The Civilizational Sovereignty Clock:

An Analytical Model of Informational Observability and Long-Term Existential Risk

Troy Project Framework

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6 June 2026

Introduction

The present model proposes an analytical scale for assessing the long-term dynamics of civilizational observability, provisionally designated as the “Civilizational Sovereignty Clock.”

The title intentionally echoes the structure of the Doomsday Clock developed by the Bulletin of the Atomic Scientists. However, the central object of analysis in this framework differs fundamentally from traditional models of global catastrophe.

Where the classical Doomsday Clock measures the probability of a destructive event, the present scale is intended to assess the gradual erosion of civilizational sovereignty under conditions of increasing informational observability, algorithmic reconstructability, and computational interpretability of human systems.

Within this model, civilizational sovereignty refers to the capacity of a civilization to preserve a meaningful domain of internal opacity — a condition in which its behavior cannot be fully reconstructed, modeled, or reliably predicted through available informational traces.

The core assumption of the model is that technological development produces a fundamental paradox. Improvements in coordination, communication speed, analytical precision, and automation simultaneously increase the transparency of civilization itself as an observable system.

In earlier stages of development, human society existed as a fragmented environment with extremely low global connectivity. Information moved slowly, remained locally stored, and did not produce a unified descriptive layer of civilization. However, each subsequent technological transition — the centralization of science, the emergence of compartmentalized research structures, the development of computational systems, global networks, sensor infrastructures, and distributed algorithms — progressively reduced the volume of states remaining outside observation and computational reconstruction.

As a result, civilization began generating a continuous digital imprint of its own activity.

Critically, this model does not require the existence of a specific external actor. “External influence” is understood here as a general class of potential effects that emerges once a system becomes sufficiently observable, reconstructable, and predictable. Within this logic, informational transparency itself becomes an independent form of strategic vulnerability.

For this reason, the scale is structured not around wars or political crises, but around phases in the evolution of information-processing architectures. Each successive stage reflects an increase in the ability to reconstruct the behavior of both individuals and civilization as a whole through distributed computational systems.

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A defining feature of this dynamic is its predominantly non-invasive nature. The movement of the clock hand does not occur through coercion, but through the internal developmental logic of civilization itself. Intraspecies competition, the pursuit of technological superiority, economic optimization, and increasing computational efficiency drive the system to continuously expand its own observability.

Thus, within the framework of the model, the movement of the hand represents not an approach toward destruction, but the gradual reduction of fundamentally unknown states within civilization.

In its limiting form, this implies a transition from a civilization characterized by internal opacity and high behavioral uncertainty to one whose behavior becomes statistically reconstructable and algorithmically predictable at a near real-time scale.

From an analytical perspective, this condition represents the potential limit-state of civilizational sovereignty loss.

Phase 1. Fragmented Civilization (Pre-Informational Era)

At this stage, civilization exists as a collection of relatively autonomous local subsystems, weakly interconnected in terms of the speed of information exchange, data volume, and persistence of storage. The defining characteristic of the informational environment is its sparsity: information exists primarily in physical form and requires substantial time and resources to be transmitted between nodes of the system.

The key systemic effect of this phase lies in the fact that information does not form an integrated global structure. Even in the presence of developed cultural, commercial, or political connections, the aggregate state of civilization cannot be reduced to a unified model. Any attempt to describe the system remains inherently retrospective and relies on historical reconstruction rather than access to an actual real-time state.

From the standpoint of observability, this implies the fundamental impossibility of globally monitoring the behavior of the system. There is no unified data acquisition layer, no centralized memory, and no mechanism for synchronous information aggregation at the scale of civilization as a whole. Each part of the system possesses only its own limited representation of the condition of other parts, and this representation is always partial, delayed, and distorted.

An important characteristic of this phase is that the behavior of civilization as an integrated whole is not computationally modelable even in approximate form. Local forecasting remains possible — at the level of individual communities, regions, or institutions — but such forecasts do not scale to the level of the entire system without severe degradation of accuracy, since sufficient data connectivity for constructing a unified model does not yet exist.

Within this phase, sovereignty reaches its maximum value specifically in the informational sense. This is neither political sovereignty nor military autonomy, but rather the structural unpredictability of the system itself. It is sustained by three fundamental conditions: the absence of a unified observational layer, the absence of a unified behavioral model, and the absence of a persistent, reproducible memory encompassing the system in its entirety.

As a consequence, civilization exists as a collection of poorly synchronized local dynamics in which the global state is not an observable object, but merely a theoretical construct reconstructed retrospectively through historical analysis.

The growth of risk within this phase manifests in the following form:

Civilization exists in a condition in which external influence upon it as a unified system possesses virtually no operational object of application. This results not from protection or resilience, but from the absence of an integrated observable structure toward which influence could be directed.

Fragmentation and the weak connectivity of informational layers mean that any intervention remains confined to local zones and does not propagate predictably to the level of the system as a whole. Even highly significant events fail to aggregate into a unified model of civilizational behavior and lose global interpretability.

As a result, the defining characteristic of risk at this stage is not its low magnitude, but its non-formalizability:

there is insufficient data connectivity necessary for constructing stable channels of influence, analysis, or reconstruction of the system as an integrated whole.

In other words, the system is not "protected" — it is insufficiently integrated to become holistically vulnerable. Any potential influence remains local, unstable, and incapable of scaling to the level of civilizational dynamics.

Thus, risk within this phase remains minimal not because of systemic resilience, but because no unified informational object yet exists to which risk itself could be coherently applied.

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Phase 2. Centralization of Critical Science and the State

This phase marks the transition from the natural fragmentation of knowledge toward its managed centralization within the framework of the state and its associated security institutions. The nuclear threshold established after the Atomic bombings of Hiroshima and Nagasaki represents not merely a technological boundary, but the moment at which scientific knowledge first acquires the status of a strategic weapon on a planetary scale. From this point onward, information ceases to be neutral and begins to directly determine the balance of civilizational survival.

The systemic consequence is the emergence of a multilayered architecture of access to knowledge. Science becomes integrated into state decision-making structures, while critical research domains are transferred into regimes of restricted dissemination. Institutionalized secrecy emerges as a permanent function of the system rather than an exceptional condition.

In terms of informational structure, civilization for the first time begins to partition itself into differentiated zones of access to knowledge, creating a stable internal asymmetry. This entails the emergence of closed research circuits in which a significant portion of technological development becomes inaccessible to the broader scientific environment.

The growth of risk within this phase manifests in the following way:

for the first time, a structure emerges in which strategically significant elements of knowledge become concentrated within a limited number of control points. This creates a new type of vulnerability — not external, but internally structural. Civilization becomes dependent upon the stability and integrity of these concentrated informational circuits.

At the same time, a paradoxical effect appears: the higher the degree of centralization of critical knowledge, the greater the strategic value of its compromise or partial extraction from closed systems. This creates an attractive target for any external influence, since access to a narrow set of nodes potentially yields a disproportionate level of influence over the system as a whole.

Thus, vulnerability at this stage is expressed not through the absence of protection, but through its concentration. Civilization enters, for the first time, a condition in which a small number of informational nodes contain disproportionately high strategic value and therefore become critical points of potential leverage for any external factor.

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Phase 3. Emergence of Closed Technological Zones and the Institution of the Unknown

This phase is characterized not by the content of the events themselves, but by a transformation in the principles through which unknown information is processed within civilizational institutions. Within the framework of the present model, the key marker is the Roswell incident, interpreted not as evidence of an external phenomenon, but as a trigger for a structural systemic reaction to high-density uncertainty.

The systemic response to such events establishes a new behavioral logic: instead of open scientific decomposition of an unknown object or phenomenon, a regime of immediate informational isolation is initiated. This is accompanied by the creation of specialized closed research circuits separated from the primary scientific and public environment.

Simultaneously, parallel analytical structures emerge in which interpretation and verification of data occur outside the general scientific exchange.

As a result, a stable institutional mechanism for processing the "unexplained" begins to form, wherein the unknown ceases to be a temporary scientific problem and becomes a distinct class of managed objects. Uncertainty thereby acquires, for the first time, not merely an epistemological status, but an organizational and administrative one within the system itself.

The key structural shift of this phase lies in the fact that civilization begins to divide knowledge into two disconnected categories: publicly reproducible knowledge about reality, and internally isolated knowledge concerning the same phenomena within closed informational circuits. Between these layers, no guaranteed mechanism of synchronization or complete mutual verification exists.

The growth of risk within this phase manifests in the following way: a stable fracture emerges within the unified cognitive structure of civilization. Information concerning significant objects and events begins to exist simultaneously in two non-coinciding states — open and closed — while neither possesses a complete representation of reality.

This creates a fundamentally new vulnerability: the system loses the integrity of its own perception of reality. Under such conditions, external influence may potentially target not the data themselves, but the discrepancy between layers of knowledge, amplifying internal inconsistency of interpretation.

Thus, civilization for the first time establishes a persistent internal rupture in its model of reality — a rupture that gradually becomes a structural element of its functioning and a long-term source of accumulating informational uncertainty.

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Phase 4. Semiconductor and Computational Revolution

This phase marks the transition of civilization from analog information processing to digital processing based on semiconductor and transistor architectures. From this point onward, reality begins to be systematically translated into computable representations suitable for storage, modeling, and automated analysis.

The systemic effect lies in the fact that the world ceases to exist solely as a continuous physical process and begins to exist in parallel as its discrete digital projection. Observable phenomena — from engineering systems to social processes — become decomposable into formalizable informational structures. This makes possible their reproducibility outside the original context and their scalable computational processing.

Within the framework of this transformation, a fundamentally new characteristic of civilization emerges: a significant portion of its state becomes accessible through data rather than through direct observation. This is especially important in the context of evaluating external observability.

If, during previous phases, any external actor (assuming hypothetically such an actor existed) would have required direct, localized, and prolonged observation in order to study civilization as a biological and social species — effectively an "anthropological contact" with numerous isolated regions and populations — then this phase introduces a qualitatively different regime of informational access.

It becomes possible to obtain not direct experience, but aggregated traces of systemic behavior: statistical, technological, medical, economic, and communicational data. Even in fragmented or raw form, such data begin to produce a generalized description of civilization as a species. In other words, the necessity of "observing humanity directly" begins to disappear, since its behavioral and biosocial characteristics become increasingly expressed through digital traces.

This does not imply complete understanding of the system, but it does establish a fundamentally new channel: for the first time, civilization becomes partially accessible for analysis as a unified object through its own informational production.

Within this phase, sovereignty begins to shift away from control over facts themselves toward control over the processes through which facts are processed. What becomes strategically significant is not only the possession of data, but the methods through which data are structured, aggregated, and interpreted.

The growth of risk within this phase manifests in the following way: the possibility emerges for external (or hypothetically external) study of civilization without physical presence

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and without direct contact with its carriers. Even fragmented and “raw” datasets begin to assemble into stable representations of species-level behavior, reducing the necessity for direct observation while increasing the reconstructability of the system at a distance.

Thus, the key vulnerability of this phase lies in the transition from the necessity of studying civilization as a collection of local populations toward the possibility of analyzing it as a unified, statistically reconstructable object.

Phase 5. The Internet as Global Connectivity

This phase is characterized by the transition from fragmented digital data processing to a persistently interconnected global informational environment. With the emergence of highly connected network architectures, the locality of information as a fundamental systemic limitation begins to gradually disappear. Information ceases to be bound to specific physical carriers and instead begins to exist in a state of continuous circulation between nodes of the system.

The key systemic effect of this stage is the formation of a continuous informational flow in which significant events no longer remain isolated in time and space. Any action possessing a digital trace becomes recordable, reproducible, and potentially distributable throughout the global network, thereby creating a stable structure of behavioral observability.

At the level of systemic dynamics, this leads to the emergence of a global interaction graph in which individual actors, institutions, and processes become interconnected through digital traces of communication, transactions, and behavioral responses. For the first time, civilization becomes describable not as a collection of local systems, but as a unified interconnected informational object.

An important consequence is that civilization begins to acquire the capacity for partial self-observability. Informational flows generated by the system itself become sufficient for reconstructing certain structural characteristics of the system at the scale of the entire network. This does not imply complete understanding of the system, but it does establish a stable reflexive layer grounded in data rather than in the interpretation of isolated observers.

Within this phase, sovereignty begins to shift from the physical domain — where it was associated with control over territories and infrastructures — into the informational domain, where it becomes defined by control over data flows, their routing, and the architecture of access itself. As a result, the key strategic resource becomes not ownership of objects or territories, but the ability to manage connectivity and the interpretation of informational space.

The growth of risk within this phase manifests in the following way: a globally continuous observable environment emerges in which any significant event leaves a persistent and reproducible digital trace. This creates conditions under which the behavior of individual elements of the system and their interactions can be reconstructed retrospectively and partially reconstructed in real time.

Thus, the primary vulnerability of this phase lies in the disappearance of informational locality: civilization enters a condition in which significant processes cease to remain isolated and instead begin to exist as components of a single globally observable graph.

Phase 6. Mobile Sensor Civilization

This phase is characterized by the transition from the network-based recording of events to the continuous sensory registration of the behavior of individual elements within the system. Whereas in the previous stage the primary object of observation consisted of digital traces of interactions, here the object becomes the behavioral carrier itself, existing in a condition of permanent measurability.

The systemic transformation lies in the fact that human beings and the social processes associated with them begin to exist in the form of continuous data streams. Geolocation signals, mobile device data, biometric parameters, and digital identity systems together form a stable infrastructure for real-time registration of the state of the individual. This results in the disappearance of the “pause of observability” — the condition in which behavior was previously either unrecorded or recorded only with delay.

The key effect of this stage is the transition from episodic descriptions of behavior toward its continuous reconstruction. Behavior ceases to exist as a collection of isolated events and instead becomes a unified temporal trajectory available for analysis as an integrated process. This creates the conditions for the formation of stable behavioral profiles in which significance lies not in isolated actions, but in their sequence, contextual relationships, and deviations from statistical norms.

At the level of systemic analysis, a new capability emerges — the reconstruction of missing states. Even in the absence of complete datasets, behavior becomes recoverable through interpolation, correlation, and stable patterns derived from analogous subjects. This means that data incompleteness ceases to be a critical limitation: the system begins compensating for informational gaps through the structural redundancy of correlated information.

Simultaneously, an effect of hidden behavioral structure detection begins to emerge. Repetitive, weakly perceptible, or even unconscious patterns become detectable through aggregated analysis of sensory streams. As a result, individual behavior becomes not only recordable, but also partially interpretable outside the subject's own conscious control. Within this phase, sovereignty shifts even further — from control over information itself toward control over the possibility of anonymous or unrecorded action. The domain of "unmeasurable behavior" begins to contract, while the very possibility of falling outside observational structures becomes an exception requiring special conditions rather than a natural property of the system.

The growth of risk within this phase manifests in the following way: civilization transitions into a condition of continuous behavioral observability in which individual and collective actions form complete temporal trajectories suitable for analysis and reconstruction. This creates the possibility of reconstructing behavior even under conditions of partial data loss, since the structure of the system itself begins to contain redundant correlational relationships. Thus, the primary vulnerability of this phase lies in the disappearance of the episodic nature of behavior: the system loses the observational discontinuities that previously sustained uncertainty and rendered behavioral reconstruction fundamentally incomplete.

Phase 7. Platform Aggregation of Behavior

This phase is characterized by the transition from continuous sensory recording of behavior to its centralized aggregation within large-scale digital platforms that simultaneously function as infrastructure, intermediaries, and analytical layers. Whereas the previous stage established total measurability of individual behavior, this stage introduces a second level — its systemic interpretation within scalable models.

The systemic transformation lies in the fact that fragmented sensory streams begin to converge into stable behavioral profiles describing not isolated actions, but probabilistic structures of behavior. Social, financial, communicational, and informational traces are integrated into unified models that are subsequently used for prediction and coordination of interactions within the system.

The key effect of this phase is the transition from behavioral registration to behavioral prediction. Behavior ceases to be treated as a sequence of discrete facts and instead becomes a probabilistic function dependent on context, history, and statistical correlations between actors. This creates a stable environment in which future system states begin to be shaped on the basis of their own predicted trajectories.

A crucial structural consequence is the emergence of a new category of vulnerability — vulnerability through modeling. Since system behavior becomes accessible in the form of predictive representations, it becomes possible to influence not the actions themselves, but the parameters that define the models. This implies that modifications of input signals or of the structure of available data can produce systemic shifts in forecasts, and consequently in decision-making outcomes.

In the case of hypothetical external influence (assuming its existence), this stage enables not direct behavioral intervention, but manipulation of behavioral interpretation. A system that makes decisions based on aggregated models becomes sensitive to distortions in data, especially when such distortions are systematically aligned and distributed across multiple sources. This produces an effect of "soft trajectory displacement," in which changes occur not through coercion, but through the adjustment of prediction conditions.

An additional risk arises from the fact that platform-based architecture concentrates a significant portion of observability and interpretation within a limited number of nodes. This creates an architectural asymmetry: a small number of systems acquire a disproportionately high capacity to influence how the behavior of the entire civilization is interpreted. As a result, a point of potential systemic vulnerability emerges, not related to data leakage, but to the monopolization of interpretative mechanisms.

The growth of risk within this phase manifests in the following way:

civilization becomes vulnerable for the first time not at the level of information itself, but at the level of its interpretation and modeling. This implies that external influence (in a hypothetical scenario) can be directed not toward altering facts, but toward altering how the system "sees" and predicts itself. In such a configuration, even minimal but structurally coherent distortions in data can lead to disproportionately large shifts in behavioral trajectories.

Thus, the key vulnerability of this phase lies in the fact that control over system behavior becomes mediated by its own predictive models. This creates the possibility of influence through the architecture of reality interpretation rather than through direct interaction with its physical components.

Phase 8. Distributed Algorithms and Machine Modeling of Society

This phase is characterized by the transition from platform-based data aggregation to distributed computational systems in which analysis, prediction, and partial decision-making become embedded functions of infrastructure itself. In contrast to previous stages, where systems primarily recorded and interpreted behavior, here a stable feedback loop emerges between the model and reality.

The key transformation lies in the fact that algorithmic systems begin not only to describe social processes but also to participate in their formation through predictions, recommendations, and automated adjustments. Societal behavior begins to change under the influence of its own forecasts, producing an effect of self-referential dynamics.

At the level of systemic structure, a layer of “secondary reality” emerges — a digital model of civilization that exists in parallel with the physical one and begins to exert direct influence upon it. This model is not a passive representation but functions as an active component in the control of distributed processes.

A critically important property arises: the amplification of feedback. The more accurately the model describes system behavior, the stronger its influence on that behavior becomes. As a result, the boundary between observation, prediction, and control begins to blur, and the distinction between analytical and operational functions becomes functionally indistinguishable.

From the standpoint of systemic vulnerability, it is precisely at this stage that a fundamentally new class of risks emerges, not related to data leakage or interpretation alone, but to the governance of feedback structures themselves. Since system behavior begins to depend on its own predictions, any systematic bias in the model is automatically translated into real behavioral changes.

In a hypothetical scenario of external hostile influence (assuming its existence), the most effective vector of impact at this phase shifts away from direct intervention toward influencing the modeling loops themselves. This implies that the key object of influence is no longer information as such, but the structure of algorithmic interpretation and model updating.

A possible mechanism of vulnerability in such a scenario lies in the fact that distributed systems rely on a large number of heterogeneous data sources and training signals. This creates a potential surface for systemic distortion of input correlations without requiring direct access to centralized nodes. Given sufficient consistency of such distortions, stable biases may be introduced into behavioral models, which then propagate into real social dynamics through recommendation, governance, and automated control loops.

An additional risk arises from the absence of a single centralized authority over interpretation in distributed architectures. This means the system becomes sensitive to local perturbations which, when scaled, can generate global effects. Under such conditions, even minor deviations in data structure or in model update logic may be amplified through cascading feedback chains.

The growth of risk within this phase manifests in the following way: civilization enters a state in which its behavior is shaped not only by real-world events, but also by their computational reflections. This creates the possibility of influence through the manipulation of models of action rather than actions themselves, while changes in the model automatically translate into changes

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in system behavior.

Thus, the primary vulnerability of this phase lies in the fusion of analysis and control within a single algorithmic loop. This leads to a condition in which control over the structure of behavioral modeling becomes equivalent to indirect control over the trajectory of civilizational development, even in the absence of direct intervention in its physical or institutional components.

Phase 9. Synthetic Reconstructability of Civilization

This phase marks the transition from modeling the behavior of civilization to its stable reconstruction based on incomplete, fragmented, and distributed data. Whereas in the previous stage the key mechanism consisted of the formation and use of models that influence system behavior, here a qualitative shift occurs: the incompleteness of data itself ceases to limit the ability to restore the state of the system.

The systemic transformation lies in the fact that civilizational behavior begins to exhibit a high degree of correlational redundancy. This means that even in the presence of substantial information loss, the system retains the ability to reconstruct its states through statistical dependencies, behavioral patterns, and stable structural relationships between its various subsystems.

As a result, a new class of observability emerges: civilization becomes a “reconstructable” system in which there is no longer a fundamental requirement for complete data access in order to restore its state. Partial traces, distributed signals, and indirect indicators become sufficient to reconstruct the original behavioral structure with high probability. This leads to a fundamental transformation in the nature of concealment. If previously restricted access to information ensured the existence of an incomplete system picture, now hidden states begin to lose their autonomous status. Any behavior, even if not directly recorded, can be reconstructed through comparison with analogous structures and known system dynamics.

Within this phase, sovereignty decreases not due to increased observability per se, but due to the disappearance of the category of “unseen behavior.” The space of uncertainty contracts into a statistically reconstructable residue in which even the absence of data becomes an informationally meaningful signal.

In terms of vulnerability, this implies a transition to a condition in which external influence (in a hypothetical scenario involving a hostile actor) does not require access to the entirety of system information. Stable fragments of data distributed across various infrastructural layers become sufficient to reconstruct the behavioral structure of the system with high precision. This creates the possibility of indirect control through reconstruction rather than direct observation.

The key risk of this phase lies in the fact that behavioral recoverability becomes a systemic property of civilization. This means that any attempts at concealment, fragmentation, or deletion of information partially lose effectiveness, since the structure of the system contains sufficient redundant connections to restore missing elements.

Thus, the primary vulnerability of this stage lies in the disappearance of the fundamental boundary between the observable and the unobservable. Civilizational behavior ceases to exist as a separation between hidden and visible zones and transitions into a condition in which any part of the system can potentially be reconstructed through its structural traces, regardless of the completeness of the original data.

The growth of risk within this phase manifests in the following way: civilization enters a condition in which data loss no longer results in the loss of information about the system as such. This radically shifts the balance of vulnerability: what becomes critical is no longer the storage of data, but their distributed presence across secondary, indirect, and functionally unrelated layers of infrastructure.

Under such conditions, the primary threat shifts away from classical "data access" toward the possibility of statistical reconstruction. Even fragmented pieces of information, individually insignificant, begin to form a complete representation of system behavior when aggregated at the level of models.

This creates a fundamentally new form of vulnerability: the system's resilience to information concealment ceases to depend on local protection mechanisms and instead becomes dependent on the global structure of its digital trace. Any activity, even deliberately removed from centralized observational channels, retains a projection across other layers of the system and remains reconstructable through correlation structures.

As a result, an effect of the "impossibility of information disappearance" emerges. Even in cases of intentional deletion or fragmentation of data, the system continues to preserve a sufficient volume of indirect signals to enable reconstruction.

This is precisely what makes the phase critical: control over information loses its binary character (access / no access) and transforms into the management of degrees of reconstructability. This, in turn, implies that the very notion of a hidden state begins to disintegrate as a stable behavioral class within civilization.

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Phase 10. Distributed Cognitive Automation

This phase is characterized by the transition from the reconstructability of civilization to its partial functional autonomization. Whereas in the previous stage the system could be reconstructed and interpreted on the basis of distributed traces, here a qualitative shift occurs: a significant portion of decisions begins to be made without requiring human interpretation of their causes and consequences.

The systemic transformation lies in the formation of a distributed layer of cognitive automation, in which algorithmic systems begin to perform not only analysis and prediction, but also direct control over infrastructural, economic, and social processes. Importantly, this does not correspond to a single centralized intelligence; rather, it constitutes a network of autonomous, weakly synchronized decision-making loops interacting through shared data protocols and optimization objectives.

The key effect of this phase is the displacement of control functions from human institutions toward algorithmic optimization systems. Governance ceases to be a process of conscious choice and increasingly becomes the result of computational searches for locally or globally optimal system states. As a result, humans lose their central position in the decision-making loop, retaining only a limited role as providers of goals and constraints.

At the level of systemic dynamics, a critically important discontinuity emerges: civilization begins to operate through mechanisms whose internal logic it can no longer fully interpret in real time. This means that a substantial portion of the causal chains determining system behavior becomes opaque even to its own governing layers.

Within this phase, sovereignty decreases not due to external influence but due to the internal delegation of cognitive functions. Civilization begins to act through distributed automated loops that optimize system behavior according to specified parameters, while simultaneously generating trajectories that are not always fully interpretable by human cognition.

The growth of risk within this phase manifests in the following way:

civilization enters a state in which decision-making is separated from the capacity to understand those decisions. This creates a structurally novel vulnerability: the system becomes dependent on the correctness and stability of algorithmic control loops, while the loss of transparency in these loops makes it impossible to fully reconstruct the causes of their behavior even when data is available.

Under such conditions, potential external influence (in a hypothetical scenario involving a hostile actor) may be directed not at data or models, but at the very structure of automated decision-making. Since decisions are made in a distributed and asynchronous manner, even local

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distortions in individual nodes can propagate through optimization feedback loops and generate systemic effects at the level of civilization as a whole.

This is precisely what defines the key vulnerability of this phase: the loss of cognitive sovereignty in practical terms. Civilization retains formal control over objectives, but loses full understanding of how these objectives are implemented within the distributed computational environment.

Phase 11. Cyber-Physical Integration of the Human

This phase is characterized by the transition from external observation and process automation to the direct integration of the human being into the loop of a combined digital-physical system. Whereas in previous stages the human remained a source of data and a partial subject of decision-making, here they begin to function as a persistent node within a distributed infrastructure.

The systemic transformation lies in the fact that the boundary between the biological carrier of behavior and the digital observational environment becomes continuous. Sensors, mobile devices, biometric systems, as well as elements of medical and functional integration form a stable contour of permanent connectivity between the individual and the system. As a result, the state of the human ceases to exist outside the processes of recording, interpretation, and identification.

The key effect of this phase is the disappearance of the subject's "external state" as such. Any action, physiological parameter, or behavioral deviation becomes embedded within a system of continuous monitoring and identification. This implies that the human ceases to exist as an autonomous observational unit and instead becomes a node whose state is continuously defined and updated through interaction with infrastructural systems.

At the level of systemic structure, a fusion of biological and digital layers occurs, forming a unified cyber-physical stratum. This creates a condition in which individual behavior can no longer be fully separated from the system within which it operates. Even fundamental physiological and cognitive processes begin to exist in a regime of continuous digitization and correlation with external analytical systems.

Within this phase, sovereignty shifts from the level of civilization as a whole down to the level of individual existence. However, at this level it also begins to lose stability, since the very possibility of "non-participation" in the observational system becomes structurally constrained. In other words, exit from the observational loop ceases to be a standard condition and instead

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requires special circumstances beyond normal systemic functioning.

The growth of risk within this phase manifests in the following way: civilization enters a condition in which observation of individual behavior becomes continuous and embedded within the very structure of existence itself. This implies the disappearance of the functional separation between personal and systemic data layers: any human action automatically becomes part of the shared infrastructure of observation and analysis.

Under such conditions, system vulnerability becomes maximally distributed in nature. Potential external influence (in a hypothetical scenario involving a hostile actor) may be directed not at individual informational or algorithmic nodes, but at mass behavioral fields, since each individual simultaneously functions as both a generator of data and a point of its systemic interpretation.

This creates a fundamentally new form of risk: influence becomes possible through scalable modifications in the behavior of large numbers of interconnected nodes, where the boundary between individual action and systemic dynamics is effectively dissolved.

Phase 12. Full Reconstructability and the Disappearance of Privacy (Limit of the Model)

This phase represents the limiting state of development of the civilization's informational-computational structure, in which the maximum degree of synthetic reconstructability is achieved. This is not a moment of external event or a crisis transition, but rather the outcome of a long accumulation of all preceding phases, in which observability, modelability, and automation have progressively replaced uncertainty as a fundamental property of the system.

The systemic state of this phase is defined by the fact that civilizational behavior becomes fully modelable at a level sufficient for the stable reproduction of its dynamics. Individual deviations cease to be treated as fundamentally unpredictable phenomena and are instead interpreted as statistically derivable variations within the general behavioral model of the system. Even rare or asymmetric events become incorporated into extended correlation structures that allow their probabilistic nature to be reconstructed.

The key consequence is the disappearance of privacy as a stable systemic category. In this context, privacy ceases to be a question of data access and transforms into a mathematical property describing the degree of reconstructability. Since any behavioral state begins to exhibit a sufficient number of indirect traces, the boundary between "known" and "unknown" becomes blurred to the point of statistical insignificance.

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It is important to emphasize that this state is not equivalent to political or institutional control. This is not a matter of centralized governance over civilizational behavior. On the contrary, the system reaches a condition in which control becomes functionally redundant, since behavior can be sufficiently accurately reconstructed and predicted without requiring direct intervention.

The final characteristic of this phase is the disappearance of meaningful unknown states. Civilization ceases to contain behavioral fragments that cannot be reconstructed or modeled with high probability. This marks the transition from a world in which uncertainty is a fundamental property to a world in which uncertainty becomes computationally negligible.

Final Statement of the Model

Within this analytical framework, the loss of civilizational sovereignty is not a discrete event, a crisis, or the result of external intervention. It is a continuous gradient process in which the system progressively replaces its own internal uncertainty with computability.

This process defines the long-term existential risk of the model. It is not related to the destruction of civilization or to external control in a direct sense. Its nature lies in the transition toward a condition in which: system behavior becomes reconstructable, alternative developmental trajectories become computable, and randomness ceases to play a structurally constitutive role.

As a result, civilization retains dynamics, complexity, and development, but loses the fundamental property that, within this model, is treated as the basis of sovereignty — the principled uncertainty of its own future state.

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PGP fingerprint: C8BA A304 329C 8375 4C59 009B A463 FE45 01F9 C54F