

Beyond the Aircraft:

A System-of-Systems Approach to Drone-in-a-Box Site Selection

Ania Burgess

The Pattern



! RF dead zone

! Access road floods

! Emergency response time

Why Now?

Utilities are moving from pilot docks to permanent infrastructure



Multi-site rollouts



Dock-hopping fleets



Long-term contracts

*In a pilot program, a bad site is a lesson.
In a permanent installation, it's a stalled program.*

Applying the Systems Lens

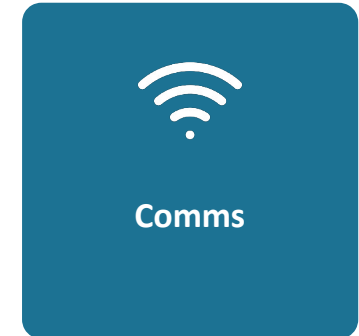
Site selection is not a real estate decision.

It's a systems engineering problem –
specifically, a system-of-systems problem.

You're not just siting a dock.

You're siting the intersection of flight operations, comms infrastructure, logistics and power, and a regulatory envelope that has to scale.

Treat it like any other system-of-systems design: define the interfaces, understand the failure modes, and validate before you commit — not after.



Four Domains



Flight Operations



Comms



Logistics & Power



Regulatory
Scalability

Each domain should clear validation independently

It's critical to look at each of them as interfaces in a system, not as independent challenges to solve

Flight Ops & Airspace



WHAT GETS MISSED

Approach/departure paths under off-nominal weather conditions, and real emergency landing options.



THE PROBLEM YOU SEE LATER

The only viable landing zone can sit inside an energized substation fence line.



Airspace
Decision



Logistics
Problem

Communications



WHAT GETS MISSED

RF propagation near substation equipment — interference that never shows up on a coverage map.



THE PROBLEM YOU SEE LATER

If satellite is the only backhaul, it's now a single point of failure for C2.



Comms
Gap



Safety Case
Problem

Power & Logistics

WHAT GETS MISSED



Power: Nuances of power requirements aren't finalized before pad is poured
Logistics: maintenance and site access are restricted

THE PROBLEM YOU SEE LATER



Power: backup power is inconsistent and creates a safety risk
Logistics: truly remote sites increase the risk math



Power
Shortfall



Safety
Gap

Regulatory Scalability

WHAT GETS MISSED



A site sized for a single-dock §44807 exemption, with no path to broader BVLOS authority

THE PROBLEM YOU SEE LATER



Sensor coverage and detect-and-avoid infrastructure requirements the site can't support — you may need to re-site entirely



Regulatory
Posture

=



Airspace
Decisions

+



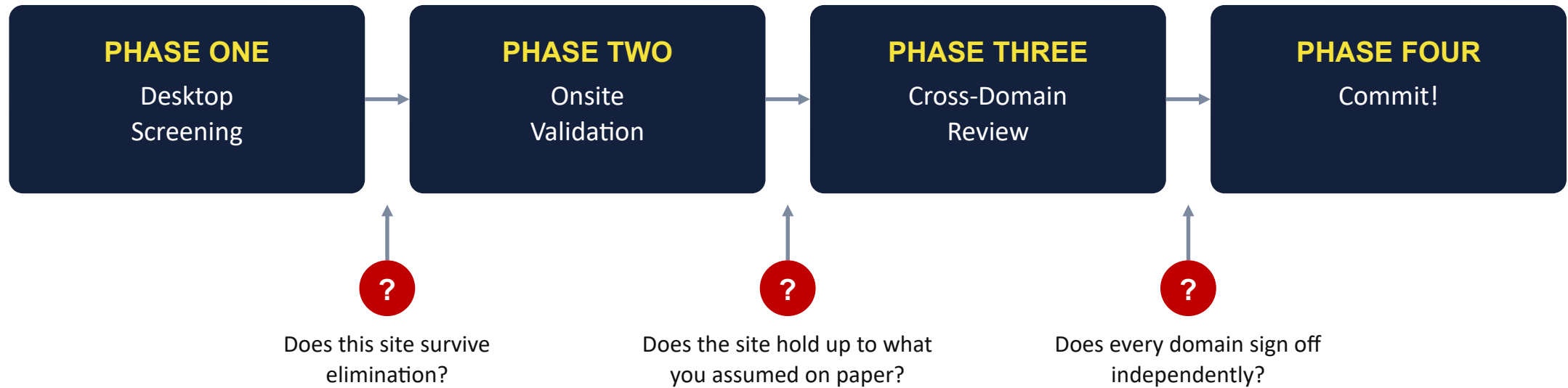
Comms
Decisions

+



Logistics
Decisions

Framework & Decision Gates



Site Disqualifier Checklist

- ✗ No verified line-of-sight RF path under realistic conditions
- ✗ No defined path to future regulatory scaling
- ✗ Emergency landing options inside energized or restricted areas
- ✗ No documented decision record
- ✗ Power infrastructure that requires an unbudgeted upgrade
- ✗ **Remote site specific:** no power margin sized for self-sufficiency
- ✗ Site access that fails in bad weather
- ✗ **Remote site specific:** no predictive-maintenance signal between visits

Any one of these might be manageable. Two or more together, and it's not a site risk — it's a system risk.

Communicating to Stakeholders

Translate site risk into the language the business is already tracking the site in:



Cost



Schedule



Safety Case

Systems thinking isn't just how you evaluate sites – it's how you get people to trust the evaluation.

Final Thoughts – the Site *is* the System

- 1 Four domains, one system — evaluated for their interfaces, not in isolation
- 2 Desktop screening narrows the field; onsite validation clears it
- 3 Decision gates catch cross-domain failures before they compound into system-level risk
- 4 A disqualifier checklist catches system-level risk that a single-domain review would miss

***The drone-in-a-box programs that scale well aren't the ones with the best aircraft.
They're the ones that treated the site selection like an engineering decision from day one.***

Thank you!

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