

Core ILRS station status

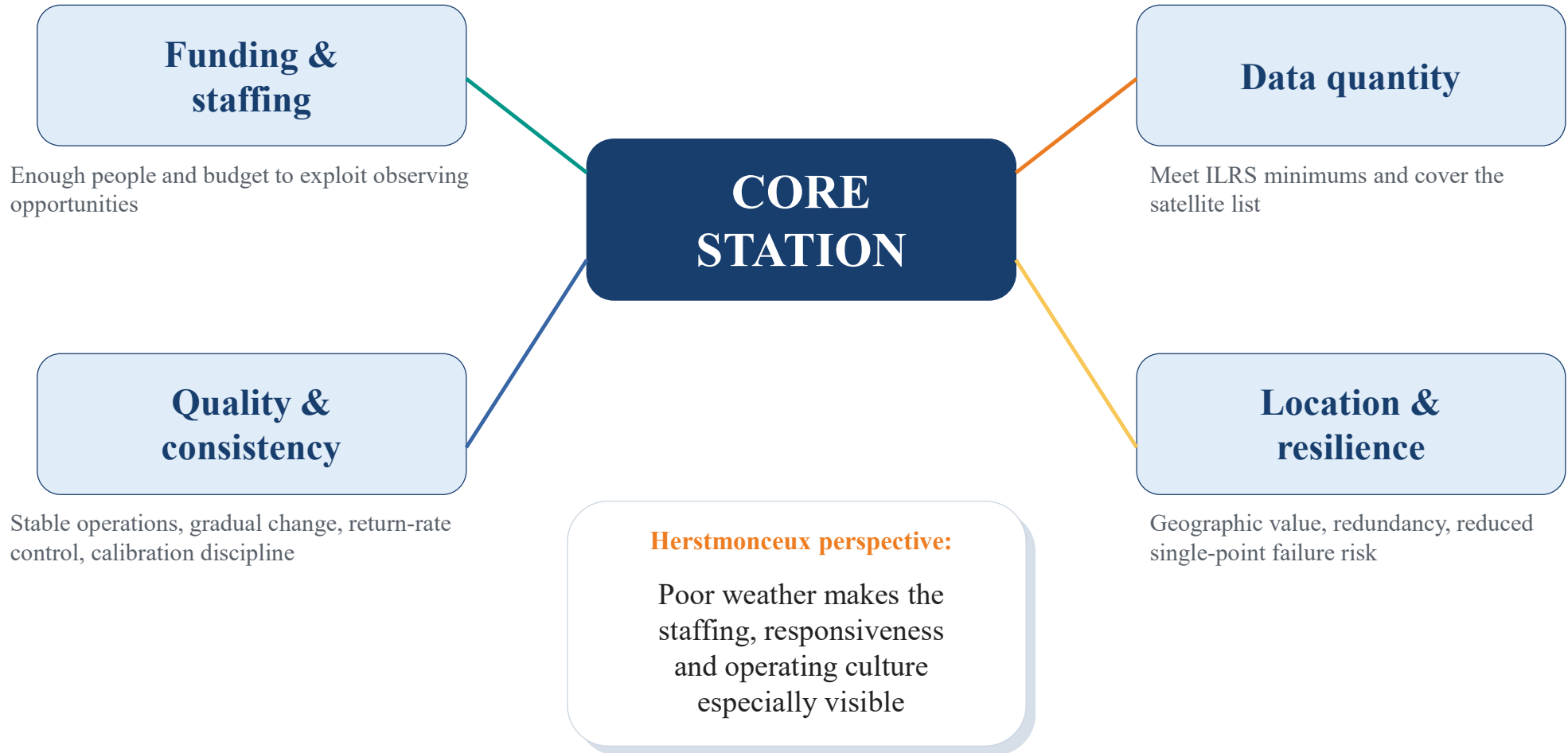
A Herstmonceux perspective

Operating model, data delivery, quality culture, and network location



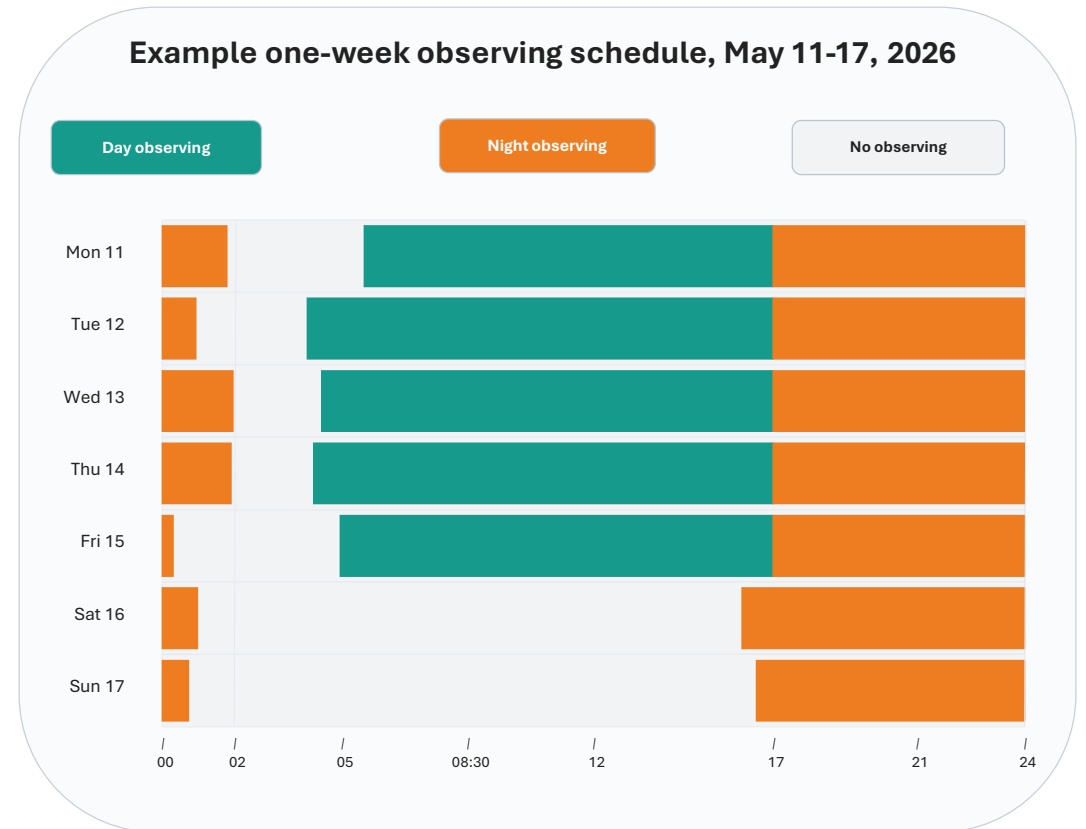
What makes a core station?

A Herstmonceux perspective



Herstmonceaux operating model

- 6 full-time staff; all staff take part in the observing rota.
- Outside office hours, operation is responsive: staff attend when conditions are suitable.
- When not observing, staff work on maintenance, upgrades, electronics, mechanics, software and data analysis.



Poor weather changes the culture

Weather limits opportunity; operations determine how much of it is captured



**“Some cloudy weather
will be along soon enough.”**

- The duty observer is in charge when tracking is possible.
- Experiments, upgrades and other work wait while clear-sky observing is underway.
- This reduces deliberate downtime and helps convert limited weather into useful data quantity.

Data quantity: broad coverage with sensible priorities

ILRS minimums are the floor; operating culture determines delivery

Observer pass list

1 LAGEOS / high-priority targets

2 High elevation visible ILRS targets

3 Remaining visible targets

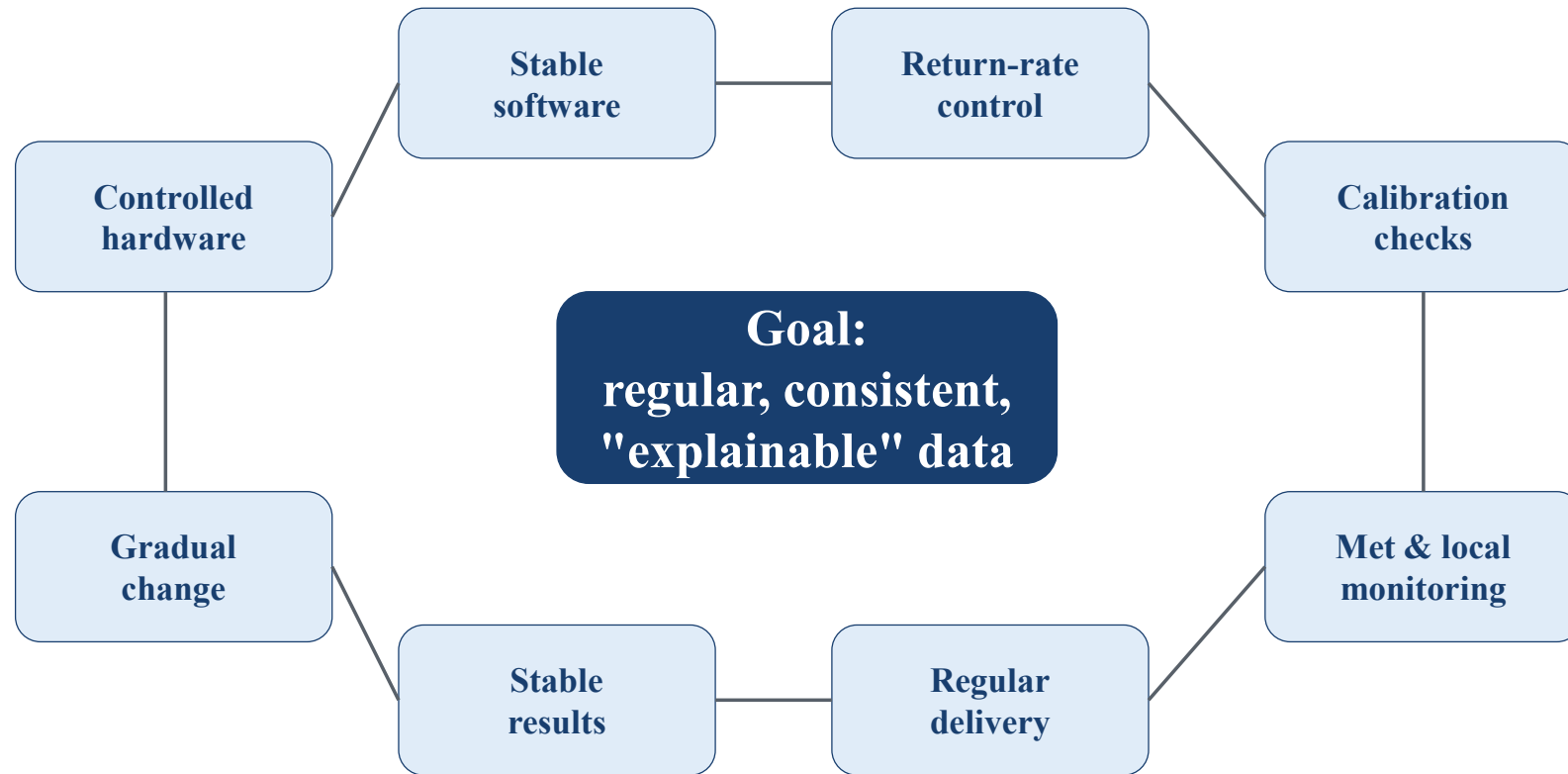
4 National-interest satellites if time permits



- Herstmonceux does not usually need dynamic reprioritization: 90% of the time the correct target is obvious from geometry/altitude.
- A priority list still matters because it keeps high-value targets prominent and standardizes operator judgement.
- Long-term staff acting as observers strengthens this process because they understand the purpose of satellites such as LAGEOS 1/2.

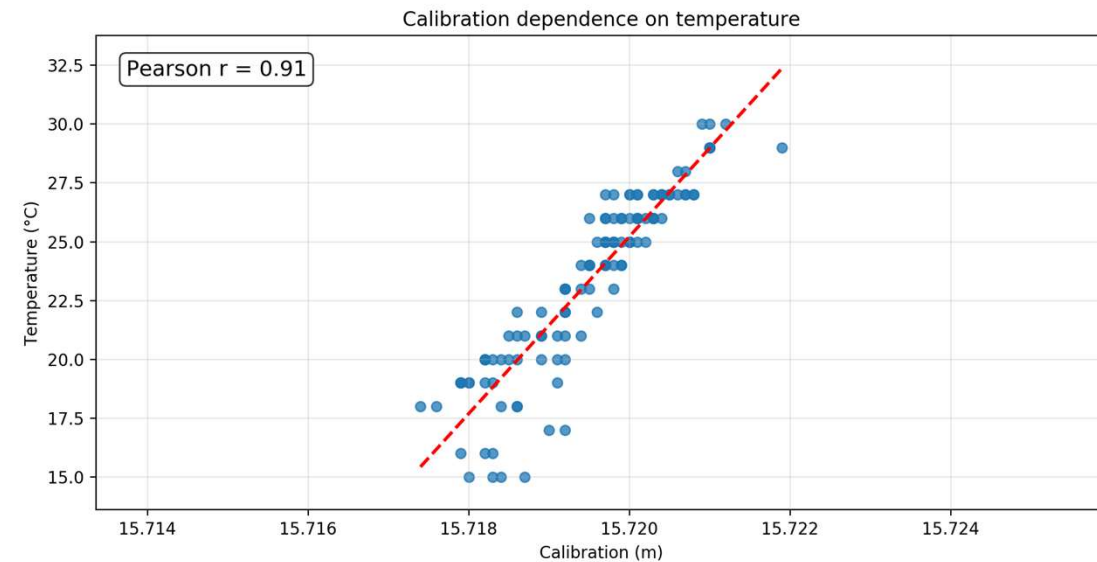
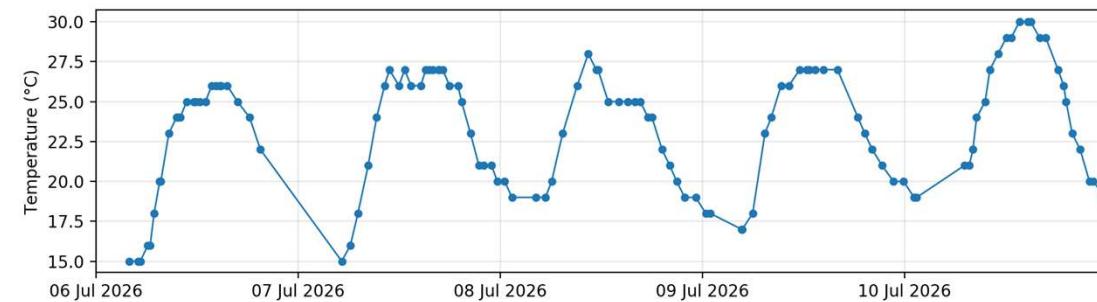
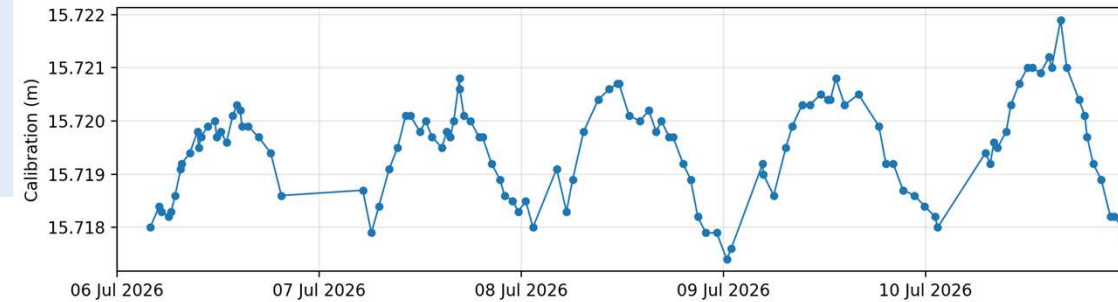
Data quality and consistency

Consistency is itself a performance metric

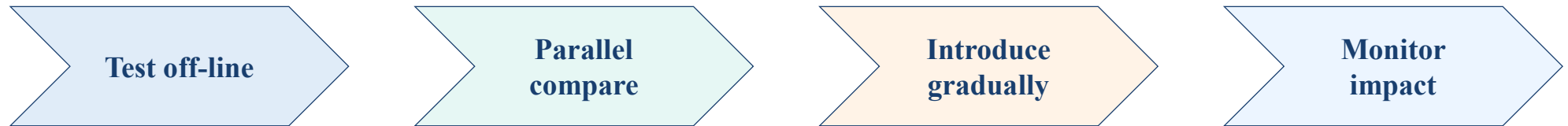


Monitoring example: calibration control

- Local calibration determines the station range correction from the system delay using a target at a known distance.
- Calibration is therefore both a correction and a station-health diagnostic.
- Some calibration variation is expected, for example from temperature or known system changes.
- **The aim is not zero change at all times; the aim is explainable change.**
- **If a step change appears without a known hardware/software/environmental cause, that is a quality warning.**



Cautious innovation

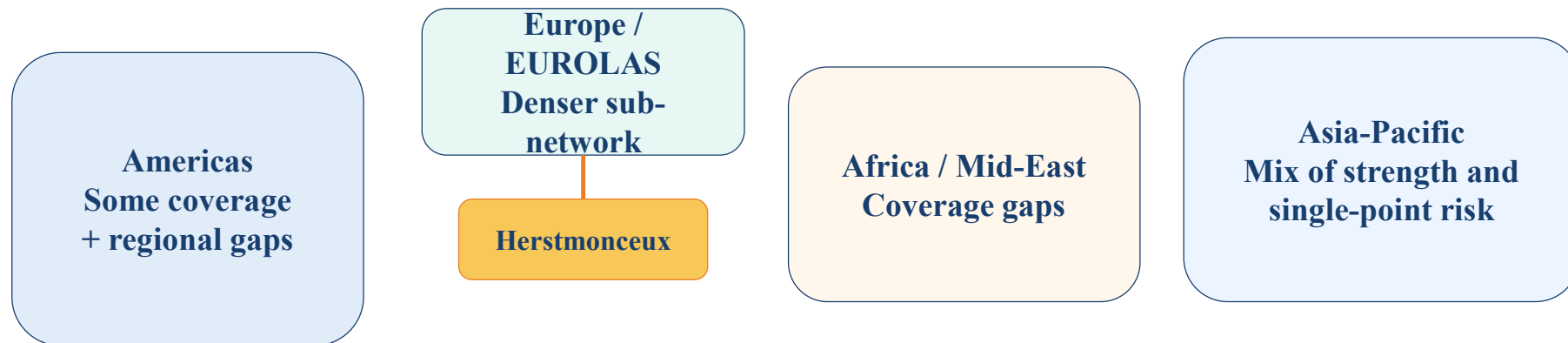


Core stations can innovate (they should); but they should not "surprise" the time series.

- Slow change has directly supported long-term stability of Herstmonceux data.
- With more capital investment and staffing, innovation and core-station stability can coexist.
- **The principle is careful verification, not avoidance of progress.**

Location and network resilience

Europe shows what a healthier global pattern can look like



- A dense regional network provides redundancy and reduces single-point-failure risk.
- That is a useful model for the global network, not just a European convenience.

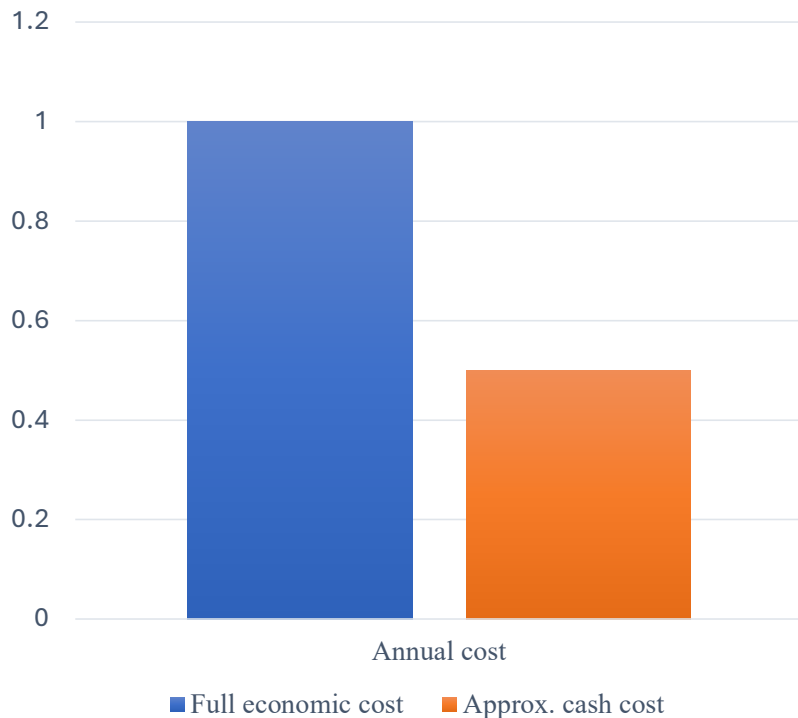
Recommendation

Place new stations where they fill real geographic gaps. Smaller systems may not start as core stations, but strategically important locations can evolve into core assets.

Funding and resourcing

Enough support to operate as a service, not just own an instrument

Illustrative annual operating cost



**£1M / year
full economic cost**

**≈ £0.5M / year
approx. cash cost**

- Most funding currently comes from government science budgets.
- That support is under pressure over time, so alternative sources are increasingly important.
- Growing geodesy visibility through UN-GGCE activity has helped raise the station profile within UK government.

At an imperfect-weather site, the key question is not just “can you operate?” but “*can you respond often enough to exploit clear windows across the week/month?*”

What this implies for “core station” status

Recommended criteria from the Herstmonceux perspective

1

Fund operations, not just hardware

2

Staff for seven-day responsiveness helps where weather is imperfect

3

Observe broadly and prioritise high-value targets consistently

4

Protect data consistency through disciplined change control

5

Monitor calibration, environment and return-rate behaviour locally

6

Value redundancy and geographic contribution in the network design

Core station status is a sustained operational commitment, not a hardware specification.