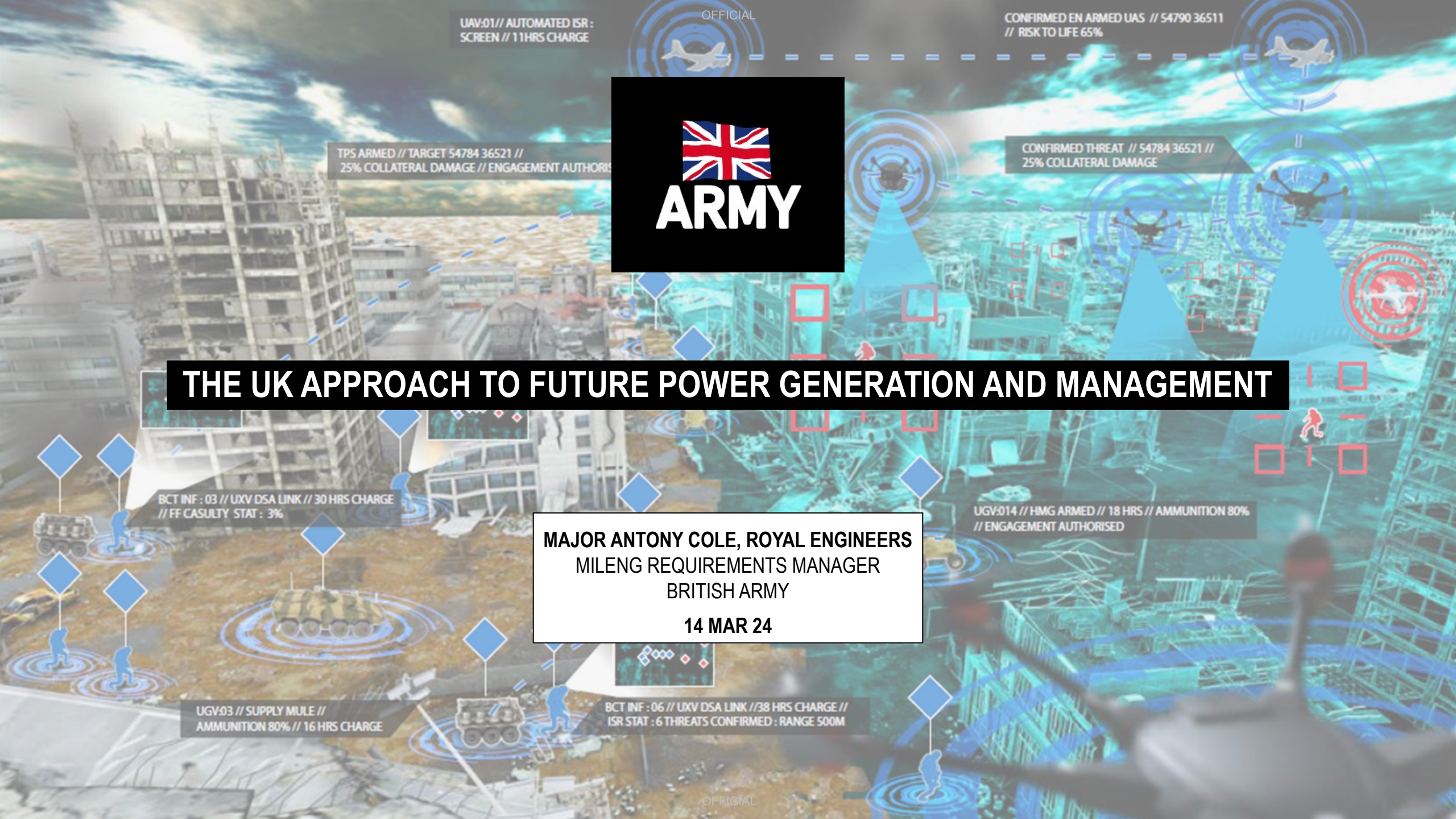


ARMY

THE UK APPROACH TO FUTURE POWER GENERATION AND MANAGEMENT

MAJOR ANTONY COLE, ROYAL ENGINEERS
MILENG REQUIREMENTS MANAGER
BRITISH ARMY

14 MAR 24

FUTURE POWER GENERATION AND MANAGEMENT

SCOPE

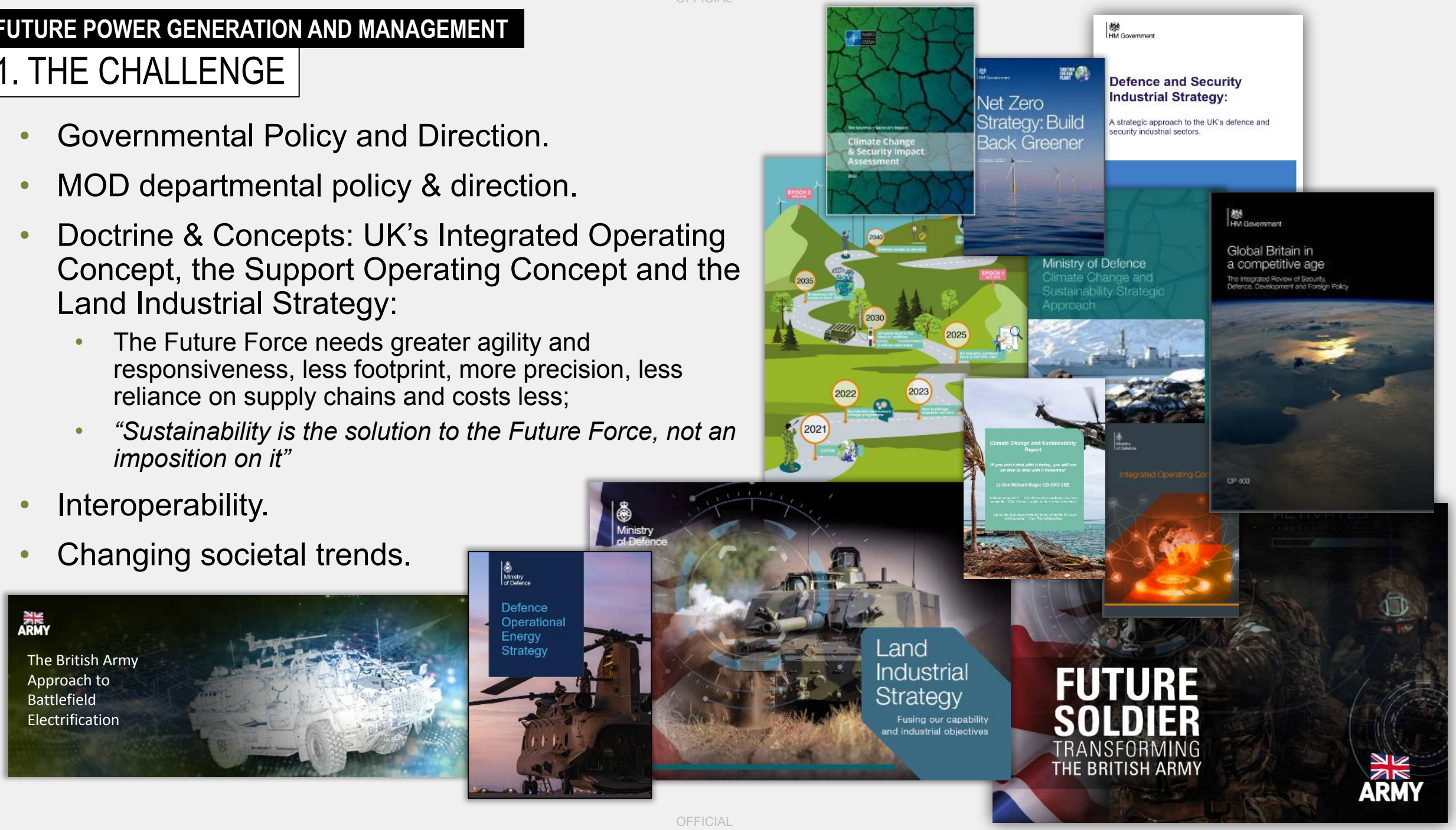
1. Current & Future Challenges facing the UK.
2. Update on the UK Manoeuvre Power (MAN-P) Project.
3. Interim Next Steps.
4. Opportunities for NATO Partner & Industry Collaboration - Developing a common Systems Architecture for power management/control across NATO.

Discussion/Questions?

FUTURE POWER GENERATION AND MANAGEMENT

1. THE CHALLENGE

- Governmental Policy and Direction.
- MOD departmental policy & direction.
- Doctrine & Concepts: UK's Integrated Operating Concept, the Support Operating Concept and the Land Industrial Strategy:
  - The Future Force needs greater agility and responsiveness, less footprint, more precision, less reliance on supply chains and costs less;
  - *"Sustainability is the solution to the Future Force, not an imposition on it"*
- Interoperability.
- Changing societal trends.



FUTURE POWER GENERATION AND MANAGEMENT

1. THE CHALLENGE

- Old equipment
- Inefficiencies
- Logistic burden
- Single Fuel Policy
- Carbon reduction
- Operational parity and advantage
- What does good look like?
- What Standards & Architectures?
- NATO Alignment and Interoperability?





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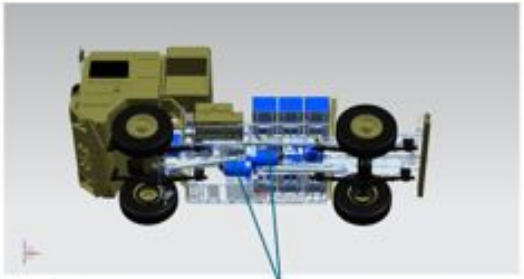
1. THE CHALLENGE

TD6 Demonstrators: Man SV Truck

[dstl] The Science Inside



Twin electric motors driving propshafts to front and rear axles

Generator: 250kW (ICU 230KW)

Batteries: 6x30kWhr

Motors: 2 x 200kW 3600Nm continuous torque

Export Power: Peak 510KW

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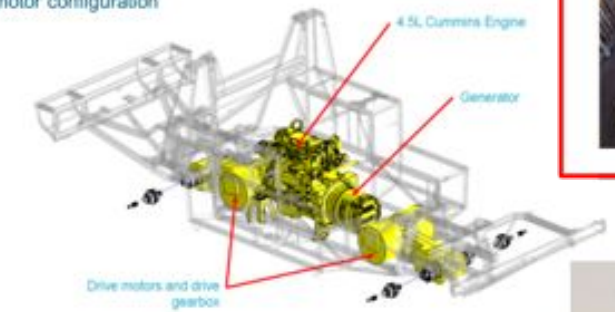
TD6 Demonstrators: Jackal

4 inboard motor configuration



Generator: 150kW (ICU 130KW)

Batteries: 2 x 30kWhr

Motors: 4 x 40kW 5600Nm continuous (60kW/8,800 peak)

Export Power: Peak 190KW

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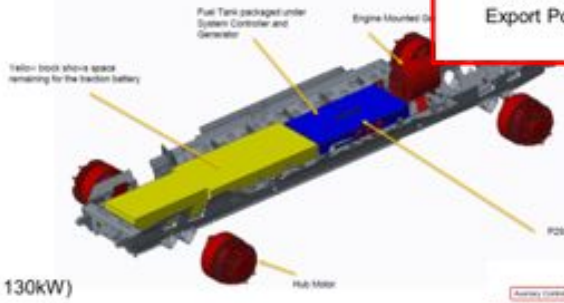
TD 6 Demonstrators: Foxhound

4 hub motor configuration



Generator: 150kW (ICU 130kW)

Batteries: 1X60 KW

Motors: 4 x 40kW 5500Nm continuous (60kW/11,000 peak) Export Power: Peak 190KW

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2. MANOEUVRE POWER (MAN-P) UPDATE

In-Service Support Contract 2024 – 28/9

Lightweight Field Generator (LFG) 2 kW

Variable Tactical Electrical Generator (VTEG) 6.5 kW

Field Electrical Power Source (FEPS) 20-40 kW

Containerised Power Generation CAT 320 & 350 kVA

Power Management Distribution System (PMDS)

Lighting & Power Distribution System (LAPDS)

Deployable Infrastructure 2028

DI28

Project MITER

Transitioned to Fd Army (Sep 23)

Manoeuvre Power (MAN-P)

- Small Hybrid Power
- Medium Hybrid Power
- Containerised Power

Combat Water Supply Systems (CWSS)

- Water Packaging
- Water Treatment
- Water Distribution

Manoeuvre Shelter (MAN-S)

- Role 1 & 2 Med Fac
- HQ Shelters

Static Infrastructure & Power (SIP)

- Role 3 Med Fac
- Domestic Accommodation

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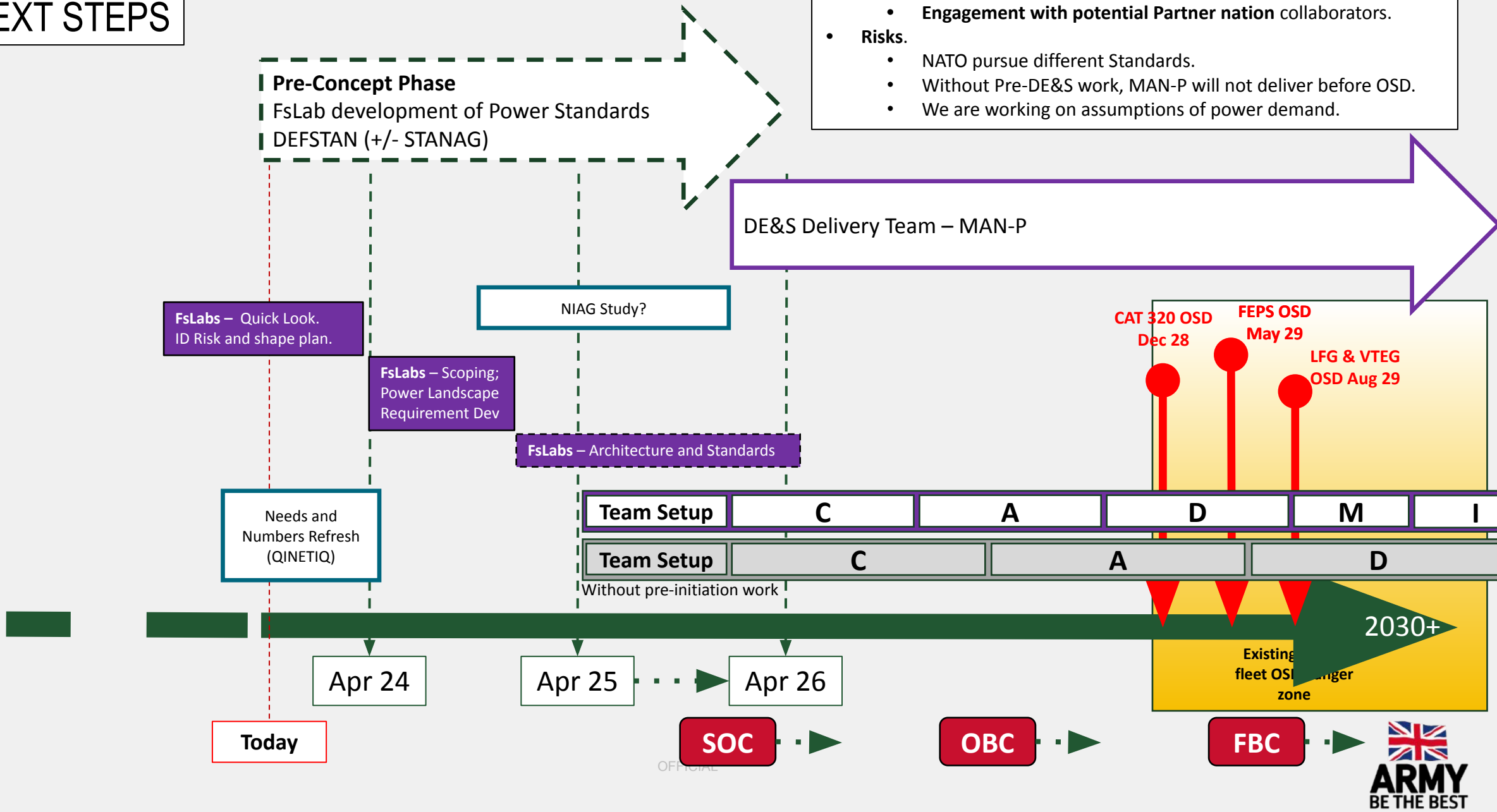
FUTURE POWER GENERATION AND MANAGEMENT

3. NEXT STEPS

- **Opportunities**.
  - Make use of 'dead time' with minimal impact on DE&S.
  - **Engagement with potential Partner nation** collaborators.
- **Risks**.
  - NATO pursue different Standards.
  - Without Pre-DE&S work, MAN-P will not deliver before OSD.
  - We are working on assumptions of power demand.



FUTURE POWER GENERATION AND MANAGEMENT

4. OPPORTUNITIES

Standards

NATO COE Infra Management Panel	Safety Cases	Interchangeability	Standardisation
Open Data Standards	STANAG	Power Quality	Interoperability (NATO)
Open Data Architecture	DEFSTAN	Power Generation & scavenging	Battery form
Integration	Power Safety	Silent power (at what scale?)	Volts, freq, plugs, colours & AC/DC
Tactical Microgrid Standard	Cyber & Data Sy	Common Architecture	LOSA - update GBA (23-013)

Power demand

Electric vehicles	Hybrid Vehicles	Battlefield Electrification
RAS	Dismounted Soldier Systems (DSA)	Use cases 1 – 3 (Mvr)
Needs & numbers	Demand (elec)	Use cases 4 & 5 (Static)

Strategy, Policy & Doctrine

DCDC	Op En Authority
Fd Army how we fight	Fd Army Posture
Behaviours (all)	User SQEP
Def Op En Strategy	(HQ) Survivability
Infra Rq	Modular & Scalable

Energy Storage & Power delivery

Onboard Inverters	Wet fuel generators	Metering & monitoring	Power management
Micro Grids	Battery/power banks	Power distribution	Power sourcing
Control systems	Auto Stop & Start	Magic Box convertors	115/230/415 v 50/60hz
Cabling (elec &/or data)	Power protection	Power conditioning	Parasitic Loss
	Battery Transportation		

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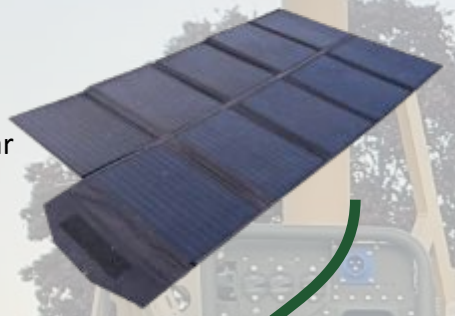
FUTURE POWER GENERATION AND MANAGEMENT

INDICATIVE SMALL HYBRID GENERATOR SYSTEM



250 Wh Solar
PV Panel
(qty 4000)
x 4

Small Battery
(SB) 4 kW
(qty 2000)
x 2

1.5 kWh Solar
PV Panel
(qty 2000)
x 2

Very Small Battery
(VSB) 2 kW
(qty 4000)
x 4

Tactical
Generator
(TG) 1 kW
(qty 4000)
x 4

mall Hybrid
enerator (SHB)
+ 2 kW
qty 1000)

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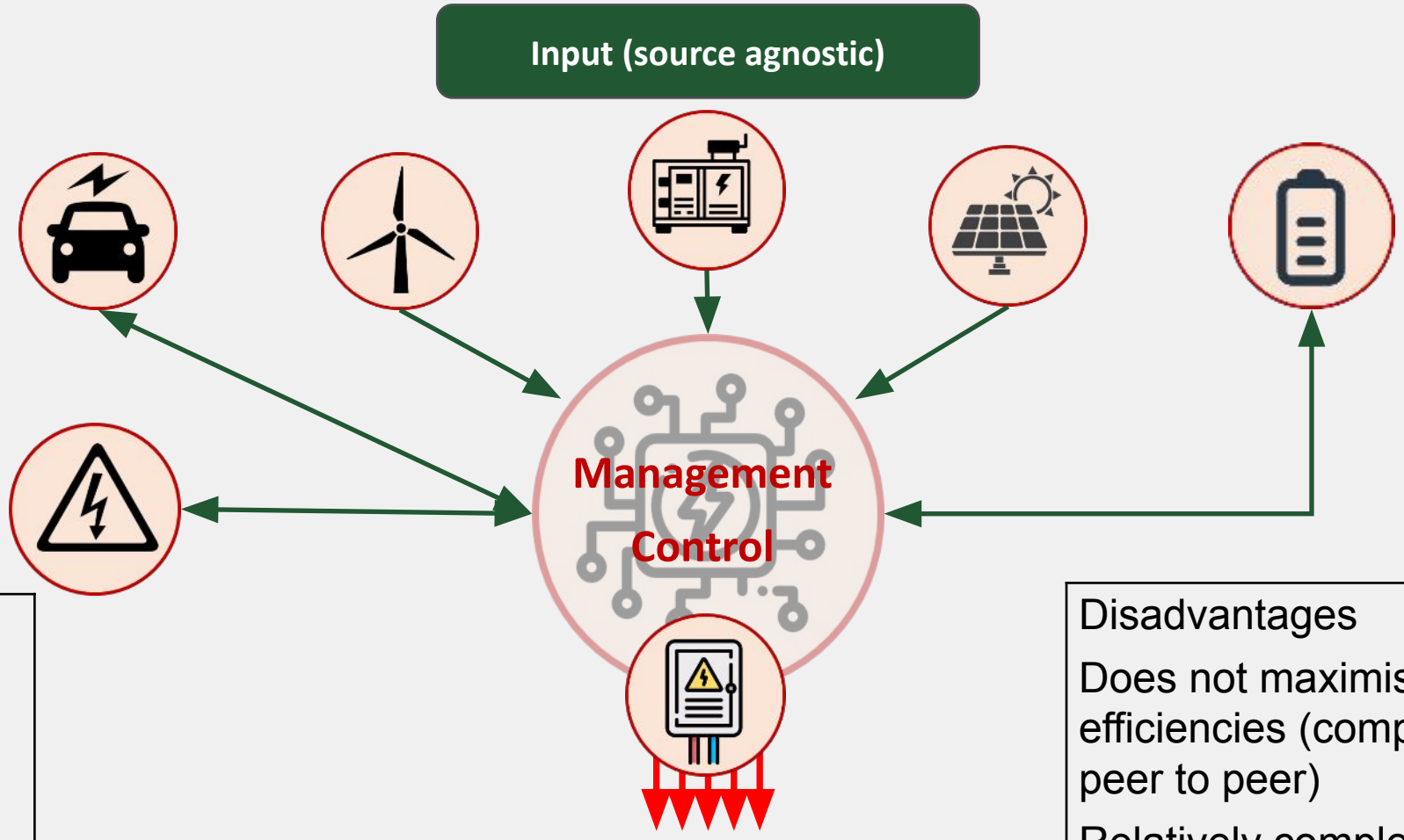
4. OPPORTUNITIES



Advantages

- High TRL
- Easy to design
- Easy to setup (in field)
- Resource efficient
- Input agnostic
- All-arms

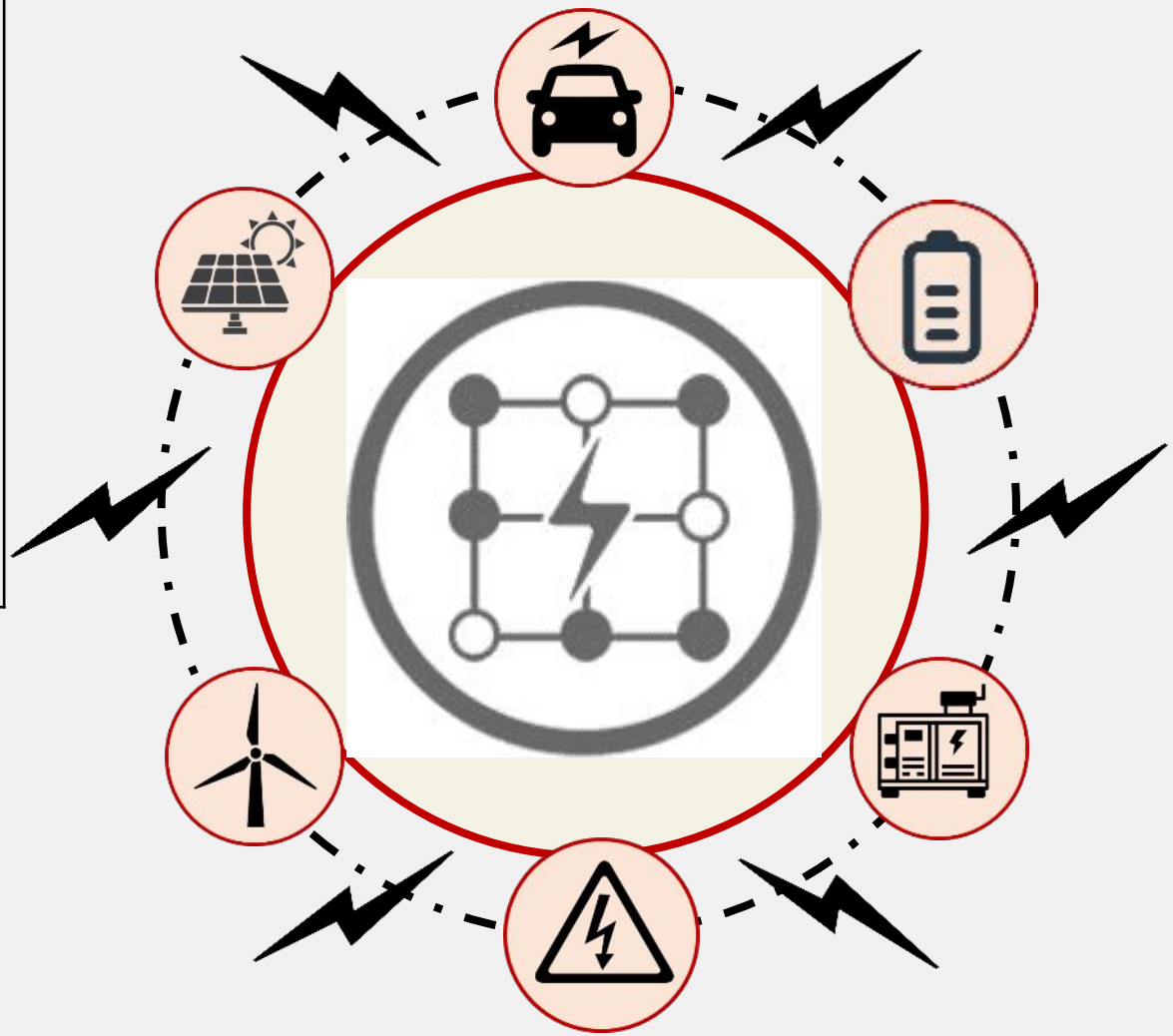
Disadvantages

- Does not maximise efficiencies (compared to peer to peer)
- Relatively complex interface

FUTURE POWER GENERATION AND MANAGEMENT

4. OPPORTUNITIES

Advantages	Disadvantages
Self-healing	Complex to design
Self-managing	Mid TRL currently
Maximises resource efficiencies	Specialist setup required
Almost infinite input/output opportunities	



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