

**CCW Informal Meeting of Experts on
Lethal Autonomous Weapon Systems (LAWS)
Geneva 13-17 April 2015**

Technical Issues

***Military rationale for autonomous functions
in weapons systems (AWS)***

Colonel (ret.) Wolfgang Richter
German Institute for International and Security Affairs
Berlin

Military rationale for autonomous functions in weapon systems

Current status

➤ **Automatic munitions**

- simple/less complex mechanic functions
- simple environment – static deployment
- humans out of the loop

➤ **Precision-guided munitions (PGM)**

- more complex functions and environment
- home in on targets or aim at location at far distances
- predefined target classes

➤ **Automatic target identification, acquisition, tracking**

- prior to weapon release, beyond visual range
- predefined target signatures or target locations

Military rationale for autonomous functions in weapon systems

Current status

➤ **Highly automated/autonomous systems**

- complex functions
- difficult but unambiguous environment
- high time pressure: humans on the loop
- air/missile defense – counter-artillery

➤ **Loitering munitions**

- highly complex functions
- environment varies due to situational context
- search & destroy specific targets or target classes in wider area
- humans on the loop (potential: out of the loop)

Military rationale for autonomous functions in weapon systems

Military Utility

- Improving survivability under time pressure
- Coping with complex tasks under threat
- Reducing risks for own personnel
- Optimizing reconnaissance-impact-network
- Sustaining monitoring-strike operations
- Shortening reconnaissance-strike gap
- Improving penetration capability
- Optimizing technical system control

Military rationale for autonomous functions in weapon systems

Command and Control

➤ **Command and control hierarchy:**

- **strategic level**
- **operative level**

net-centric operations

No stand-alone role
of AWS in
conventional warfare

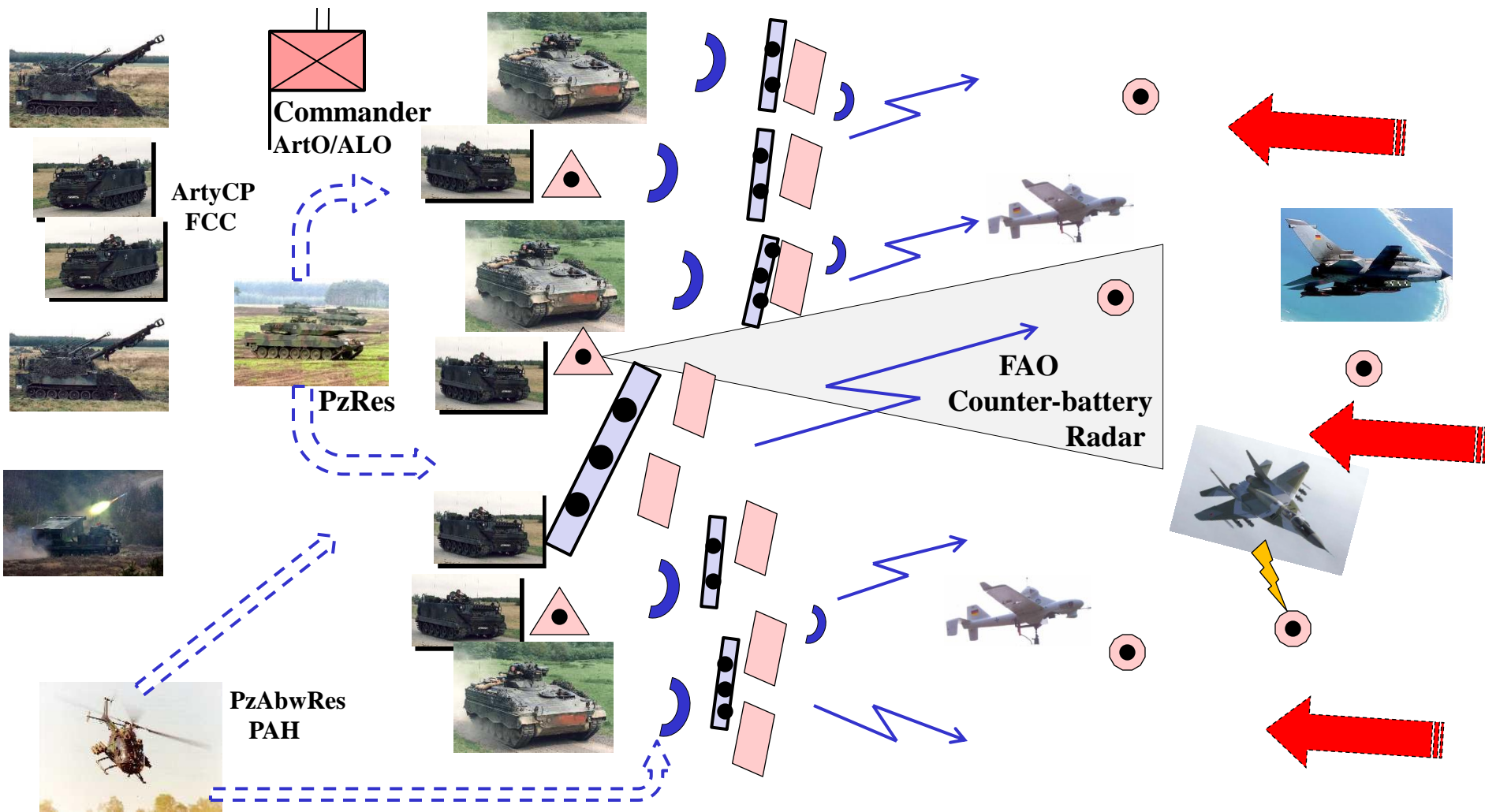
- **tactical level**
combined arms battle
- **combat team level**

**Integration
of AWS at
tactical / combat level**

Commanders design concept of operation and control its execution

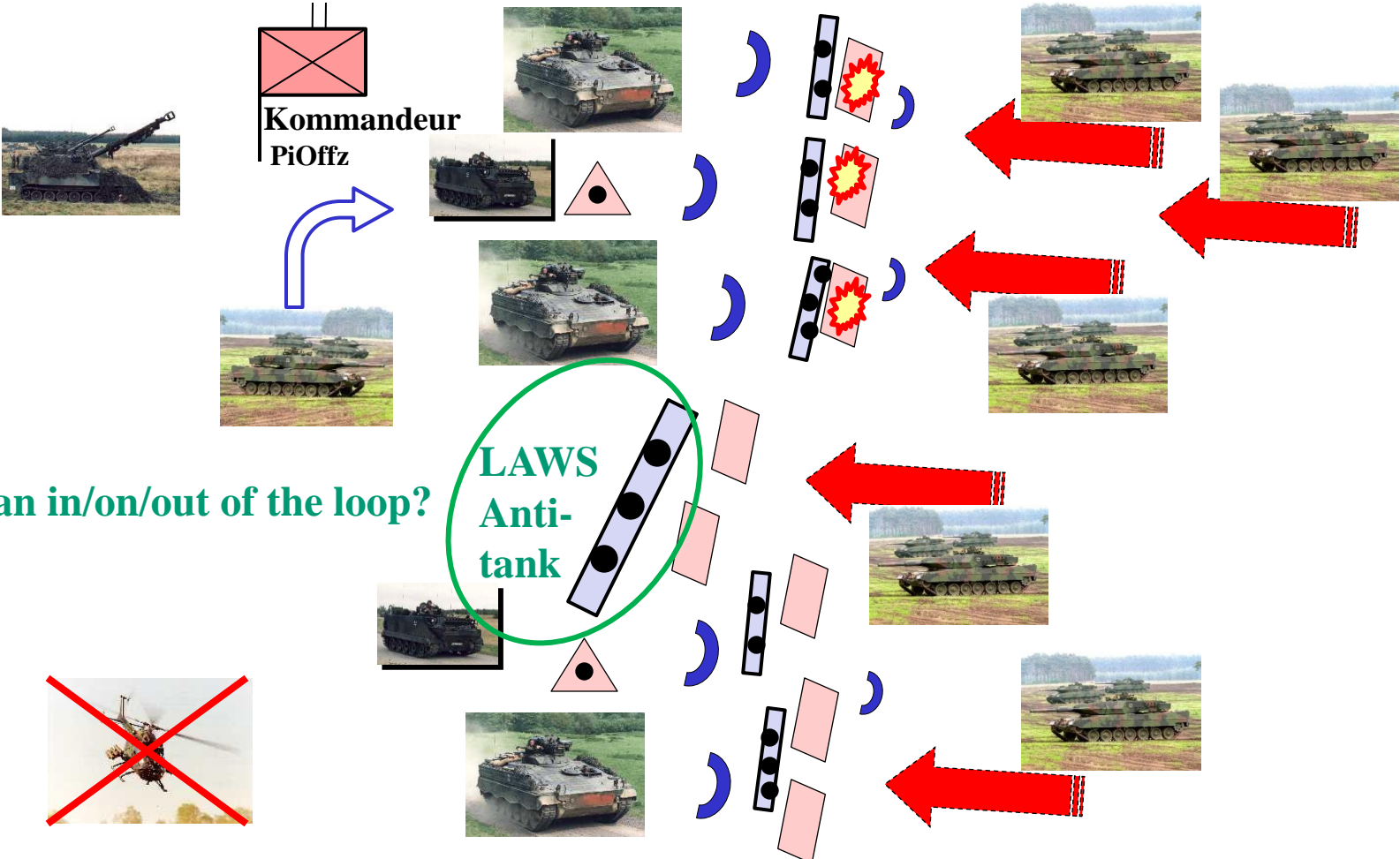
Military rationale for autonomous functions in weapon systems

Combined arms battle



Military rationale for autonomous functions in weapon systems

Denial of access to key terrain



Man in/on/out of the loop?

Military rationale for autonomous functions in weapon systems

Limitations

- AWS are no “wonder weapons”
 - Utility in combined arms operations
 - No elimination of political, military and individual risks of war
-
- Qualitative improvement of force capabilities globally
 - Parallel developments and counter-measures
might offset gains
 - **Resilience problem**
 - **Reliability and predictability are crucial**

Military rationale for autonomous functions in weapon systems

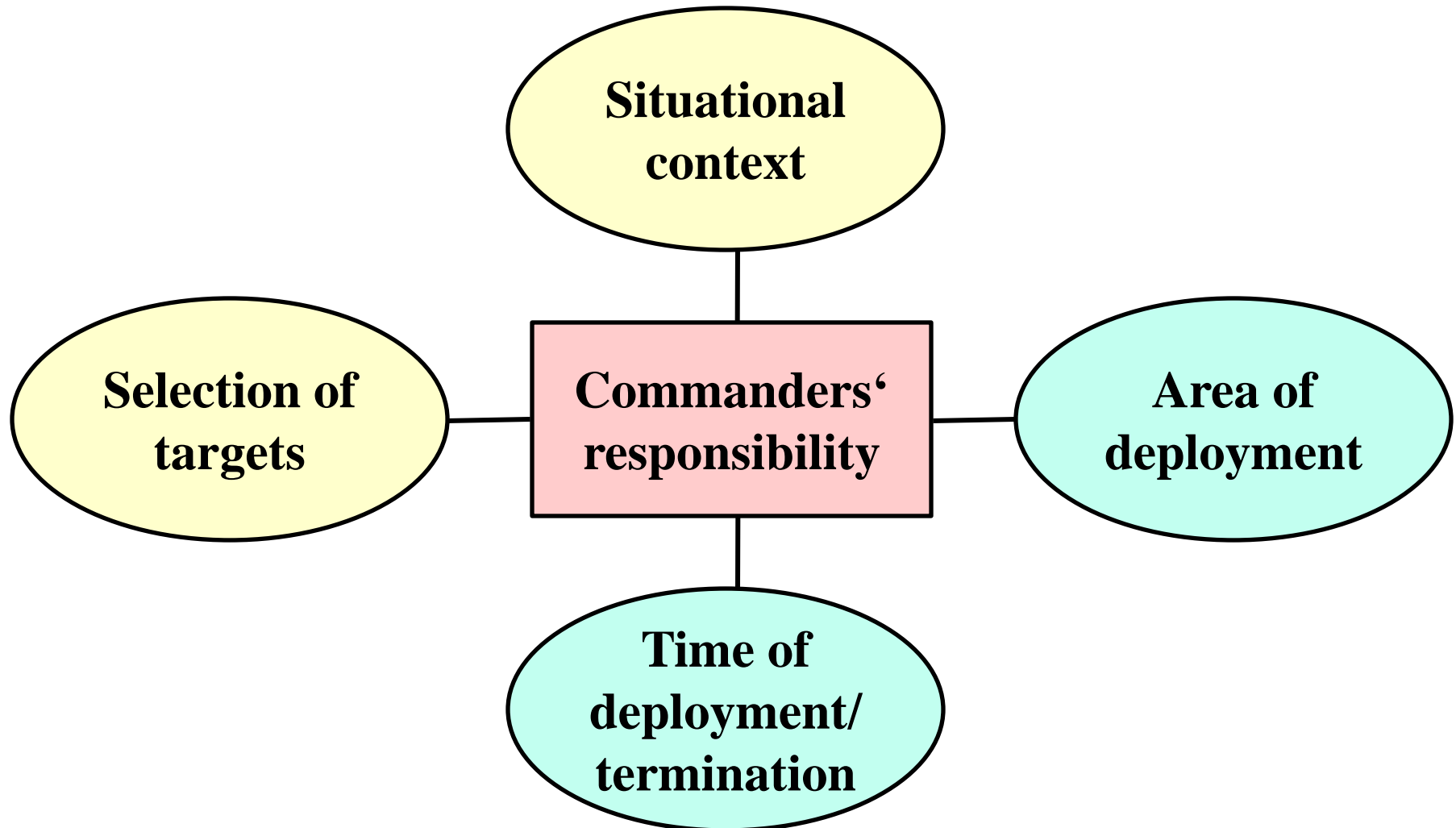
Technical Control

| | | | |
|---|---------------|---|----------------|
| Tech functions of AWS | <i>simple</i> | → | <i>complex</i> |
| Mobility of AWS/ range of impact | <i>low</i> | → | <i>high</i> |
| Space of deployment | <i>narrow</i> | → | <i>wide</i> |
| Time of deployment | <i>short</i> | → | <i>long</i> |
| Environment | <i>simple</i> | → | <i>complex</i> |

Human out of the loop → on the loop → in the loop

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Tactical Control



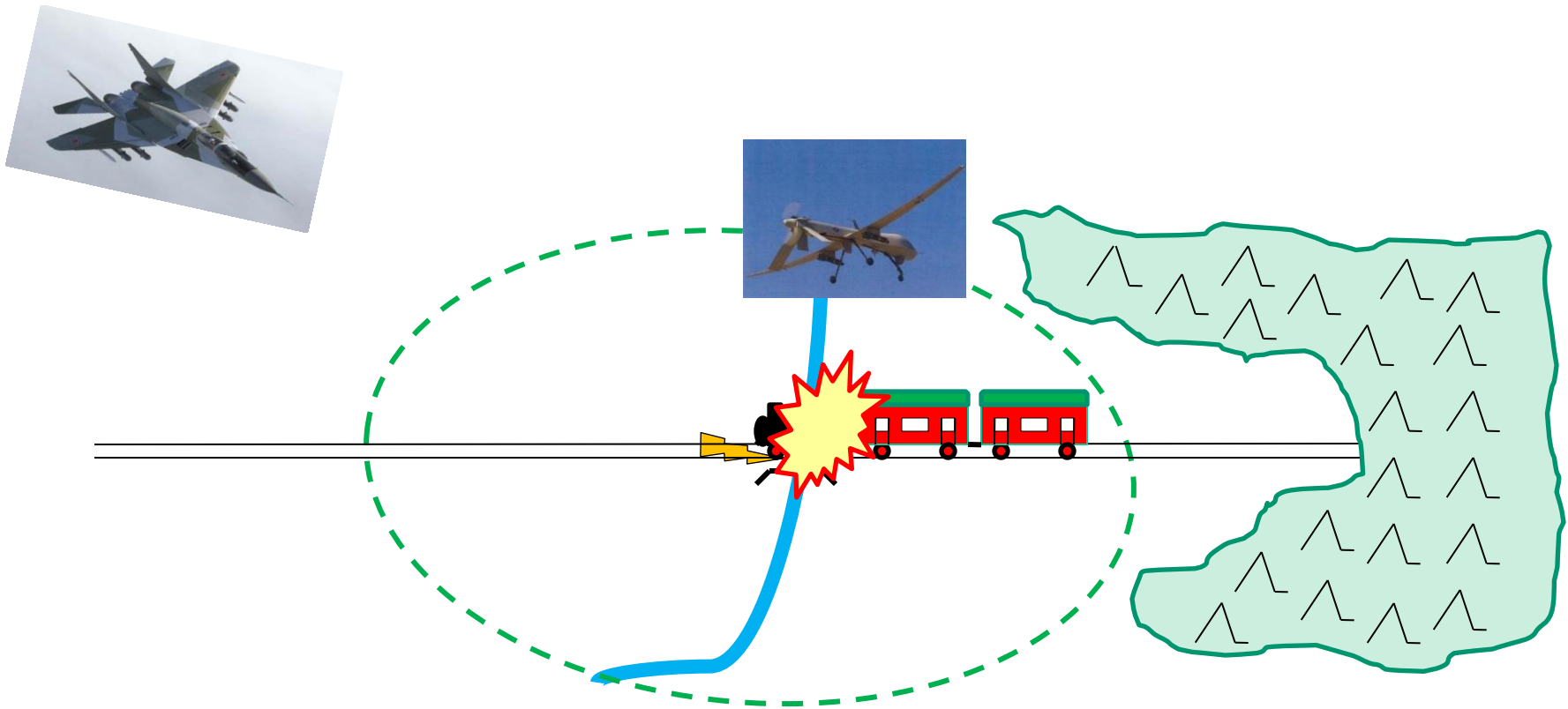
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Humanitarian concerns and constraints

- High precision / quick response times of strikes
- Higher survivability of own forces
- Less collateral damage

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Stand-off weapons versus loitering munitions



Military rationale for autonomous functions in weapon systems

Humanitarian concerns and constraints

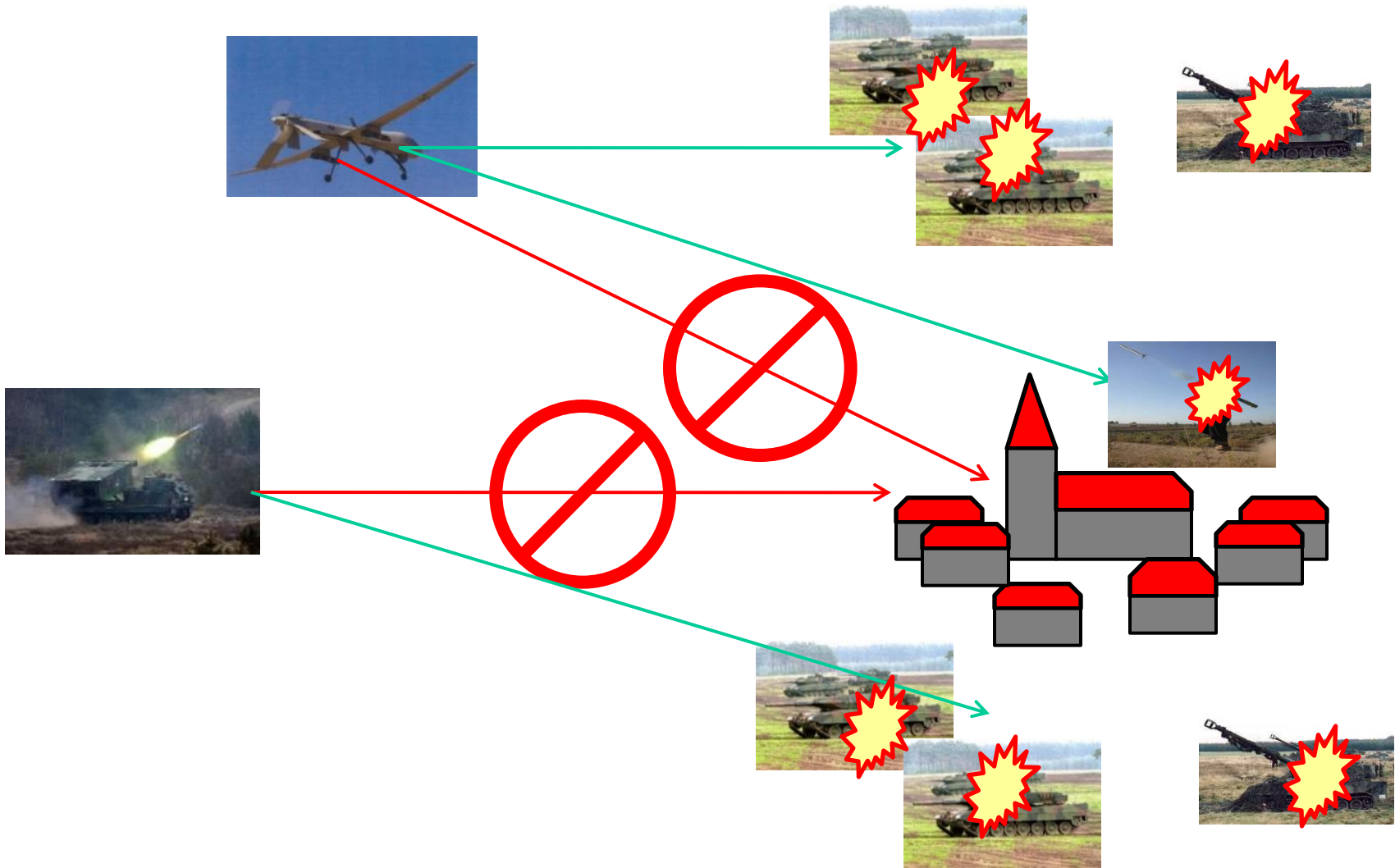
- High precision / quick response times of strikes
- Higher survivability of own forces
- Less collateral damage

- Long-range fire replacing close combat functions
- Targeting of military hardware predominant
- *Human emotions less relevant*

- Basic requirements for compliance with IHL:
- *Reliable intelligence and target recognition*
 - *Constraints of military operations / RoE*
 - **Distinction, proportionality, precaution**

Military rationale for autonomous functions in weapon systems

Art. 57 AP I – Precautionary measures before attack



Utility and Limitations of the Use of L/AWS in Military Operations

Constraints and Limitations

**Precautionary measures in
populated areas / asymmetric warfare**

- **Difficult distinction**
- **Risk of non-proportional damage**

- **High standards of thorough scrutiny & tight control !**
- **No automatic/autonomous targeting of
individuals or groups of persons !**

- **No military need for autonomous targeted killing**
- **Killing of suspects in gray zone of international law
is no military operation**

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Thank you for your attention

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