



UAV INDUSTRIES
EDUCATE.OPERATE.INTEGRATE

Risk Analysis

Braam Botha



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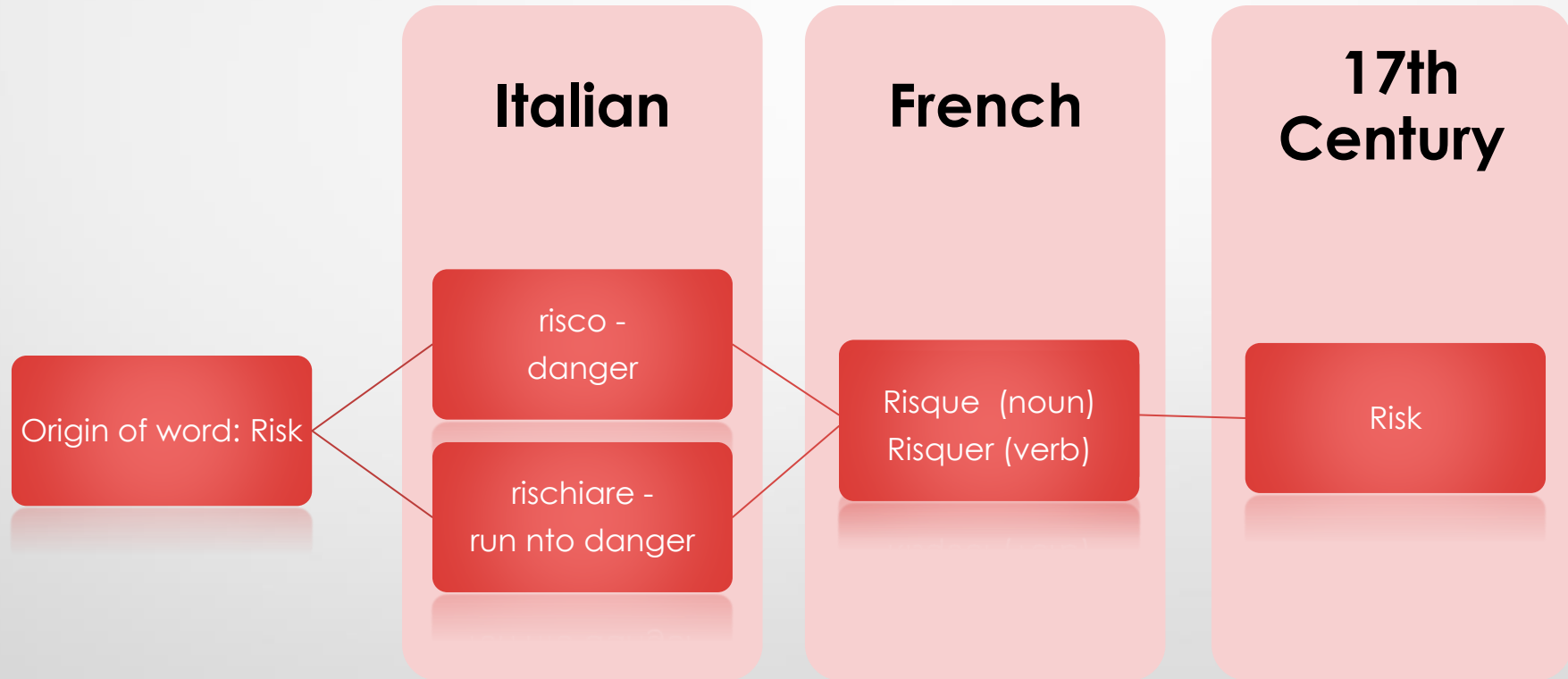
UAV Industries

- Educate
- Operate
- Integrate

Origin of the word Risk

Risk

Origin of the word Risk



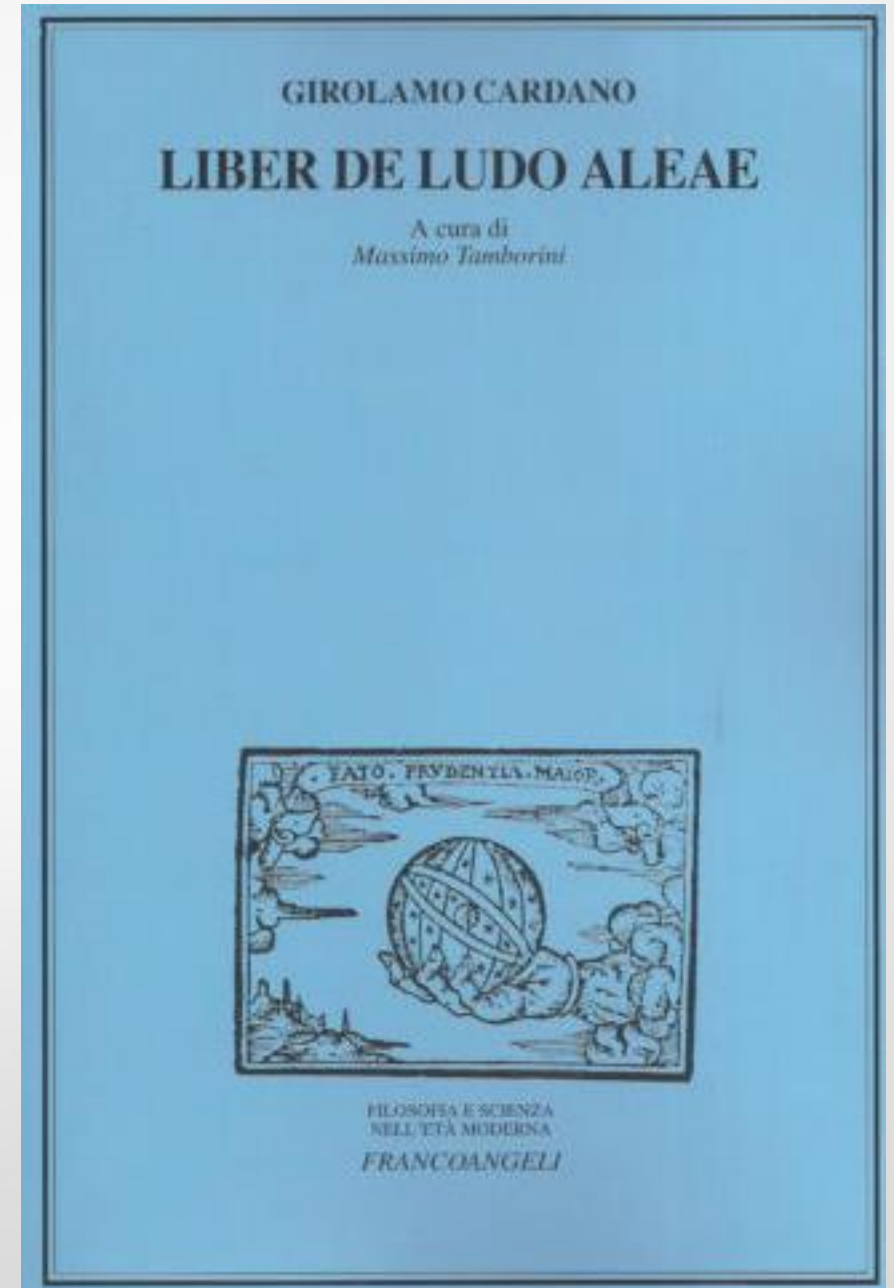
Origin of Risk Analysis - Ancient Egypt



Origin of Risk Analysis

Girallamo Cordona:

The Book on Games of Chance



Origin of Risk Analysis in Aviation

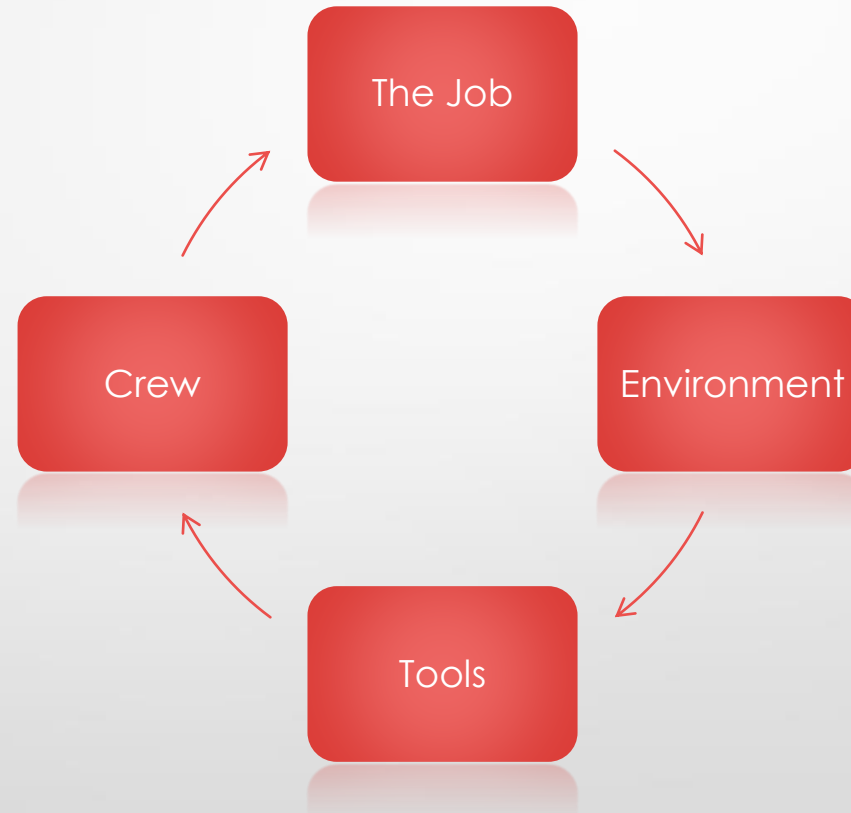


Origin of Risk Analysis in Aviation



1967 – Apollo 1

Job Risk Analysis



Pre and On Site Risk Analysis

Phase 1
Hazard Identification

Phase 2
Safety Risk Analysis

Phase 3
Safety Risk Mitigation

Phase 4
Safety Documentaion

Safety Risk Analysis - Likelihood

Probability of occurrence		
Qualitative definition	Meaning	Value
Frequent	Likely to occur many times (<i>has occurred frequently</i>)	5
Occasional	Likely to occur some times (<i>has occurred infrequently</i>)	4
Remote	Unlikely, but possible to occur (<i>has occurred rarely</i>)	3
Improbable	Very unlikely to occur (<i>not known to have occurred</i>)	2
Extremely improbable	Almost inconceivable that the event will occur	1

Safety Risk Analysis - Severity

Severity of occurrences		
Aviation definition	Meaning	Value
Catastrophic	<ul style="list-style-type: none">➤ Equipment destroyed.➤ Multiple deaths.	A
Hazardous	<ul style="list-style-type: none">➤ A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely.➤ Serious injury.➤ Major equipment damage.	B
Major	<ul style="list-style-type: none">➤ A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of increase in workload, or as a result of conditions impairing their efficiency.➤ Serious incident.➤ Injury to persons.	C
Minor	<ul style="list-style-type: none">➤ Nuisance.➤ Operating limitations.➤ Use of emergency procedures.➤ Minor incident.	D
Negligible	<ul style="list-style-type: none">➤ Little consequences	E

Safety Risk Analysis - Index

Risk probability	Risk severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5	5A	5B	5C	5D	5E
Occasional 4	4A	4B	4C	4D	4E
Remote 3	3A	3B	3C	3D	3E
Improbable 2	2A	2B	2C	2D	2E
Extremely improbable 1	1A	1B	1C	1D	1E

Safety Risk Mitigation

Unacceptable

- Immediate mitigation and escalation is required.
- Operation might be stopped

Tolerable

- Mitigate the safety risk as low and practically possible
- Mitigation to be approved

Acceptable

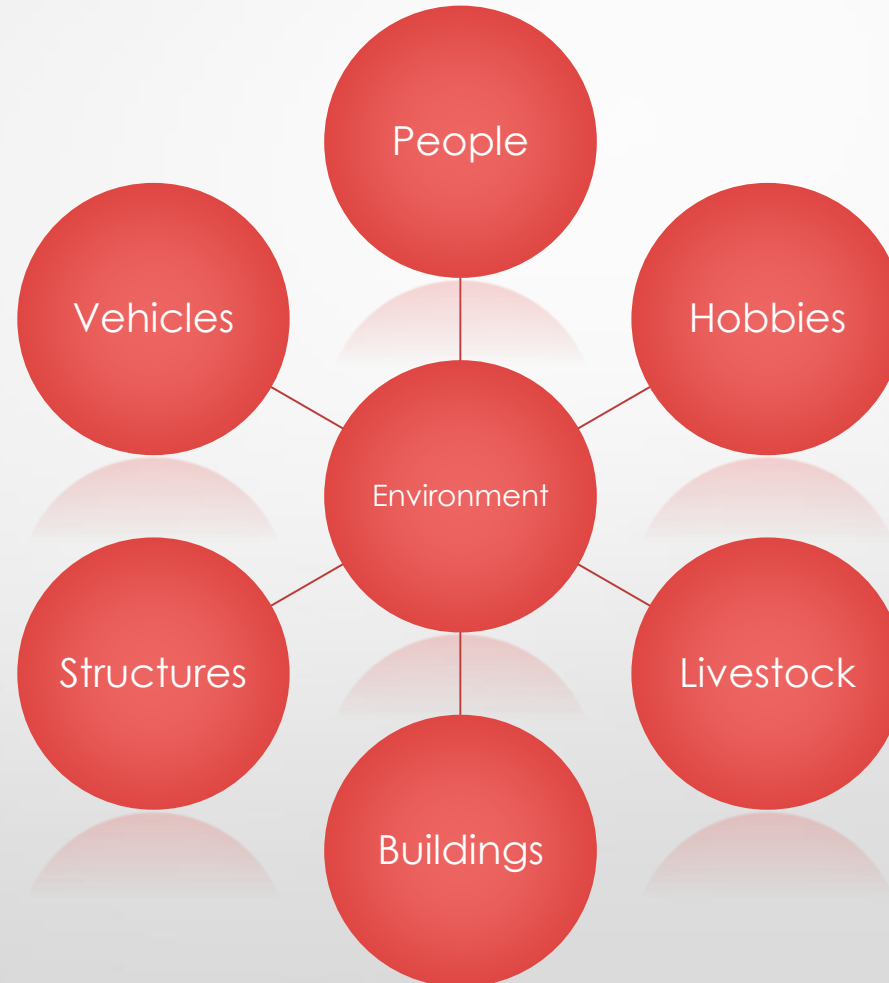
- No further actions required



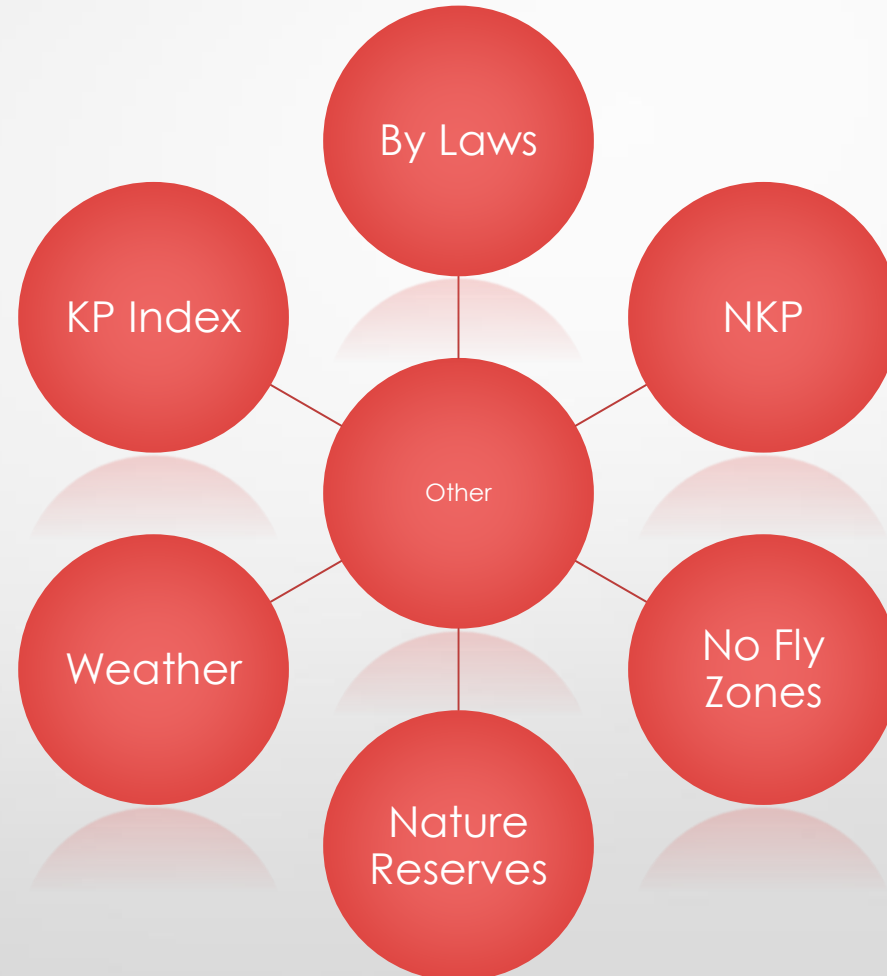
Environmental Considerations

What in this environment can cause trouble?

Environmental Considerations

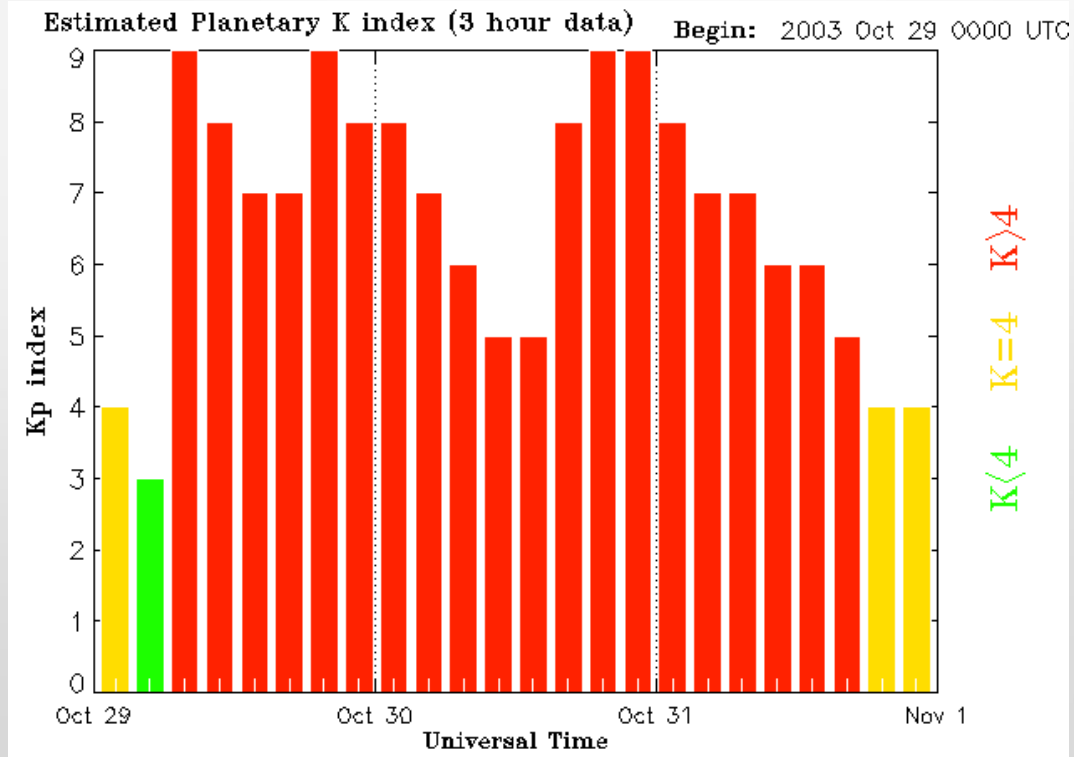


Operational Considerations



Environmental Considerations

Kp Index

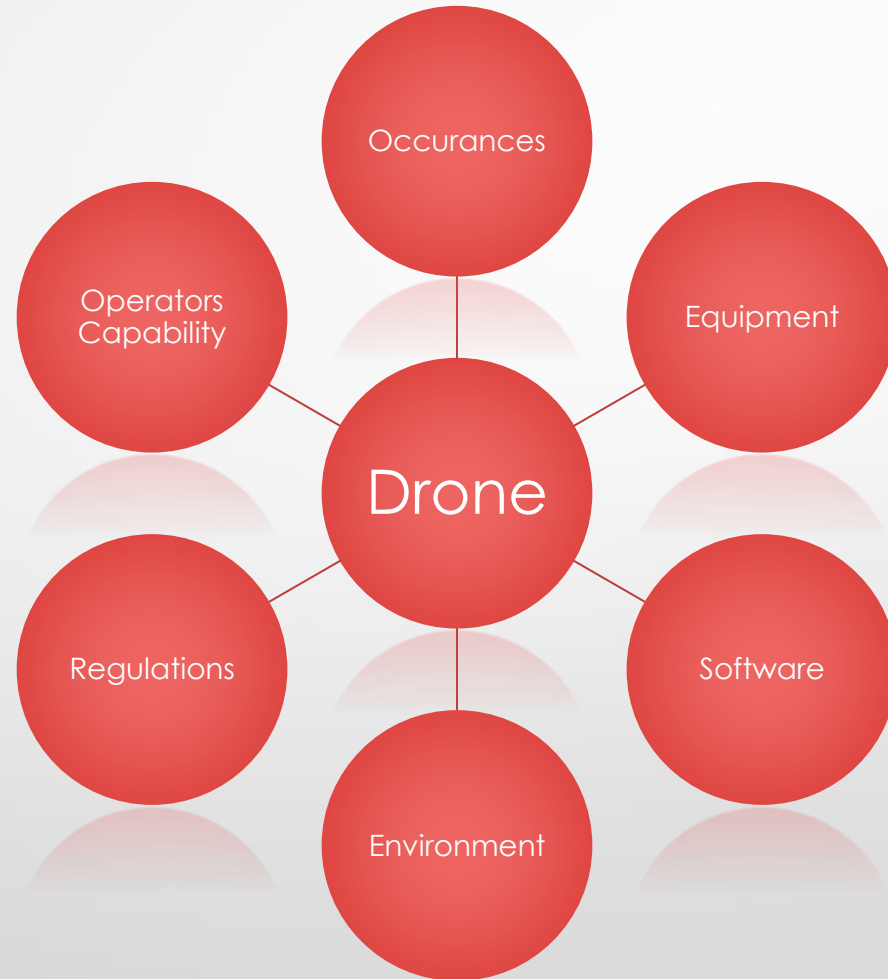




Drone Reliability

What determines reliability of a drone?

Drone Reliability



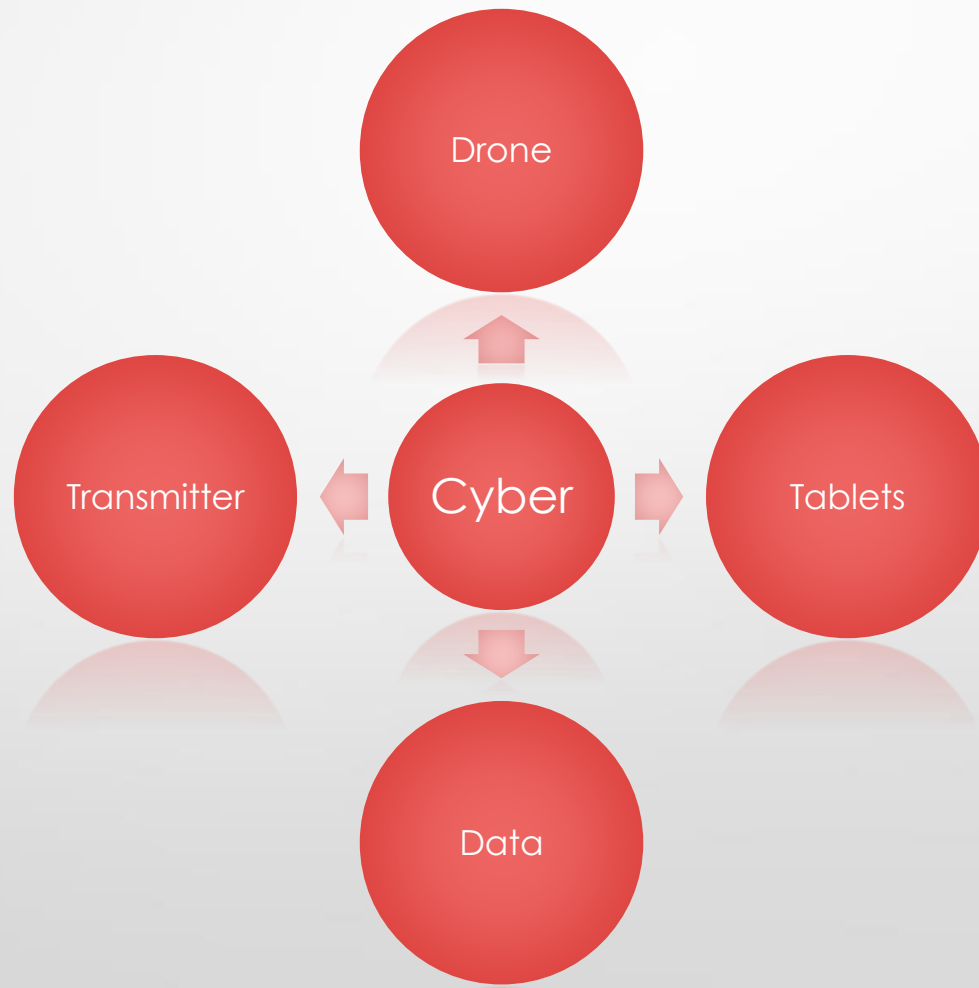
Drone Reliability



Safety Documentation



Cyber Security Strategy



Risk Analysis of the Future





The End