

Electric UAVs: Lessons from collaborative multi-supplier utility studies

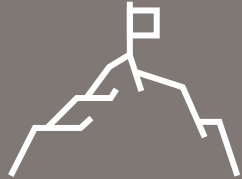
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What we'll cover today

- Project scope and context
- Customer, stakeholders and SMEs
- Our approach
- Lessons that could benefit you

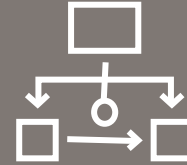
Our work helped



Drive strategic direction



Create better market understanding



Create Analysis framework for future products



Define technical requirements

Potential use cases

Battlefield
Support

Logistics on
Land

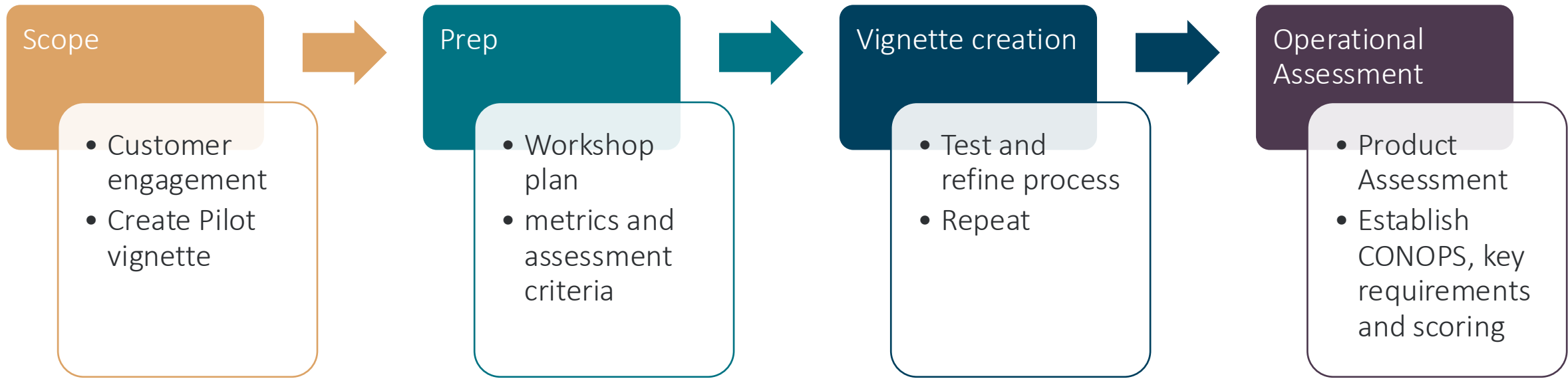
SAR on Land

Sub-Surface
Defence

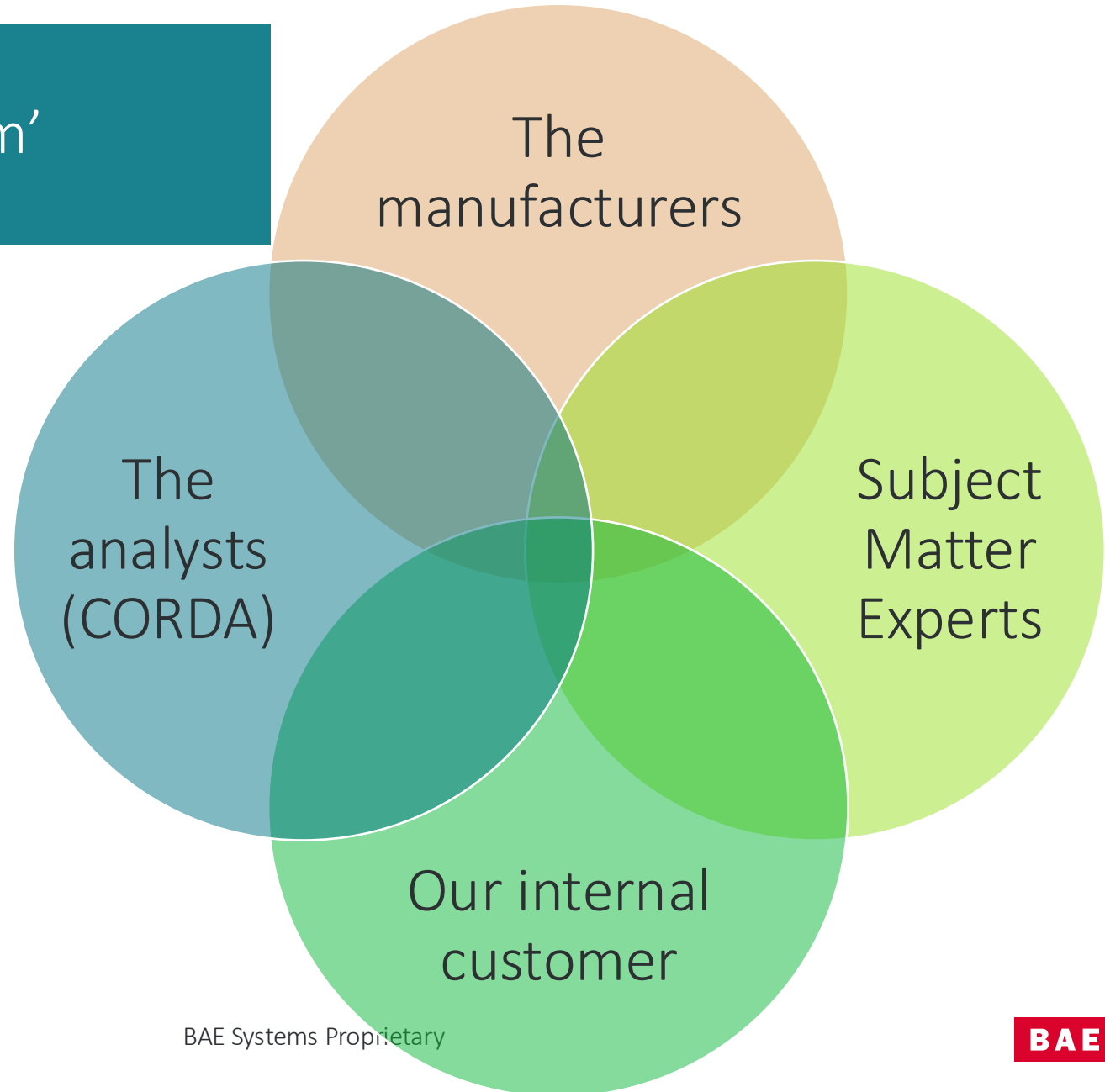
Logistics
Shore to Sea

High rise fire
control

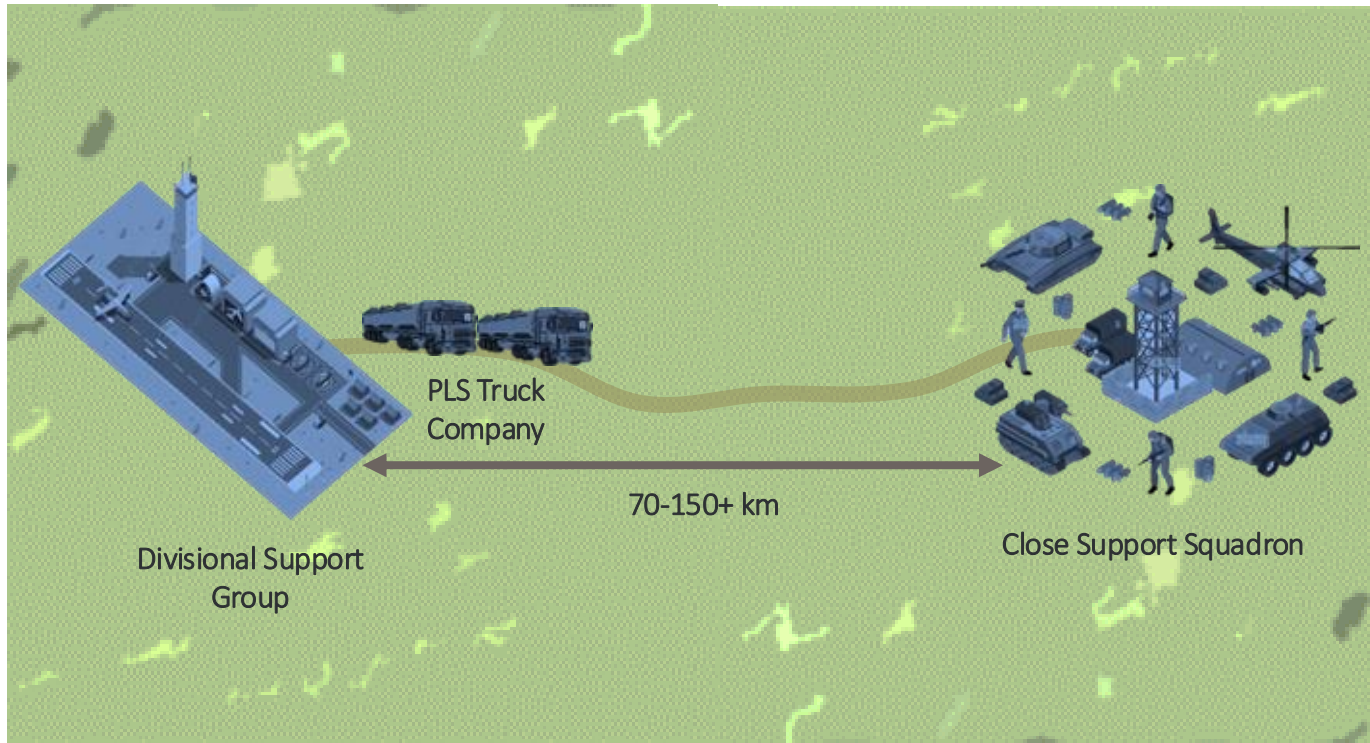
The process



The multi-disciplinary 'team'



Vignette B – Logistics at Land In Theatre logistics



Task		
Move key supplies e.g fuel, rations, water and ammunition		
Key task Assumptions and Constraints:		
<ul style="list-style-type: none"> • Close Support Squadron (CSSqn) supports ~3000pax • Total CSups (fuel, ammo, water, rations, batteries and other equipment) c. 50kg per person based on daily rations c 4kg per person. • Common vehicle spare parts e.g. starter motors, wheels, engines, seats 		
Typical Key Task Activities:	As is activities	Proposed UAV solution
1. Routine logistics daily delivery		
	<ol style="list-style-type: none"> 1. PLS Truck Company (of 7 trucks) is prepped with CSups 2. PLS Truck Company completes the 100km journey from DSG to the CSSqn 	<ol style="list-style-type: none"> 1. UAV completes multiple trips between DSG and CSSqn

Vignette B – Logistics at Land In Theatre logistics

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Move key supplies e.g fuel, rations, water and ammunition	
Information exchange requirements	
Inputs and from where	Outputs and to where
Key Task Performance Requirements:	
	MVP
• Range required when fully loaded	xx
• Payload	xx
• The platform needs to cope sufficiently on very soft ground	
Other options to consider	
• UAV could be used to deliver adhoc/emergency supplies	

Solution Discussion				
Threat level? Opportunistic attacks? Assets, cargo and people are safe Assumed advantages of the eVTOL				
MOEs/MOPs		Current	eVTOL	Justification
deliver mission objective	Payload	Yellow	Red	UAV multiple trips per day
	Manoeuvrability	Yellow	Green	UAV not affected by terrain
	Range	Green	Red	Truck range >> UAV
Time to complete task	Prep time	Yellow	Orange	
	Transit time	Orange	Green	Speed is terrain dependant for trucks.
Survivability	Detectability	Orange	Yellow	Trucks noisier, slower and bigger targets
	Susceptibility	Orange	Green	UAV is in the air and moves faster, low threat in use case
	vulnerability	Yellow	Orange	Trucks are armoured
Recommended Improvements				
Payload to be increased Multiple UAVs complicates air space management Range to be improved				

Lessons Learnt

Make sure
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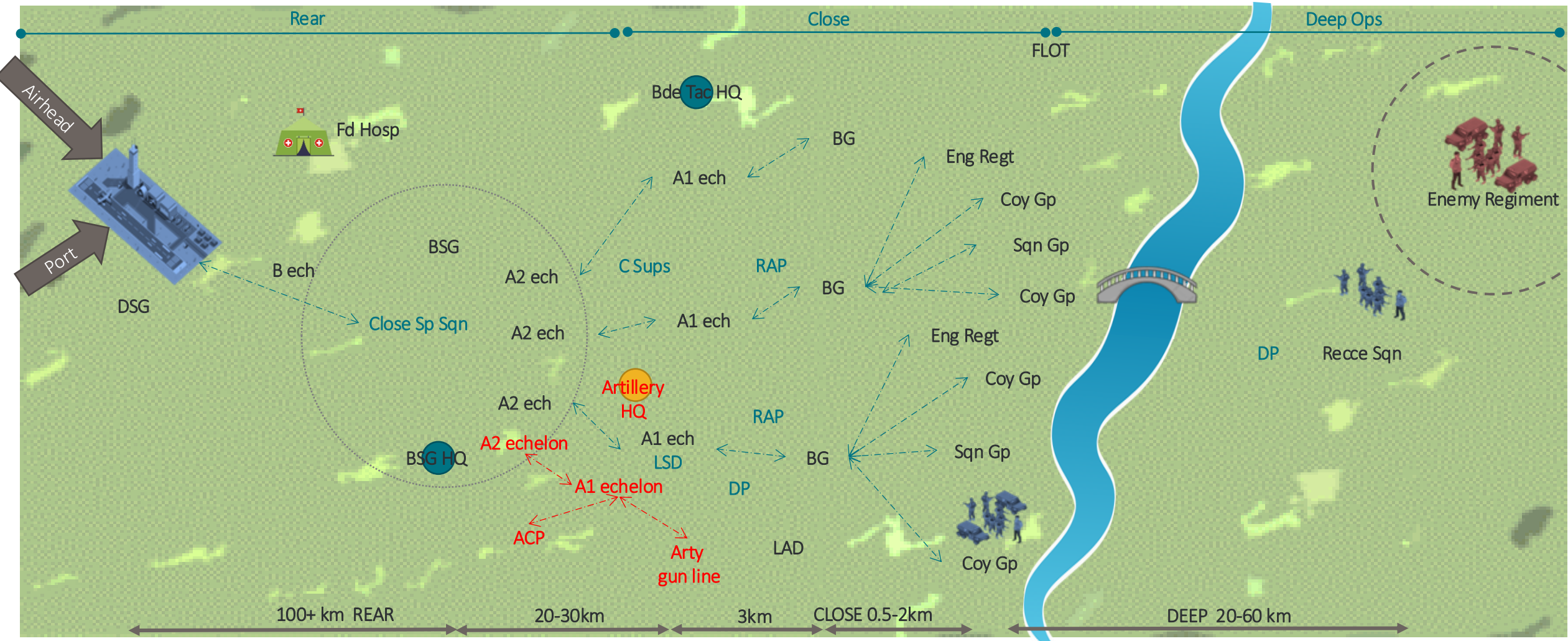
Engage
SMEs early

Overview

Vignette B – Logistics at Land



Overview: Vignette B – Logistics at Land



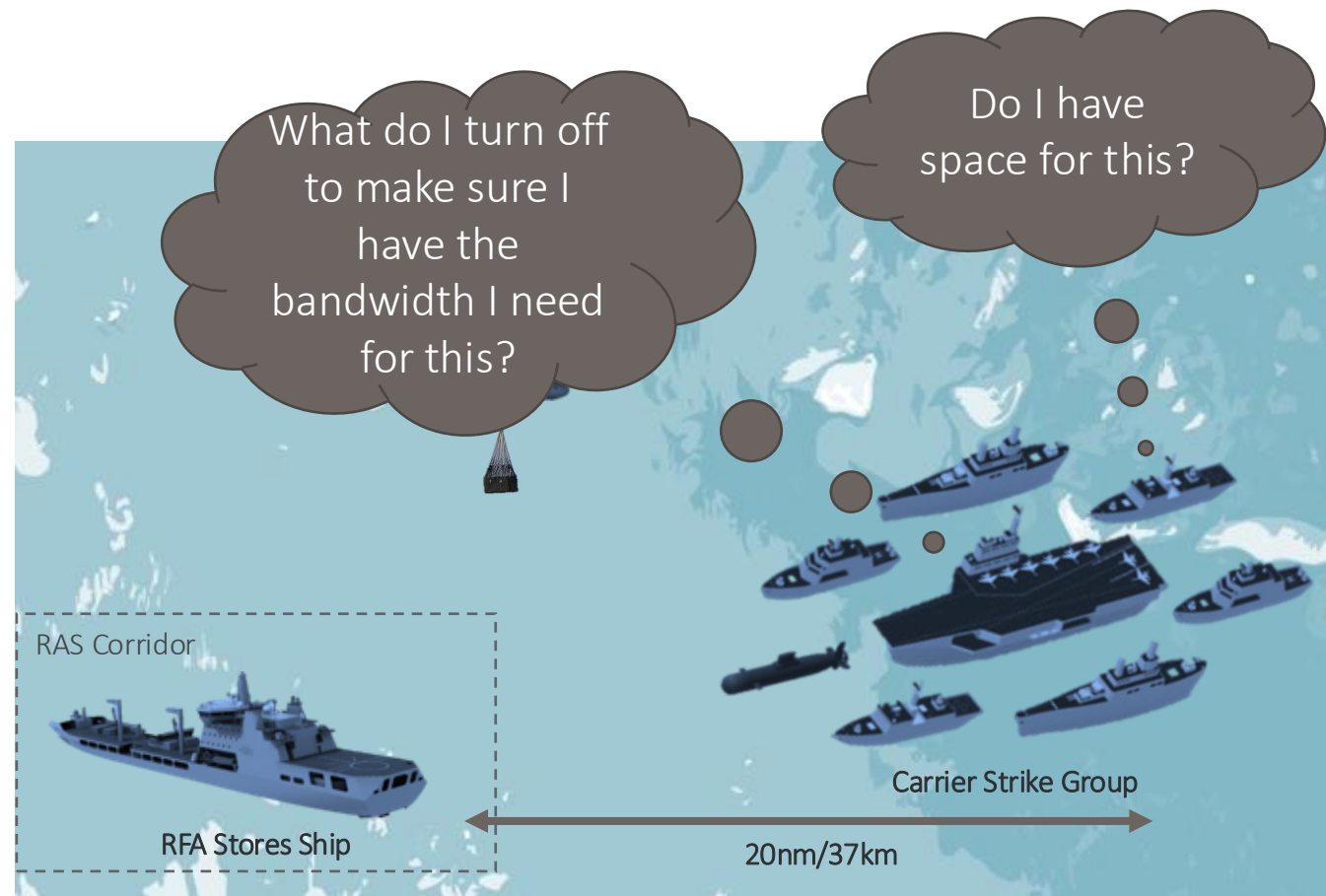
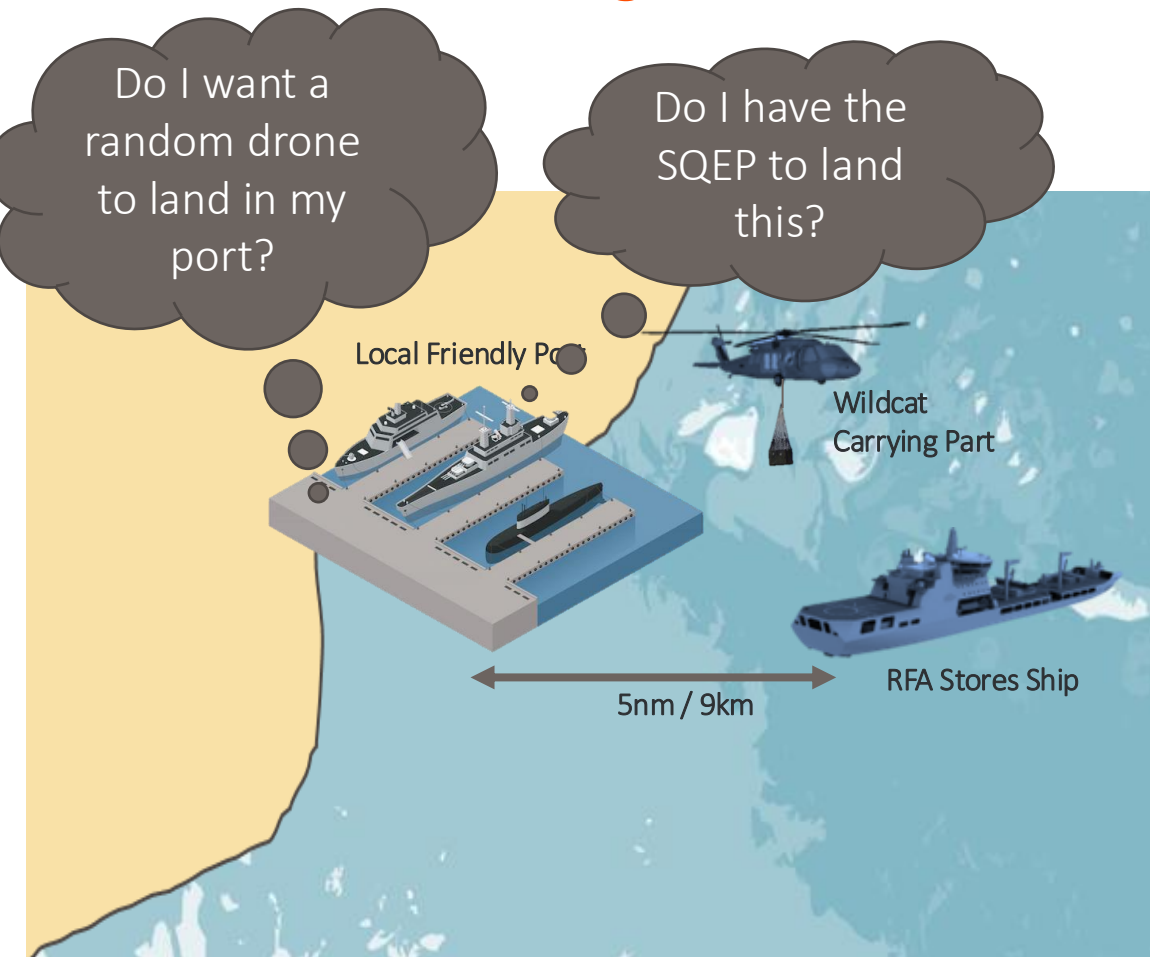
Lessons Learnt

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Engage
SMEs early

End User
focus

Not considering the limitations/restrictions on the end user



*e.g. a starter motor c. 10kg
 ** Based on SME experience –

Vignette I –Emergency Services at Land

High rise fire control



Task		
To extinguish the fire with minimal damage and risk		
Key task Assumptions and Constraints:		
<ul style="list-style-type: none"> Wet riser system and mains riser in good working condition UAV is tethered and therefore not limited by capacity of battery 		
Typical Key Task Activities:	As is activities	Proposed eVTOL solution
1. Fire has broken out and emergency services deployed		
	<ul style="list-style-type: none"> Firefighters with breathing apparatus connect hose to the landing valve of the wet riser system to tackle fire from inside High reach appliances used for external firefighting. 2 men on each hose to control. 	<ul style="list-style-type: none"> Assumes that hose has been redesigned and certified for use with UAV UAV flies to height with hose attached Hose attached to rising main for external firefighting only
2. Fire extinguished		
3. Fire damage assessment		
4. Return to station		

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Any questions?

