Paul Campbell
Vice President of AI & ML Solutions, facil.ai

Contents

Objective 1
Automation v. Control 2
Vertical Integration of Stages to Establish Control 4
Measures for Control Achieved 4
Profiling the Sectors 6
The Digital Kite 7
The Monolith 7
The Adversarial Suite 8
The Adaptive Suite 9
The Distributed Infrastructure 9
The Precision Kinetic 10
Control Profiles & Measures by CBECS Building Category 11
Observations 11
Precision Leaders Quadrant (Strengths) 11
Structural Anchors Quadrant (Weaknesses) 12
Managed Volatility Quadrant (Opportunities) 12
System Fragility Quadrant (Threats) 13
Conclusion 13

Objective

To establish a rigid distinction between automation and control and to examine why the Building Automation sector remains well off the pace when compared to the various expressions of control as seen in other sectors. In this examination, the Building Automation sector will be compared to ten other sectors: Aerospace, Agriculture, Cybersecurity, Energy Grid, Finance, Healthcare, Kinetic Arrays (Advanced Logistics and Automated Material Handling), Manufacturing, Marine Robotics and Transportation.

Automation and control are terms that are too often used interchangeably, which leads to an undercurrent of misunderstanding. It is important to understand that one does not have control without processes having already been subsumed by automation. However, having automation does not necessarily mean control has been achieved. Automation and control are related and sequential, but they are also distinct.

The transit from automation to control is influenced greatly by the applications and environments concerned and for that reason these transits profile differently by sector, making a comparison across sectors complex but worthwhile. This analysis finds six profiles among the eleven sectors in this examination. Placing the Building Automation sector into its proper context is vital, given the energy used to support building functions and human achievement within. Knowing what the shortcomings are will lead us to the solutions at the next horizon.

Automation v. Control

Automation is the delegation of a task or process to a technological system to be performed with a predetermined set of rules and minimal human intervention, where execution transforms a "procedure" into a "program."

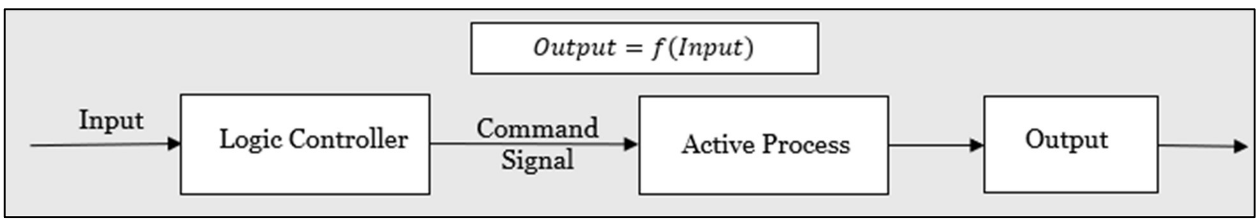

Figure 1: Open Loop Command

An Open-Loop command system receives an input command and executes a corresponding output deterministically. Given the same trigger, the system will perform the same sequence of actions repeatedly, regardless of the state of the environment. It completes its cycle without a data requirement about the result of its action. Output is a function of input.

In accordance with Control Theory, **Control** uses error feedback as a system regulator so that its output conforms to a desired setpoint. By compensating for system disturbances, behavior is normalized in tight tolerance to the setpoint. Regulation is a relentless, unceasing process.

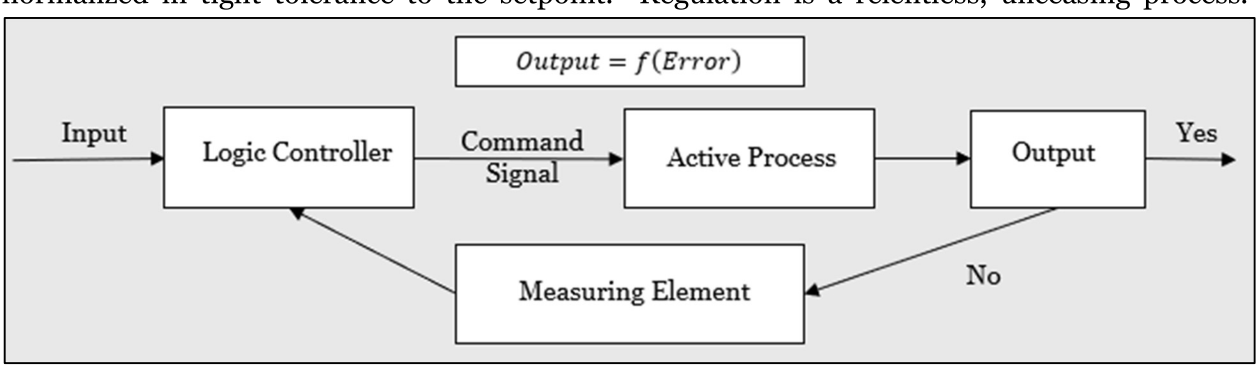

Figure 2: Closed Loop Control

Paul Campbell
Vice President of AI & ML Solutions, facil.ai

Such a system must measure its own output (the variable), calculate the error (the difference between the actual state and the desired state) and feed the error back via Closed Loop to the input. It is dynamic and corrective. It is designed to overcome any factors that would otherwise cause the system to drift away from the target. Automation completes programs well, but Control also factors in value judgments required to keep a process within a tight tolerance. Output therefore is a function of error.

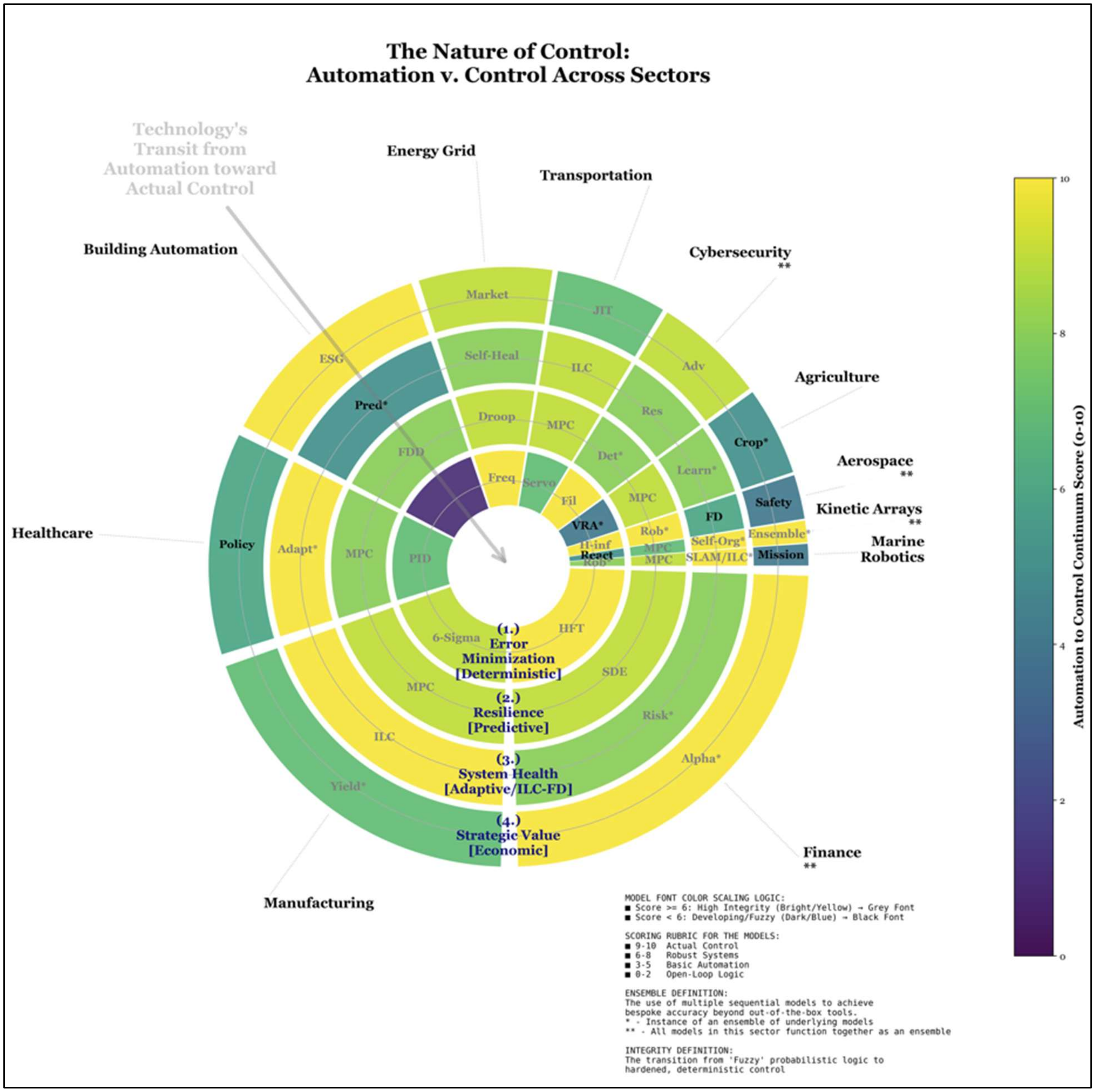

Figure 3: Control vs. Automation Across Sectors

Paul Campbell
Vice President of AI & ML Solutions, facil.ai

Dimension	Radial Feature	Represents…
Width	Wedge Arc	Data Complexity: "The 5 v's": Volume, Velocity, Variety, Veracity & Value
x Length	Rings (1-4)	Scope of Domain: Capacity to address complexity
= Total Segment Area		Control Density: The total "work" the system is doing.

Table 1: Radial Graph Interpretive Summary

Vertical Integration of Stages to Establish Control

The radial graph in **Figure 3** illustrates four stages expressed as rings that each sector must vertically integrate in order to establish control. Together these rings act in concert to establish the Integrity of Control as summarized in **Table 2**. Vertical integration is essentially an endeavor to lengthen the radius to its maximum. Control implies that a sector's rings have been transformed into a tethered, cohesive unit. In other words, with vertical integration control becomes a designed **Immutable Object**.

<table>
<tr><th colspan="5">Integrity of Control</th></tr>
<tr><th rowspan="9">Vertical Integration</th><th>Layer</th><th>Ring</th><th>Description</th><th>Success Measure</th></tr>
<tr><td rowspan="2">Smart</td><td>1</td><td>Minimalize Error (Deterministic)</td><td>Zero variance</td></tr>
<tr><td colspan="3">ESG reporting, predictive analytics, AI-driven dashboards, etc.</td></tr>
<tr><td rowspan="2">Logic</td><td>2</td><td>Resilience (Predictive)</td><td>Stability</td></tr>
<tr><td colspan="3">The cortex that governs how a system interprets its environment and responds with designed Immutable Objects to satisfy the tolerance requirement.</td></tr>
<tr><td rowspan="3">Control</td><td>3</td><td>System Health (Adaptive)</td><td>Longevity / Reliability</td></tr>
<tr><td>4</td><td>Strategic Value (Economic)</td><td>ROI, Payback Period, etc.</td></tr>
<tr><td colspan="3">High-integrity, low-latency feedback loop that returns error correction to achieve a rigid tolerance approaching zero.</td></tr>
</table>

Table 2: The Layers of Control

We would be blind, however, without an instrument for orientation. Thankfully, control can be normalized and measured through modeling techniques. These measures can then be binned and assessments made about the nature or relative state of control achieved in that sector. One should understand that risk is not a single entity but rather a suite that can be exposed in any or all four stages of control. Such proprioception is vital for a well performed enterprise-wide Risk Assessment regime and control should be included as a portfolio item.

Measures for Control Achieved

Supporting the sectors' color gradients in the radial graph are five measures of interest that are detailed in **Table 3**. Two are for Control to gauge how much has already been achieved and two for Control Debt - first cousin to Technical Debt – to gauge how much remains to be achieved. Control Efficiency and Control Debt are complements that sum to 100%.

One could argue that the Risk Index is the fulcrum in Risk Assessment. In this examination, it is a probability of a Building Automation System's controlling logic becoming unable to meet the circumstances it can be expected to face. Some industries can tolerate risk while others seek to eliminate it to the extent possible. Establishing a Risk Index is vital to informed decision-making.

Measure	Calculation	Range	Description
Control Density (Relative to other Sectors)	$\frac{\theta}{2}(R_{outer}^2 - R_{inner}^2)$	>75% of max	Robust
		41% - 75% of max	Calibrated
		<40% of max	Lean
	Mirrors NIST Cybersecurity Framework. Also known as "Control Coverage" or "Defense in Dept".		
Control Efficiency %	$\left(\frac{Control\ Density}{[GDP\ x\ Max\ Pos.Density]}\right) x\ 100$	80% - 100%	Optimal
		50% - 79%	Functional
		< 50%	Subcritical
	Also known as "Control Effectiveness", which industry standards like COBIT or ISO 27001 measure.		
Control Debt (Relative to GDP)	$GDP\ x \sum_{i=1}^{4}(1.0 - s_i)\ x\ w_i$	>60%	Systemic
		21% - 60%	Operational
		<20%	Incidental
	A widely used concept used to gauge remaining risk known in other disciplines as "Technical Debt" or "Residual Risk". Akin to ISO 31000.		
Debt Ratio %	$\left(\frac{Control\ Debt}{[GDP\ x\ Max\ Pos.Density]}\right) x\ 100$	< 20%	Managed
		21% - 45%	Burdened
		> 45%	Toxic
	Also known as "Gap Analysis" in the ERM context.		
Risk Index	$(GDP\ x\ Control\ Debt)x\ Exposure$ *[Exposure is the width of the pie slice in Error! Reference source not found..]*	< 30	Tempered
		31 – 85	Transitionary
		>85	Volatile
	The Risk Index is the measure of the resulting systemic impact when an enterprise's scale finally overwhelms its ability to control its own logic.		

Table 3: Measures for Control and their meaning

Please note that the Control Benchmarks from each ring for each sector in **Figure 3** are only representative of the ring for that sector at large. No score is attributed to the Control Benchmarks directly nor are they factors in the calculation of the measures in **Table 3**.

The analytic value of Control Efficiency and Control Debt resides in understanding the economic dimension and the relative strength of control of each sector. These measures are poles on a continuum and the Risk Assessment is the dynamic vector that finds the operational equilibrium between Risk and Control Integrity. The ability to temper unacceptable realization resulting from risk exposure makes the juice of operational equilibrium worth the squeeze of Risk Assessment. Just as the objective in blade smithing is to create a sustainably sharp edge without becoming brittle, so it is with Risk Assessment.

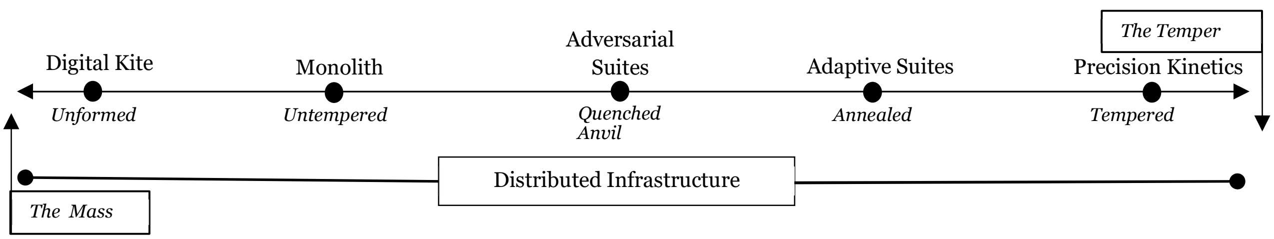

Figure 4: Control Efficiency – Control Debt Continuum

Profiling the Sectors

Profile	Sector(s)	Control Status
The Digital Kite	• Building Automation	**Broken**: top-heavy control structure with no physical grounding (Ring 4)
The Monolith	• Aerospace • Kinetic Arrays	**Rigid**: massive & inflexible density (Rings 3 & 4) that lacks a "Cortex" (Ring 2)
The Adversarial Suite	• Finance • Cybersecurity	**Reflexive**: decentralized control map where rings are in conflict
The Adaptive Suite	• Healthcare • Agriculture	**Symbiotic**: high-efficiency state where the Cortex (Ring 2) and Sensors (Ring 1) work in a tight loop
The Distributed Infrastructure	• Energy Grid • Transportation	**Essential**: high-density, high-width sectors where control implicit in the vertical
The Precision Kinetic	• Manufacturing • Marine Robotics	**Operational**: every ring is perfectly weighted to trigger Immutable Objects the moment a tolerance is threatened; proprioceptive

Table 4: Sectors and their Profiles

Our model categorized each of the eleven sectors into one of six descriptive profiles based on their GDP contributions and produced a Risk Assessment summary statement. This statement accompanies the Control Efficiency, Control Debt and Risk Index measures which then were binned to produce to complete the report card that appears atop each of the profiles that follow.

Table 4 shows the profile assignments and reveals critical statements about the status of control that makes one profile unique from the others. The nature of control varies widely depending upon the sector (i.e., use case) and completeness of vertical integration.

The Digital Kite

<table>
<tr><th>Sector</th><th>Economic Profile (per GDP)</th><th>Control Density</th><th>Control Efficiency %</th><th>Control Debt</th><th>Debt Ratio %</th><th>Risk Index</th></tr>
<tr><td rowspan="3">Building Automation</td><td rowspan="2">Core Infrastructure</td><td>120.0</td><td>75.000</td><td>40.0</td><td>25.000</td><td>40.0</td></tr>
<tr><td colspan="2">Calibrated</td><td colspan="2">Operational</td><td>Transitionary</td></tr>
<tr><td colspan="6">High capital intensity and massive workforce dependency.</td></tr>
</table>

Configuration: This profile has invested in high-level strategic models (Rings 3 and 4) but not in foundational feedback loops (Ring 1) or cortex (Ring 2). This incomplete digital transformation – graphically represented by an insufficient radius length – breaches the mechanical integrity that creates control and settles for the limited value that automation can offer. Hence the Building Automation sector is an uncontrolled digital kite.

Friction: When marketing outpaces engineering in this context, it can create illusory control, amplified by dashboards that convey high resolution views of open loop administered setpoints. This fast food convenience is the mechanism of illusion. There will naturally be units in an alarm state but rarely are the limits of automation looked upon as a factor for those units being in an alarm state in the first place, no matter how well intended and well deployed the automation was.

Integrity: Substantial Control Debt is often the result of accepting automation either as an interval milestone on the journey to control, settling for automation outright or the conflating of automation and control.

The Monolith

<table>
<tr><th>Sector</th><th>Economic Profile (per GDP)</th><th>Control Density</th><th>Control Efficiency %</th><th>Control Debt</th><th>Debt Ratio %</th><th>Risk Index</th></tr>
<tr><td rowspan="3">Aerospace</td><td rowspan="2">Emergent</td><td>19.6</td><td>61.250</td><td>12.4</td><td>38.750</td><td>12.4</td></tr>
<tr><td colspan="2">Calibrated</td><td colspan="2">Systemic</td><td>Tempered</td></tr>
<tr><td colspan="6">High unit value but relatively lower total global economic dimension.</td></tr>
<tr><td rowspan="3">Kinetic Arrays</td><td rowspan="2">Emergent</td><td>14.6</td><td>91.250</td><td>1.4</td><td>8.750</td><td>1.4</td></tr>
<tr><td colspan="2">Robust</td><td colspan="2">Incidental</td><td>Tempered</td></tr>
<tr><td colspan="6">High unit value but relatively lower total global economic dimension.</td></tr>
</table>

Configuration: There is no Integrity Gap in this profile because full integration is not left to chance. With "Mission" comes the expectation of "Mission Success" and a healthy respect for the dire consequences of system failure. Control is zero-sum and sacrosanct. Rigid planning and management are paramount.

Friction: The sectors in this profile absolutely require architectural integrity. No voids at any layer can be tolerated as these industries reside in an environment of vertical determinism. Uncertainty is managed like a variable and requires unity between the software's intent and the hardware's performance.

Integrity: High-frequency loops between the sensors and the devices concerned heavily populate Ring 1. Establishing a foundation at the inner-most ring creates the source of truth that the outer rings (Fault Detection Ensembles and Self-Org Ensembles) are reliant on. Configuration is not defined by perfection, but a Deterministic Recovery Ensemble. If a device fails, the configuration doesn't just create an alert signal for a human to troubleshoot. Rather, it re-writes the control logic instantaneously to maintain the mission objective. The high-level goal is transparent all the way down to the last detail.

The Adversarial Suite

Sector	Economic Profile (per GDP)	Control Density	Control Efficiency %	Control Debt	Debt Ratio %	Risk Index
Finance	Systemic Foundation	294.0	91.875	26.0	8.125	26.0
		Robust		Incidental		Tempered
	Failure would be catastrophic with global impacts.					
Cybersecurity	Systemic Foundation	68.5	85.625	11.5	14.375	11.5
		Robust		Incidental		Tempered
	Failure would be catastrophic with global impacts.					

Configuration: Control in this profile exists in a state of fleeting equilibrium and is thereby quite reflexive. Without precision damping to pre-empt the possibility of control becoming hyper-reflexive and unstable, the system will exhibit high-frequency oscillation and significant overshoot errors when reacting to environmental volatility. Tuning the reflex to the volatility is a matter re-directing the system from reacting to the raw data toward a narrative of the system's state by leaning heavily on the control layer (Ring 3 in **Figure 3**) to affect a **Synthetic Damping**.

Friction: A system in this profile resists movement until a massive amount of control force is applied whereupon the ability to modulate the frequency is lost and the system overshoots. Without modulation, these systems are stubbornly unstable. Lack of modulation is chiefly attributable to an unenviable signal to noise ratio.

Integrity: Signal fidelity is the emblem of achievement for this profile. When a system's susceptibility to overshoot error is externally damped, a state of synthetic stability is achieved, and Control Debt is reduced as a result.

The Adaptive Suite

<table>
<tr><th>Sector</th><th>Economic Profile (per GDP)</th><th>Control Density</th><th>Control Efficiency %</th><th>Control Debt</th><th>Debt Ratio %</th><th>Risk Index</th></tr>
<tr><td rowspan="3">Healthcare</td><td rowspan="2">Core Infrastructure</td><td>123.0</td><td>76.875</td><td>37.0</td><td>23.125</td><td>37.0</td></tr>
<tr><td colspan="2">Robust</td><td colspan="2">Operational</td><td>Transitionary</td></tr>
<tr><td colspan="6">High capital intensity and massive workforce dependency.</td></tr>
<tr><td rowspan="3">Agriculture</td><td rowspan="2">Core Infrastructure</td><td>42.4</td><td>66.250</td><td>21.6</td><td>33.750</td><td>21.6</td></tr>
<tr><td colspan="2">Calibrated</td><td colspan="2">Operational</td><td>Tempered</td></tr>
<tr><td colspan="6">High capital intensity and massive workforce dependency.</td></tr>
</table>

Configuration: Systems in this profile must modulate the amplitude rather than the frequency. Systems in this profile are challenged to create the capacity or headroom to handle the peak volume without losing efficiency in the lower volumes. Known as Dynamic Range, it emphasizes Scaling rather than Filtering like with the Adversarial Suite, but it does so at a cost (known by "Inertial Surcharge, "Efficiency Tax", etc.). As with any heavy and immediate scaling, adding capacity requires significant resource support but there is a quasi-buyback with the ability to scale back down for the lower volumes.

Friction: In the Adaptive Suite , efficiency is lost in proportion to the distance the system is from the its design point. Significant resource support is required to overcome its own Static Inertia during the initial transition between low-output and high-output states and then with disproportionate resource support overcome the end range as the system approaches its capacity. The non-linear, at-will nature of resource support is the "tax" paid for the speed of adaptation. It contrasts starkly to the nature of steady state operations in terms of efficiency.

Integrity: Systemic elasticity is the chief quality required in this profile and is defined by the ability to scale to peak amplitude without exceeding the mechanical elastic limit. A high-integrity state ensures the system recovers to baseline without retaining Control Debt, preempting hysteresis where a system's latency causes it to remain at peak intensity longer than the physical demand requires.

The Distributed Infrastructure

<table>
<tr><th>Sector</th><th>Economic Profile (per GDP)</th><th>Control Density</th><th>Control Efficiency %</th><th>Control Debt</th><th>Debt Ratio %</th><th>Risk Index</th></tr>
<tr><td rowspan="3">Energy Grid</td><td rowspan="2">Established Vertical</td><td>84.0</td><td>87.500</td><td>12.0</td><td>12.500</td><td>12.0</td></tr>
<tr><td colspan="2">Robust</td><td colspan="2">Incidental</td><td>Tempered</td></tr>
<tr><td colspan="6">Mature industries with significant but localized economic footprints.</td></tr>
</table>

Configuration: Asynchronous Latency and Protocol Fragmentation are the chief obstacles to proper control in this profile, where asset management has to bridge wide geographic dispersion while accounting for a range of technical generations. In a manner of speaking, this profile must be a time-traveling polyglot able to handle the stresses of simultaneous amplitude (latency) and frequency (multi-language) modulation. It could be asserted that this profile is an amalgam of the Adversarial Suite and Adaptive Suite profiles.

Friction: Jitter occurs when the system cannot discern a change in volume (Amplitude) or a change in timing/language (Frequency) in its effort to provide the appropriate solution. Communications networks know this challenge all too well.

Integrity: Integrity for this profile seeks temporal and semantic coherence, which address Asynchronous Latency and Protocol Fragmentation respectively. Achieving a translated, time stamped and verified transcript of the raw data (occurring in Ring 3 in **Figure 3**) ensures that the global control remains synchronized even as individual nodes manage the localized friction, with a suite of fail safes being the guardian of coherence much the way circuit breakers maintain the integrity its circuit.

The Precision Kinetic

<table>
<tr><th>Sector</th><th>Economic Profile (per GDP)</th><th>Control Density</th><th>Control Efficiency %</th><th>Control Debt</th><th>Debt Ratio %</th><th>Risk Index</th></tr>
<tr><td rowspan="3">Manufacturing</td><td rowspan="2">Core Infrastructure</td><td>216.0</td><td>84.375</td><td>40.0</td><td>15.625</td><td>40</td></tr>
<tr><td colspan="2">Robust</td><td colspan="2">Incidental</td><td>Transitionary</td></tr>
<tr><td colspan="6">Physical and digital backbones. High capital intensity and massive workforce dependency.</td></tr>
<tr><td rowspan="3">Transportation</td><td rowspan="2">Established Vertical</td><td>64.0</td><td>80.000</td><td>16.0</td><td>20.000</td><td>16.0</td></tr>
<tr><td colspan="2">Robust</td><td colspan="2">Operational</td><td>Tempered</td></tr>
<tr><td colspan="6">Mature industries with significant but localized economic footprints.</td></tr>
<tr><td rowspan="3">Marine Robotics</td><td rowspan="2">Emergent</td><td>11.3</td><td>70.625</td><td>4.7</td><td>29.375</td><td>4.7</td></tr>
<tr><td colspan="2">Calibrated</td><td colspan="2">Systemic</td><td>Tempered</td></tr>
<tr><td colspan="6">High unit value but relatively lower total global economic dimension.</td></tr>
</table>

Configuration: This profile is characterized by its requirement of a near-zero latency control narrative to maintain the total synchronization of high-speed mechanical phases. Offsetting the oscillation of harmonic resonance fluidly is the signature of this profile.

Friction: Control is a challenge of multi-variable optimization in low dimensional space. The computational and mechanical energy required to steer the system away from destructive vibrational frequencies is the efficiency tax in this profile.

Integrity: For this profile where low dimensional space is a chief feature, integrity is commonly maintained through Model Predictive Control. MPC is a highly effective vehicle to achieve a high-frequency fail-safe that anticipates and suppresses harmonic resonance before intolerable oscillation or resonance occurs. This is distinct from passive damping. It is active cancellation much like we experience with noise cancelling headphones.

Control Profiles & Measures by CBECS Building Category

The most recent Commercial Building Energy Consumption Survey (CBECS) dataset from 2018 was published by the Energy Information Administration in 2022. Within this survey, the EIA established 21 categories of buildings and for this analysis these building categories were grouped into their profiles based on their measures for control and control debt.

These data were plotted in **Figure 5**. Quadrant boundaries were set at the mean value for each axis, Realization Risk (a.k.a. Realization Index) and Control Debt. Quadrants were then labeled to describe risk status. As an added layer of assurance, Control Efficiency Percentage was used as the measure to assert where on the control – control debt continuum that a building type resides.

The closer to the intersection of the two axes, the expectation is that control should be more efficient. While several building types occupy the Precision Leaders quadrant where there is low risk and low debt, their Control Efficiency Percentages reveal an interesting nuance: the conflict between the Control Efficiency Percentage and the Risk Index revealed the presence of Active and Passive building types among Precision Leaders. Those with high Control Efficiency Percentages are there by intention and those with low Control Efficiency Percentage are there by happenstance.

Observations

The quadrants in **Figure 5** hew to a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis format, while the building profiles represent dynamic assets roaming that landscape by means of their risk measures. The objective is simple: to assess how to move assets from left to right by liquidating Control Debt. While the objective is simple, the value judgements may prove more challenging to those making the decisions. Interestingly, other than one outlier in this analysis of buildings by type, we only have the Threat of Systemic Fragility and the Strength of Precision, so the general way forward for risk mitigation has near universal application.

Precision Leaders Quadrant (Strengths)

Passive Leaders: The Control Efficiency Percentage acts like a vector that reveals that six of the twelve plots in this quadrant have low control efficiency. The buildings in these sectors only appear free of realizable risk because their current GDP Mass (smaller plot circle) or Control Width (thinner pie slice) is too small to trigger catastrophic realization. However, their low Control Efficiency percentages indicate a significant technical or logic deficiency. These sectors are not implicitly precise, but rather untested. Once these assets scale up or placed into more complex operational environments, they will lack the 'tempered' governance required to stay stable, at which time they will plot into the Systemic Fragility quadrant

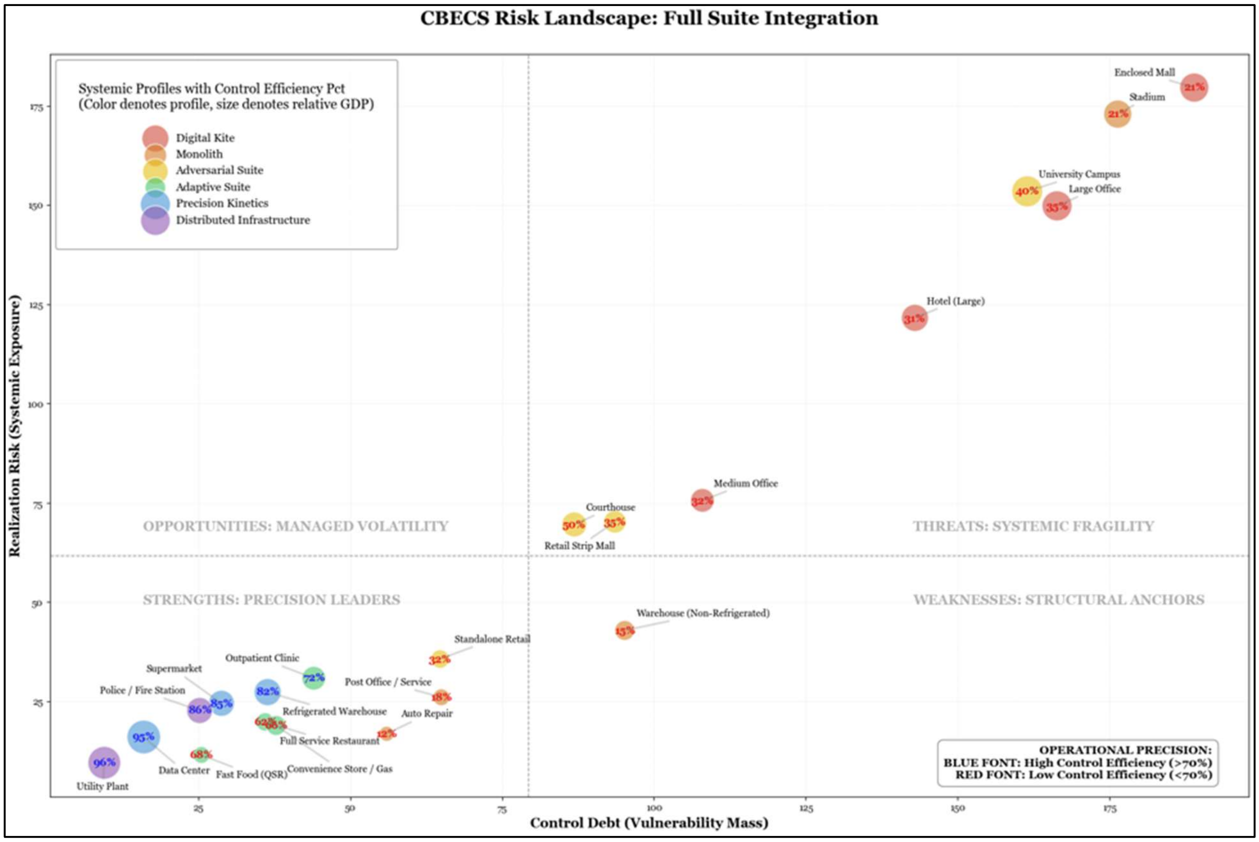

Figure 5: Risk Map Overlaid on CBECS Building Categories

Active Leaders: The three profiles covering nine building types exhibit the greatest control implicitly. The Distributed Infrastructure, Precision Kinetics and Adaptive Suite profiles all plot entirely within the "Precision Leaders" quadrant. The six plots with high control efficiency percentages are actively managing their risk. The other three plots are all from the Adaptive Suite and sit just outside the threshold for high control efficiency so while they are categorically passive, they are only marginally so and good candidates for mild intervention.

Structural Anchors Quadrant (Weaknesses)

This quadrant is defined by mass (somewhat larger plot circle indicating greater GDP), but manageable Control Debt due to the lower system requirements. The only building type plotting in this quadrant is the non-refrigeration warehouse, which seems appropriate at first sight. Its high Control Debt is consistent with its poor Control Efficiency percentage, but these measures are masked by a low risk index, which should still be acknowledged. This is a problem of latency.

Managed Volatility Quadrant (Opportunities)

This unoccupied "Ghost Quadrant" reflects a limit in this analysis: a sector capable of maintaining >70% Control Efficiency while managing high Exposure/Mass migrates effectively and quickly toward becoming a Strength. Survival in this quadrant requires a parity with Aerospace technology that current building automation technology has yet to achieve. In other words, this ghost effect indicates that risk has already been managed by those best situated to manage it, meaning it would be exceedingly rare to find their lightning in this bottle. This nexus is just not found among the CBECS building types.

System Fragility Quadrant (Threats)

The Digital Kite, Monolith & Adversarial Suite profiles covering eight building types exhibit the least control and plot mostly within the System Fragility quadrant. Their GDP contribution and high risk exposure have outpaced their ability to govern themselves. Generally speaking, these three profiles in this quadrant find themselves constrained by physics because of delicate control (weak tether to Rings 1 and 2 in **Figure 3**.) or expense of Control Debt or unstable control respectively. We can conclude that as a building's GDP contribution and risk exposure scale, a type of initially voluntary efficiency tax becomes progressively threatening and that increasing Control Efficiency is a survival requirement to prevent the gravity of mass from collapsing the system.

Conclusion

In the built environment, properly assessed low risk is a dynamic result of operational precision. This analysis illustrates that the greatest threat isn't buildings most exposed to risk, but those passively low risk buildings that exhibit low Control Efficiency percentages that coast along on their low risk building profiles while masking or accepting underlying technical gaps. Low risk does not always equate to good management. Coasting on profile inertia in the face of low control efficiency is the smoke before the fire.