

The background of the slide features a tall, spiral-patterned lighthouse on the left side, illuminated from within. The lighthouse is set against a dark, moody sky. The entire scene is overlaid with a large, semi-transparent blue shape that tapers from the top right towards the bottom left, creating a dynamic geometric effect.

# Drones from a maritime risk management perspective

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# Contents

- Iranian drone types operating in the maritime
- Controlling a drone
- Drone sensors
- Drone detection
- Risk mitigation technologies
- Risk mitigation measures
- What drives risk?



MOHAJER	
Crew	2
Length/wing span	7.5m/10m
Payload	100Kg/150Kg
M speed/C speed	200Km/130km
Endurance	12 hours
Weapons can be added	



SHAHED - 136	
Crew	1
Length/wing span	3.5m/2.5m
Payload	40Kg/55Kg
M speed/C speed	185Km/100km
Endurance	40 Mins
The nose section contains the warhead (One-way attack)	

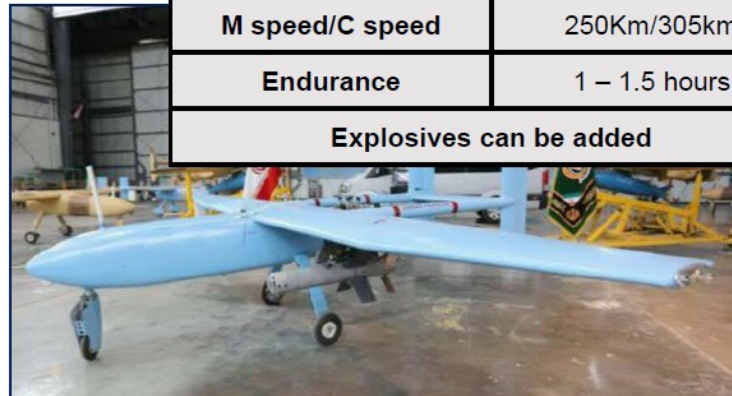


GAZZA	
Crew	2
Length/wing span	10 m/21.5m
Payload	500Kg
Cruise speed	350 km
Endurance	35 hours
13 bombs and 500 kg of electronic equipment	

KIAN	
Crew	1
Length/wing span	4.5m/4 m
Payload	40Kg
Max speed	500Km
Endurance	1.5 – 2 hours
Long range ISR + (Kamikaze)	



KAMAN 12	
Crew	1
Length/wing span	2.8m/3.25m
Payload	40Kg
M speed/C speed	250Km/305km
Endurance	1 – 1.5 hours
Explosives can be added	



KARRAR	
Crew	1
Length/wing span	4 m/2.5m
Payload	227Kg
Max speed	900 Km
Endurance	50 Mins
Can carry missiles or bombs	

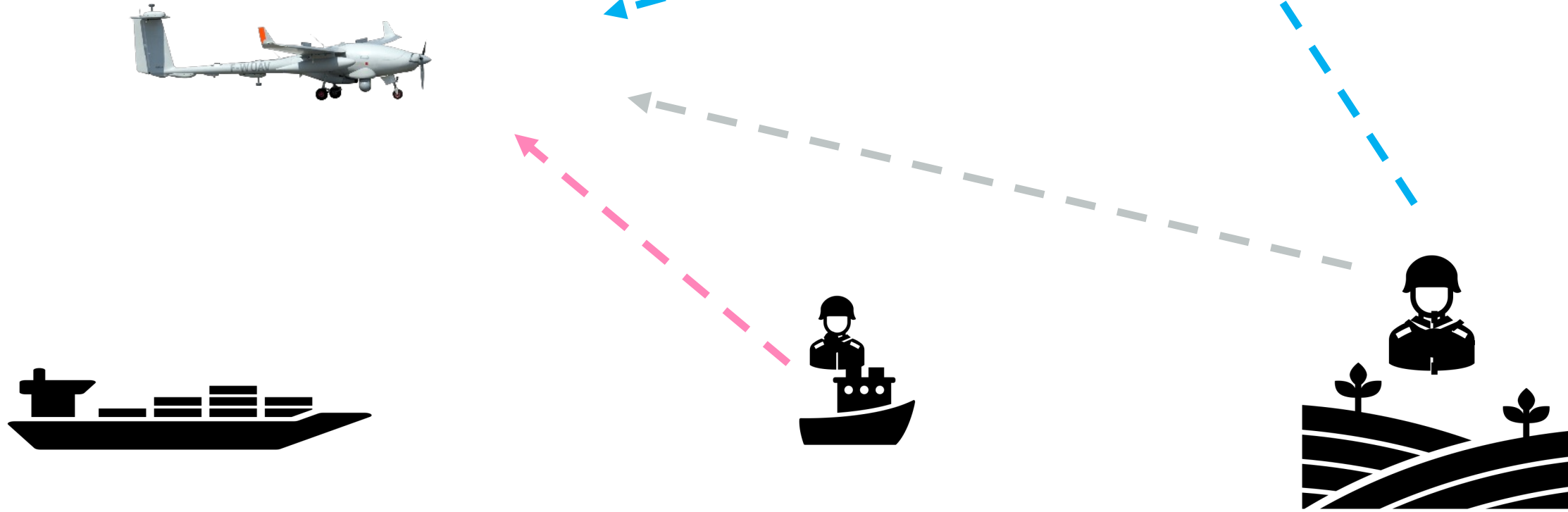


**Combined Maritime Forces**

**UNCLASSIFIED**

**Ready Together**

# Controlling a drone



# Drone sensors

- GPS
- Radar
- AIS
- Cameras
- ESM (radar “fingerprinting”)
- Avionics sensors like speed, tilt, acceleration, etc.



# Drone detection

## Method

## Challenge



Radar



Electro-optical



RF directional finders



Acoustic



Cyber Takeover



False positives & signal refraction



Requires line-of-sight



Achieving exact precision and accuracy



Noisy environments and quiet drones



Overcoming advanced drone protocols

# Risk mitigation technologies

Method | Challenge



RF Jammers



Communication/GNSS interference



Kinetic solutions



Collateral damage risk



Lasers



Accuracy affected by weather conditions



Electromagnetic Pulse (EMP)/High Power Microwave (HPM)



Significant collateral damage to electronics in area



GNSS electromagnetic



Navigational disruption

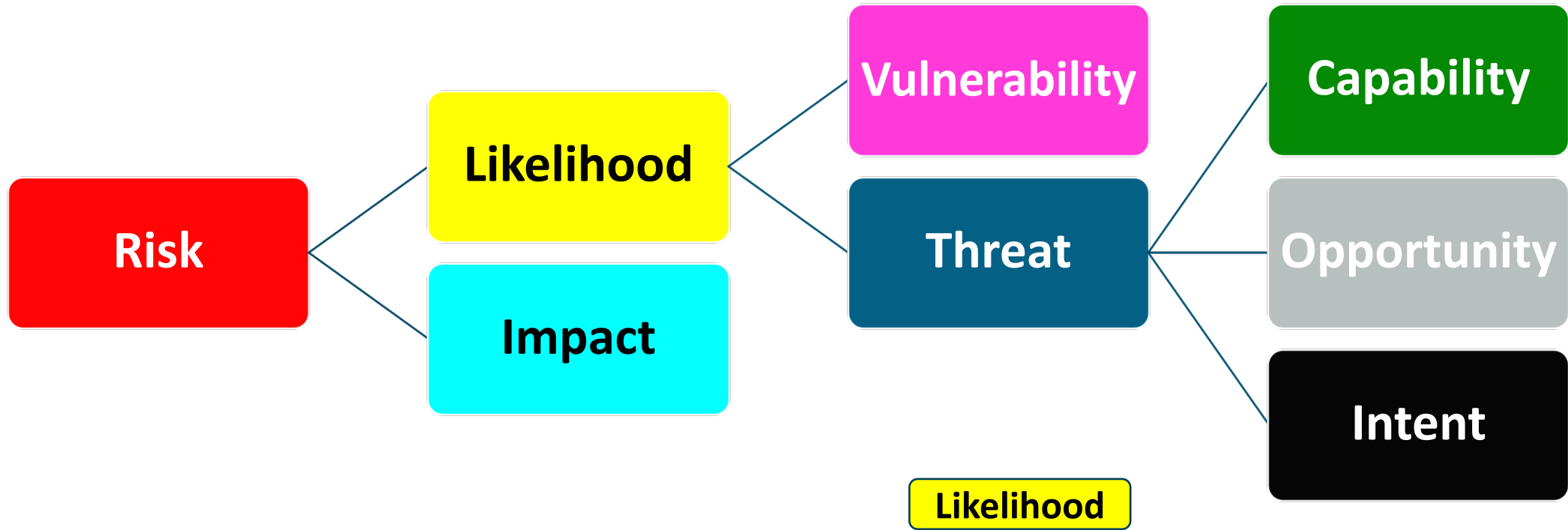


Cyber takeover



Overcoming advanced drone protocols

# Looking closer at risk as a concept



$$\text{Risk} = \text{Impact} \times \text{Vulnerability} \times (\text{Capability} \times \text{Opportunity} \times \text{Intent})$$

Threat



**Risk**

— is very much driven by —

**Intent**

**BIMCO**

- Ships with relations to US sanctions enforcement
- Ships with US interests
- Israeli citizens involved somehow e.g. through vessel ownership
- Ships loading oil from Yemen
- Other direct involvement in the Yemen conflict

# Risk mitigation measures

- BMP5
- AIS policy
- Darkening ship
- Report to UK MTO
- Maintain situational awareness
- Consider routeing
- Increase ship resilience
- Physical barriers – fencing
- Drill, drill, drill
- P&I, Flag States, mil. authorities
- [www.maritimeglobalsecurity.org](http://www.maritimeglobalsecurity.org)

