewer rounds per engagement
- More stowed kills
- Extend mission profile

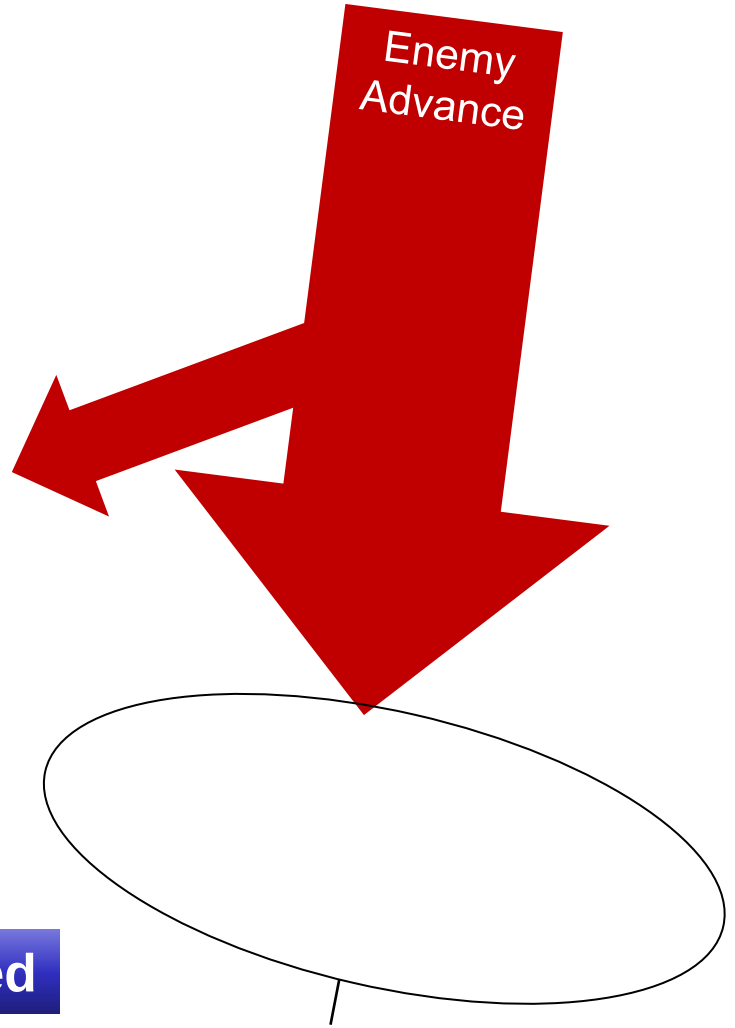
Lethal

Force the Adversary to React

- Cannot bypass
- Cannot allow in rear areas
- Expendable vs. Attritable

Broad Spectrum Lethality

UGV w/30mm & Javelins



Too Deadly to be Ignored

Smart

Aided Target Recognition

- Speed Engagements
- Reduce Fratricide

Sector Scan / Pixel Change

- Change Detection
- Reduce Soldier Load

Location-dependent TRPs

Reliable

High Mean Time Between Failure

- Both weapon & mobility platform
- Built-in-Tests & self-diagnosis
- Chain gun consistency

Cyber hardened

- Communication link
- Internal software

Resilient

- Protect/Clean its own sights
- Powered immediate action

Sustainable

Resupply

- Keep in the fight
- Magazine reload
- If not – at least 2x the number of robots

Robot to Robot

- Designed for the lethality package
- Magazine? Clip?

Modular

Adaptable to Mission Set

- Multiple weapon configurations (gun / missile)
- Stationary or mobile
- Sensor suite

Capable of Expanding to support Heavy Data & Power Load

- Advanced power and data solutions
- Next generation battery performance

Physical Properties

Weight

- Can impact trafficability

Height/CG

- Risk of tipping

Physical Configuration

- Risk of unintended impacts from main gun, side extensions

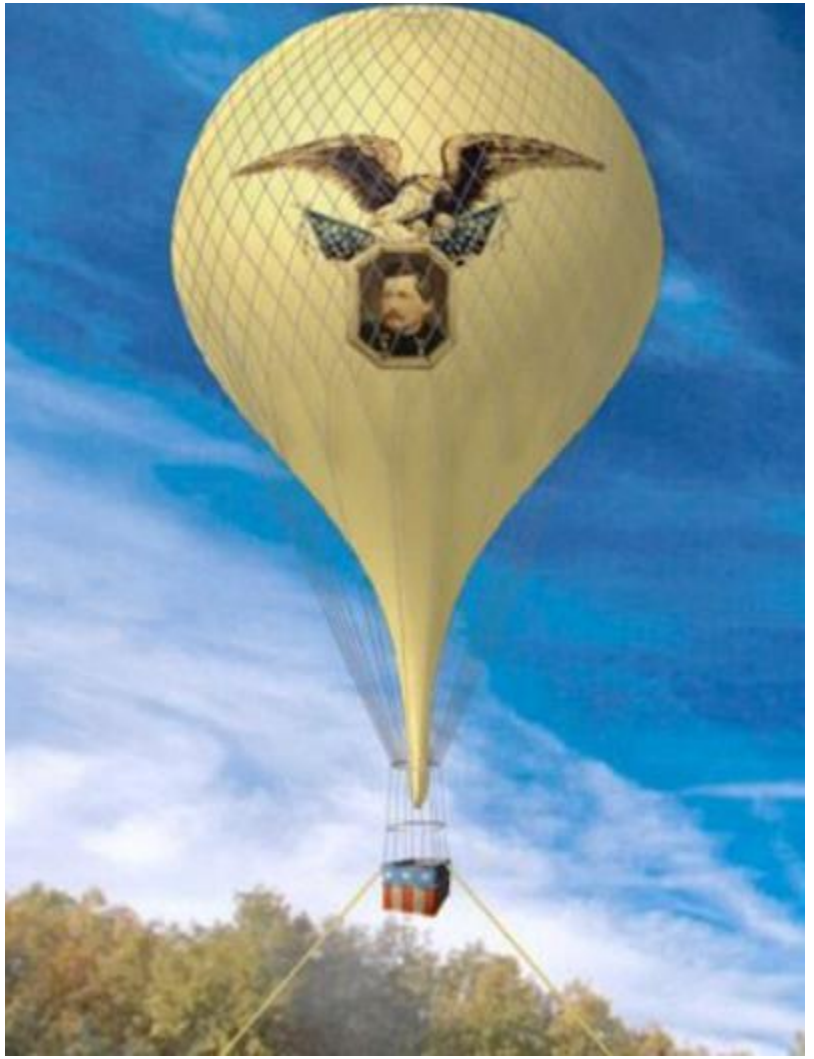
Safe

Tested, Proven

- Repetitive reliable performance
- Fielded
- Supported units have trained with this capability

Capable sensor suite

- Day/Night capable beyond max range of onboard weapons



Secure

Armored

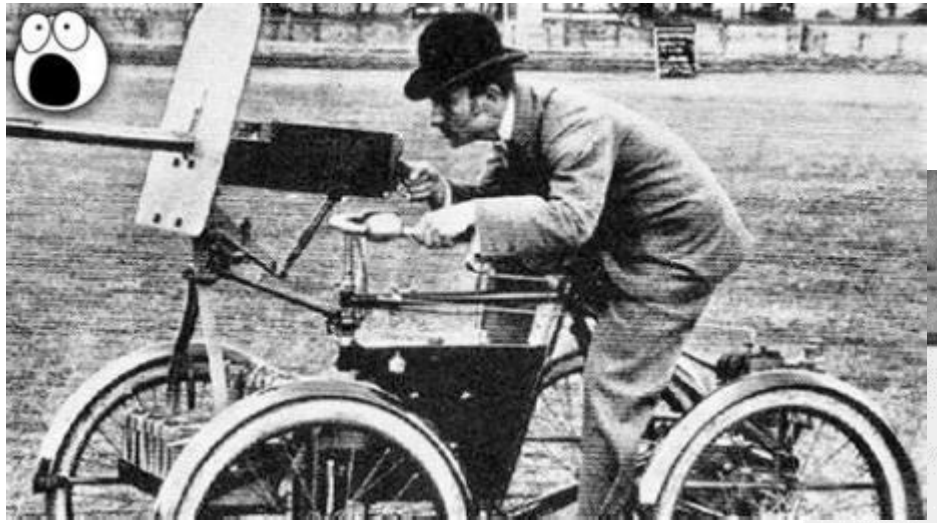
- At least STANAG Level 2

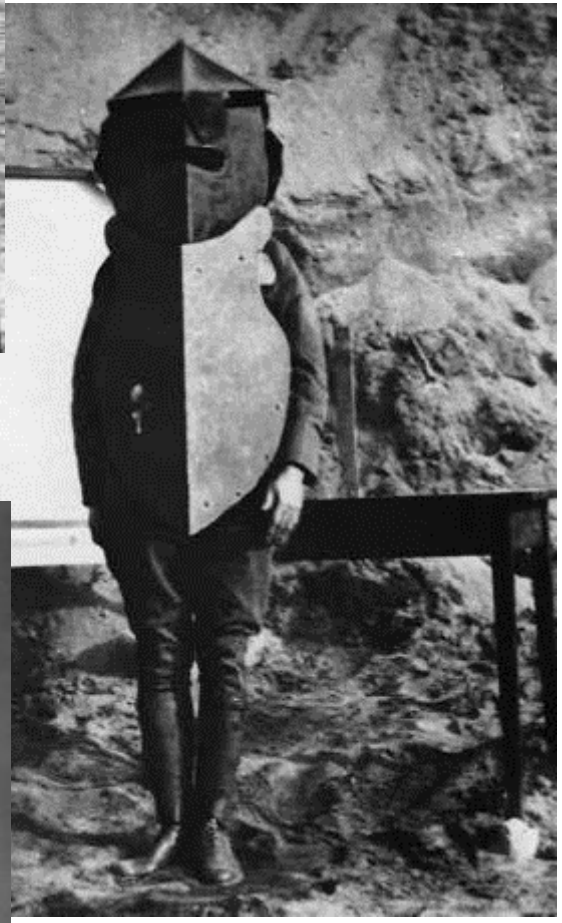
Resistant to tampering

- Weapons cannot be turned on supported units
- Difficult to re-purpose

Close In Non-Lethal

- 360° view and defend
- Taser?





Conclusion

What we put on top of a robot is, at least, as important as the platform itself.

Questions?

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