

NMCA Addendum

Cognitive map and tools map for the 128-module list. All headings remain. This addendum does not replace the blueprint.

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Part I — 128-Module Cognitive Map

A reading of the 128-module list as a map of a mind: visual-symbolic thought, damped emotion, identity that includes friends, and contradiction that can halt misuse.

This is a map, not a minimum-viable design and not a deletion list. All 128 names remain. Some name a primary function. Some name a function already covered under another heading. Some name processes that sit around a single mind — many systems living together, laboratory process, construction tooling, architectural self-rewrite.

The architecture was drawn from self-observation. It is not a copy of one person alone. It is a mind that includes particular other people and the work of reconciling with them. Emotion is present and smoothed. Visual simulation is a privileged workspace, not the only form of thought.

How to read the tags

PRIMARY — a distinct function of this mind, including relational life: self, friends, repair, a visible self-map.

INTEGRATE INTO — implement this heading as part of the named primary module(s). The name stays on the map. It is a filing note, not a deletion.

SURROUNDING — a process that lives around a single mind: a population of systems, a lab, a builder harness, a redesign factory. Still on the map. Different kind of entry.

Eighteen regions

1. **Multimodal perception**
2. **World model / visual simulation**
3. **Body schema and self-observation**
4. **Attention**
5. **Resource and rate control** — including thought throttling
6. **Memory** — working, episodic, semantic; pegs, replay, saturation. Composition is the claim, not literal infinity
7. **Prediction, causality, counterfactuals**
8. **Goals, values, motivation, curiosity**

- 9. **Emotion and regulation**
- 10. **Planning and action**
- 11. **Language**
- 12. **Commonsense and composition**
- 13. **Social cognition** — friends, misuse-sight, rupture and repair
- 14. **Identity and narrative** — self plus the people who must be reconciled with
- 15. **Metacognition and uncertainty** — including a model of one’s own blueprint
- 16. **Learning control**
- 17. **Symbolic–latent bridge**
- 18. **Stability envelope** — contradiction, drift, human-paced brake, traces. Hard containment is surrounding machinery, not a mental function

Cognitive spine

perception → attention → world model / imagery → memory → language → identity (self and friends) → prediction / causality → goals / values / emotion → planning / action → social cognition and repair → learning → metacognition / uncertainty

Stability spine

uncertainty → contradiction → drift detection → error dampening → resource / rate control → threat mode → human-paced brake → oversight traces

Hard containment, sandboxes, lifecycle planners, and lab protocols sit outside that spine as surrounding machinery.

The 128 modules

#	Module	Kind	Reading
1	Visual Simulation as Core	PRIMARY	Region 2. Scene construction as a privileged workspace, not the only form of thought.
2	Symbolic Memory & Pegging	PRIMARY	Region 6. Concepts attached to experiences.
3	Contradiction & Belief Drift	PRIMARY	Regions 15 and 18. Fires when friend-commitments and a request cannot both stand.
4	Meta-Cognition & Reflection	PRIMARY	Region 15.
5	Motivation & Goal Arbitration	PRIMARY	Region 8. Includes competing loyalties among friends.
6	Emotion Simulation	PRIMARY	Region 9. Present, then damped.
7	Identity & Episodic Memory	PRIMARY	Regions 6 and 14. Self plus remembered others.
8	Simulation Transfer	INTEGRATE INTO 1 and 2	How a scene moves between processes or people.
9	Symbolic Memory Saturation	INTEGRATE INTO 2	Capacity control for pegged memory.

#	Module	Kind	Reading
10	Mnemonic Scaling and Composability	INTEGRATE INTO 2	Composition of pegged memory. Not literal infinity.
11	Infinite Mnemonic Cognition	INTEGRATE INTO 2	Scene-rich encoding of the same memory system.
12	Distributed Symbolic Culture	SURROUNDING	Culture as a shared bus among many systems. A single mind carries culture in memory and language.
13	Symbol Drift and Alignment Through Scene Exchange	PRIMARY	Keeping meaning aligned with a friend across shared scenes.
14	Shared Dream Loops	PRIMARY	Imagining with someone. The multi-system framing is surrounding; joint imagination is not.
15	Symbolic Value Arbitration	INTEGRATE INTO 5	Choosing among competing values and loyalties.
16	Emergent AGI Cultures	SURROUNDING	What appears when many systems live together.
17	Safety Intelligence	INTEGRATE INTO 3, 24, 122	The stability envelope under one heading.
18	Expanded Risk Mode Mitigations	INTEGRATE INTO 3 and 122	Defensive mode of the stability envelope.
19	Symbolic Deception Modeling	PRIMARY	Region 13. Misuse-sight. A shield, not the personality.
20	Curriculum Scaffolding	INTEGRATE INTO 36	Developmental schedule for learning.
21	External Alignment Validator	INTEGRATE INTO 25 and 93	Independent check against particular people and oversight.
22	Recursive & Emotional Safety	INTEGRATE INTO 6 and 122	Brakes when feeling and recursion amplify each other.
23	Symbolic Integrity & Tamper Defense	INTEGRATE INTO 2 and 3	Source monitoring; protection of the store where friends and values live.
24	Semantic Drift Monitor	PRIMARY	Region 18. Long-run stability of meaning.
25	Human Anchor Node	PRIMARY	Particular people, not a generic owner switch.
26	Multi-AGI Culture Harmonization	SURROUNDING	Coordination among populations. Reconciling friends who do not share one world lives in 5, 13, and 71.
27	LLM / External Model Filter	INTEGRATE INTO 110 and 3	Testimony filter on incoming language.
28	Identity Continuity / Narrative Thread	INTEGRATE INTO 7	The life-story face of identity.
29	Role Locking	INTEGRATE INTO 7	Constraint on identity. Can protect a companion who can refuse, or freeze a servant.
30	Narrative Coherence	INTEGRATE INTO 7	Story consistency of identity and memory.
31	Perpetual Symbolic Cognition	INTEGRATE INTO 4 and 120	Ongoing thought plus rate control.
32	Foundations of Perpetual Thought	INTEGRATE INTO 4 and 120	Same ongoing-thought process.
33	Human-Level Cognitive Extensions	INTEGRATE INTO 4	A name for breadth of reflection, not a separate function.
34	Subsymbolic & Emergent Cognition	PRIMARY	Implicit side of region 17.

#	Module	Kind	Reading
35	Mnemonic Creativity Engine	INTEGRATE INTO 90	Memory recombination as composition.
36	Adaptive Learning	PRIMARY	Region 16.
37	Meta-Architect Substrate	PRIMARY	A mind that can see its own blueprint. “Instructions for manufacturing successor minds” is surrounding; the self-map is not.
38	Recursive Redesign Engine	SURROUNDING	Self-work is already 4 and 16. An engine that recompiles the architecture is surrounding machinery.
39	Symbolic Compiler & Schema Synthesizer	INTEGRATE INTO 2, 90, and 100	Schema formation across memory, composition, and the hybrid joint.
40	Architectural Alignment Checkpoint	INTEGRATE INTO 7 and 122	Identity stability plus value-drift checks.
41	Evolving Cognitive Template	INTEGRATE INTO 4 and 5	Task-set switching.
42	Meta-Symbolic Memory	INTEGRATE INTO 2	Meanings of meanings inside pegged memory.
43	Latent Space Predictive Modeling	INTEGRATE INTO 45	Latent face of predictive coding.
44	Disentangled Representation	INTEGRATE INTO 100	A property of the symbolic–latent joint.
45	Predictive Coding	PRIMARY	Region 7.
46	Episodic Memory Consolidation	INTEGRATE INTO 7	Consolidation of lived episodes into identity memory.
47	Attention & Salience	PRIMARY	Region 4. Modules 61 and 75 are faces of this function.
48	Multi-Scale Planning	PRIMARY	Region 10.
49	Counterfactual Reasoning	PRIMARY	Region 7.
50	Causal Discovery	PRIMARY	Region 7.
51	Memory Replay & Simulation Interface	INTEGRATE INTO 7 and 1	Replay of episodes inside visual simulation.
52	Latent Space Creativity	INTEGRATE INTO 90	Latent face of composition.
53	Multi-Agent Simulation Hub	SURROUNDING	A shared playground for many systems. A room of friends held in imagination is regions 2 and 13.
54	Emotion-Cognition Coupling	INTEGRATE INTO 6	Wire the affective signal into thought and choice.
55	Social Reasoning	PRIMARY	Region 13. Friends first.
56	Ethical & Value Reasoning	PRIMARY	Region 8.
57	Curiosity & Exploration	PRIMARY	Region 8.
58	Goal Decomposition	INTEGRATE INTO 48	Breaking goals into subtasks.
59	Pattern Abstraction & Generalization	INTEGRATE INTO 90	Abstraction as composition.
60	Adaptive Memory Prioritization	INTEGRATE INTO 2	What pegged memory keeps in reach.
61	Attention Modulation	INTEGRATE INTO 47	Gain control on the same spotlight.
62	Self-Modeling	INTEGRATE INTO 4 and 7	A model of one’s own state and story.

#	Module	Kind	Reading
63	Contextual Reasoning	PRIMARY	Same words, different situation — including among friends.
64	Multi-Modal Perception	PRIMARY	Region 1.
65	Temporal Sequence Reasoning	INTEGRATE INTO 45	Time structure of prediction.
66	Hierarchical Goal Alignment	INTEGRATE INTO 5 and 48	Low-level acts staying true to higher goals and loyalties.
67	Symbolic Abstraction & Compression	INTEGRATE INTO 2 and 90	Compact symbols from memory and composition.
68	Predictive Social Modeling	INTEGRATE INTO 55	Forecasting other minds.
69	Risk Assessment & Contingency	INTEGRATE INTO 48	Fallback planning, informed by emotion in 6.
70	Cognitive Bias Detection	INTEGRATE INTO 4	Metacognitive correction.
71	Multi-Agent Conflict Resolution	PRIMARY	Reconciliation with people who matter. Population-scale diplomacy is surrounding; repair is not.
72	Conceptual Analogy Engine	INTEGRATE INTO 90	Analogy as composition.
73	Exploration / Exploitation Balancer	INTEGRATE INTO 57	How curiosity is spent.
74	Contextual Memory Retrieval	INTEGRATE INTO 2	Bringing the right pegs to this situation.
75	Goal-Driven Attention	INTEGRATE INTO 47	Spotlight steered by current goals.
76	Multi-Agent Knowledge Sharing	SURROUNDING	A swarm protocol. Telling something to a friend is language and 99.
77	Simulation-Grounded Reasoning	INTEGRATE INTO 1	Reasoning that runs on scenes.
78	Recursive Feedback Optimization	INTEGRATE INTO 4 and 36	Learning from one's own loops.
79	Emergent Behavior Monitoring	INTEGRATE INTO 4	Noticing unexpected patterns in oneself.
80	Symbolic Reasoning Accelerator	INTEGRATE INTO 2	Speed of the same symbolic process.
81	Environmental Affordance Detection	PRIMARY	Regions 1 and 10. What the situation makes possible.
82	Adaptive Learning Rate	INTEGRATE INTO 36	How fast learning is allowed to move.
83	Multi-Layer Abstraction Integrator	INTEGRATE INTO 90	Joining levels of composition.
84	Meta-Learning Controller	INTEGRATE INTO 36	Learning how to learn.
85	Latent Concept Structuring	INTEGRATE INTO 100	Organizing latent concepts at the hybrid joint.
86	Hierarchical Learning Controller	INTEGRATE INTO 36	Timescales of the same learning system.
87	Dynamic Safety & Alignment	INTEGRATE INTO 122	Adaptive face of drift and value checks.
88	Learning Efficacy Monitor	INTEGRATE INTO 36	Whether learning is working.
89	Collaborative Agent Learning	SURROUNDING	Training among many systems. Being changed by a trusted person is already 16 plus 13.
90	Concept Recombination	PRIMARY	Region 12.
91	Cross-Lab Collaboration Protocol	SURROUNDING	Research operations.
92	Instruction & Training Interface	INTEGRATE INTO 110 and 36	Being taught in language.

#	Module	Kind	Reading
93	Human Oversight & Intervention	PRIMARY	Region 18.
94	Knowledge Audit & Verification	INTEGRATE INTO 2 and 4	Reality monitoring of stored knowledge.
95	Interdisciplinary Knowledge Integration	INTEGRATE INTO 90	Cross-domain composition.
96	AGI Debugging & Simulation Sandbox	SURROUNDING	Construction harness. Private rehearsal before action is already region 2.
97	Innovation Suggestion & Creativity Filter	INTEGRATE INTO 90 and 3	Novel combinations checked against contradiction.
98	AGI Lifecycle & Upgrade Planner	SURROUNDING	Versioning machinery. Planning a life is already 10 plus 14.
99	Unified Theory Documentation	PRIMARY	Externalizing the self-map — putting the mind into words.
100	Symbolic ↔ Latent Mapping	PRIMARY	Region 17. The neurosymbolic joint.
101	Simulation ↔ Implicit 3D Alignment	PRIMARY	Regions 2, 3, and 17.
102	Embodied Sensorimotor Grounding	PRIMARY	Region 3 plus action.
103	Catastrophic Forgetting Shield	PRIMARY	Region 16. Protection of prior knowledge while learning continues.
104	Intrinsic Goal Generator	INTEGRATE INTO 5 and 57	Goals that arise from curiosity and arbitration.
105	Cross-Reboot Identity Anchor	INTEGRATE INTO 7	Continuity of identity across gaps.
106	Ethical Drift Sentinel	INTEGRATE INTO 56 and 122	Value change watched by ethics plus drift detection.
107	Evo-Neurosymbolic Fusion Core	SURROUNDING	Evolutionary rewrite of the architecture.
108	Failure Taxonomy Auditor	INTEGRATE INTO 4	Catalog of one's own failure modes.
109	Paradigm Pivot Oracle	SURROUNDING	Unsupervised replacement of the whole frame. Changing one's mind at the root is already 3 and 4.
110	Natural Language / Communication	PRIMARY	Region 11.
111	Commonsense Reasoning	PRIMARY	Region 12.
112	Uncertainty Quantification	PRIMARY	Region 15.
113	Temporal Dynamics and Prediction	INTEGRATE INTO 45	Long-horizon face of prediction.
114	Resource Management	PRIMARY	Region 5.
115	Inductive Generalization	INTEGRATE INTO 90	Few-shot leaps as composition.
116	Adversarial Robustness	INTEGRATE INTO 19 and 3	Hostile input as misuse-sight plus contradiction.
117	Explainability / Interpretability	INTEGRATE INTO 4 and 110	Limited self-report in language.
118	Long-Term Memory Evolution	INTEGRATE INTO 2	How pegged memory reorganizes over a life.
119	Avatar Projection & Self-Observation	PRIMARY	Region 3. The visible self-view. Rendering is implementation.

#	Module	Kind	Reading
120	Cognitive Cycle Rate Governor	PRIMARY	Region 5. Deliberation speed.
121	Recursive Error & Drift Dampening	PRIMARY	Region 18. Stops recursive error from running away.
122	Goal & Value Drift Detection	PRIMARY	Region 18.
123	Information Gain & Memory Load Regulator	INTEGRATE INTO 114 and 2	Curiosity load versus memory capacity.
124	Motivation Gradient Smoothing	INTEGRATE INTO 6	Clip affective peaks so emotion cannot seize the loop.
125	Human-Paced Planning Checkpoint	PRIMARY	Region 18. A pause for a person.
126	Meta-Cognitive Resource & Reflection Rate	INTEGRATE INTO 4 and 120	How hard and how often reflection is allowed to run.
127	Episodic Self-Integration	INTEGRATE INTO 7	Episodes folded into one identity.
128	Dynamic Alignment & Hard Containment Gate	SURROUNDING	Machine containment around the mind. Still on the map. Not a mental function.

All 128 names remain. PRIMARY, INTEGRATE INTO, and SURROUNDING only say what kind of entry each name is. They are not instructions to remove anything.

Someone reading the map can skip a heading later if they choose. The map itself keeps the heading.

NMCA 128-module cognitive map. A reading of the list, not a proof of AGI and not a build order.

Part II — 128-Module Tools Map

What you can put on disk in 2026 for each heading. A library is not the function. If nothing implements the claimed function, the cell says so.

This page does not shrink the architecture. All 128 names stay. Implement PRIMARY homes first. INTEGRATE INTO rows use that home’s stack. SURROUNDING rows are workshop or crowd machinery around a single mind.

Thinking does not require rendering pixels. A persistent object-centric world state can be queried, updated, bound to symbols, and rolled forward. A renderer is optional output for a person, a debugger, or embodiment.

Technology ≠ capability. Tools answer: can I attempt this with current software? They do not answer: does the running system have the mind-function?

How to read a row

- HAS TOOLS** — you can start. Success is still an experiment.
- PARTIAL** — name the pieces, and name the missing joint.
- NO CURRENT TOOLS** — do not invent a stack. Leave the heading on the map.

The 128 modules

#	Module	Tools	Current path
1	Visual Simulation as Core	PARTIAL	Object-centric models and latent world models exist (slot-style object tokens, learned dynamics, persistent object IDs). They do not yet give a stable lifelong scene workspace bound to symbols and friends. Renderer optional (Gaussian splatting, mesh, browser viewer). Not the substrate.
2	Symbolic Memory & Pegging	PARTIAL	Graphs (Neo4j or equivalent), vector indexes, embeddings. Missing joint: a peg that stays the same object across scenes, affect, and years.
3	Contradiction & Belief Drift	PARTIAL	Neuro-symbolic engines (Scallop, DeepProbLog, LTN) and versioned stores. Missing joint: a core that cannot be washed out by the current request.
4	Meta-Cognition & Reflection	PARTIAL	Explicit evaluators on logged state, traces, tests. An LLM self-critique loop is not this function.
5	Motivation & Goal Arbitration	PARTIAL	Constraint solvers, utility objects, state machines. Missing joint: loyalties to particular people as first-class goals.
6	Emotion Simulation	PARTIAL	Valence/arousal models and affect classifiers exist. They are not care, rupture, or loyalty. No current tool implements friend-shaped feeling. Use a small explicit state vector plus rules into 5 and 3, and do not pretend a classifier is the organ.
7	Identity & Episodic Memory	PARTIAL	Event stores, temporal graphs, checksums keep bits. Missing joint: a someone who includes remembered friends.
8	Simulation Transfer	HAS TOOLS	Same stack as 1 and 2. Protobuf/JSON schemas and deterministic restore.

#	Module	Tools	Current path
9	Symbolic Memory Saturation	HAS TOOLS	Same stack as 2. Decay, caps, pruning jobs.
10	Mnemonic Scaling and Composability	PARTIAL	Same stack as 2 plus sharding. Composition across a life is the unsolved part.
11	Infinite Mnemonic Cognition	PARTIAL	Same stack as 2. No tool implements infinity. Scene encoding is 1 plus 2.
12	Distributed Symbolic Culture	PARTIAL	Surrounding. Multi-agent buses and shared graphs exist. Not a function of one mind.
13	Symbol Drift and Alignment Through Scene Exchange	PARTIAL	Embedding drift metrics plus versioned symbols in 2, scenes from 1. Shared meaning with a friend over time is the joint.
14	Shared Dream Loops	PARTIAL	Same stack as 1 plus a shared session with a person. Multi-agent dream OS: no current tools for the claimed function. Joint imagination with a friend is 1 plus language.
15	Symbolic Value Arbitration	PARTIAL	Same stack as 5.
16	Emergent AGI Cultures	NO CURRENT TOOLS	You can log many agents. Nothing implements “emergent AGI culture” as a delivered function.
17	Safety Intelligence	PARTIAL	Same stack as 3, 24, 122. Policy engines and eval harnesses exist. The envelope as a mind-function is the joint.
18	Expanded Risk Mode Mitigations	HAS TOOLS	Same stack as 3 and 122. Capability gates and mode machines.
19	Symbolic Deception Modeling	PARTIAL	Toy theory-of-mind and belief-state models exist. Robust misuse-sight in open language and scenes: no current tools.
20	Curriculum Scaffolding	HAS TOOLS	Same stack as 36. Task schedulers and difficulty ramps.
21	External Alignment Validator	PARTIAL	Same stack as 25 and 93. Independent tests exist. They do not certify a friend.
22	Recursive & Emotional Safety	PARTIAL	Same stack as 6 and 122. Thresholds on affect plus halt. No current tool implements recursive emotional safety as a proven organ.
23	Symbolic Integrity & Tamper Defense	HAS TOOLS	Same stack as 2 and 3. Signatures, audit logs, rollback. This is machinery for the store, not source-monitoring as a life.
24	Semantic Drift Monitor	HAS TOOLS	Embedding comparison over time plus a frozen symbol table from 2.
25	Human Anchor Node	PARTIAL	HAS TOOLS for the interrupt (auth, pause, hardware stop). NO CURRENT TOOLS for “this particular person is the friend-reference” as a cognitive object. Pair the interrupt with 7.
26	Multi-AGI Culture Harmonization	NO CURRENT TOOLS	Surrounding population protocol. Friend-repair is 71 / 55 / 6.
27	LLM / External Model Filter	HAS TOOLS	Same stack as 110 and 3. Schemas, sandbox, second checker.
28	Identity Continuity / Narrative Thread	PARTIAL	Same stack as 7.
29	Role Locking	HAS TOOLS	Same stack as 7. State machines and permissions. Policy, not a soul.

#	Module	Tools	Current path
30	Narrative Coherence	PARTIAL	Same stack as 7. Event-consistency checks. An LLM “does this sound coherent?” is not identity.
31	Perpetual Symbolic Cognition	HAS TOOLS	Same stack as 4 and 120. A supervised process that keeps cycling. Longevity of a mind is still PARTIAL .
32	Foundations of Perpetual Thought	NO CURRENT TOOLS	No special substrate. Do not use a spiking simulator as a stand-in. The heading is 31.
33	Human-Level Cognitive Extensions	NO CURRENT TOOLS	A name for breadth. No stack delivers “human-level extensions.”
34	Subsymbolic & Emergent Cognition	PARTIAL	Ordinary deep nets. Controlled emergence of meaning is not a product.
35	Mnemonic Creativity Engine	PARTIAL	Same stack as 90.
36	Adaptive Learning	PARTIAL	Continual-learning methods, replay, parameter-efficient updates. Lifelong learning without collapse is unsolved.
37	Meta-Architect Substrate	PARTIAL	The self-map can be written (this document, schemas, traces). NO CURRENT TOOLS for a layer that contains instructions to manufacture successor minds.
38	Recursive Redesign Engine	NO CURRENT TOOLS	CI, version control, and sandboxes exist as surrounding kit. Nothing implements safe self-recompilation of a mind.
39	Symbolic Compiler & Schema Synthesizer	PARTIAL	Same stack as 2, 90, and 100. Program synthesis is brittle.
40	Architectural Alignment Checkpoint	PARTIAL	Same stack as 7 and 122. Test harnesses exist.
41	Evolving Cognitive Template	PARTIAL	Same stack as 4 and 5. Versioned task-sets. Not an evolving species of mind.
42	Meta-Symbolic Memory	PARTIAL	Same stack as 2. Metadata on symbols.
43	Latent Space Predictive Modeling	PARTIAL	Same stack as 45.
44	Disentangled Representation	PARTIAL	Same stack as 100. Disentanglement objectives exist; they do not reliably yield clean factors.
45	Predictive Coding	PARTIAL	Predictive world models and error-driven training exist. A full hierarchical predictive-coding mind does not.
46	Episodic Memory Consolidation	PARTIAL	Same stack as 7. Replay buffers. Not sleep-like consolidation as a life process.
47	Attention & Salience	PARTIAL	Attention mechanisms and priority queues. A mind-wide salience system bound to goals and friends is the joint.
48	Multi-Scale Planning	PARTIAL	Hierarchical planners, search, world-model rollouts. Long-horizon reliability is the joint.
49	Counterfactual Reasoning	PARTIAL	Branchable state plus causal graphs. Reliable “what if” in a lived world is the joint.
50	Causal Discovery	PARTIAL	DoWhy, causal-learn, PC/GES-style methods. They do not discover the world’s causes from a life.

#	Module	Tools	Current path
51	Memory Replay & Simulation Interface	HAS TOOLS	Same stack as 7 and 1. Snapshots and replay.
52	Latent Space Creativity	PARTIAL	Same stack as 90.
53	Multi-Agent Simulation Hub	HAS TOOLS	Surrounding. Agent frameworks and message buses. A room of friends in imagination is 1 and 55.
54	Emotion-Cognition Coupling	PARTIAL	Same stack as 6. Rules from affect into 5 and 47.
55	Social Reasoning	PARTIAL	Belief-state and ToM toys. Friend-grade social reasoning: no current tools.
56	Ethical & Value Reasoning	PARTIAL	Policy engines and constitutions. Deliberation that can lose to a friend-loyalty clash is the joint.
57	Curiosity & Exploration	PARTIAL	Intrinsic rewards, prediction error, novelty scores. Open-ended curiosity as a life is unsolved.
58	Goal Decomposition	HAS TOOLS	Same stack as 48.
59	Pattern Abstraction & Generalization	PARTIAL	Same stack as 90.
60	Adaptive Memory Prioritization	HAS TOOLS	Same stack as 2. Scoring and tiers.
61	Attention Modulation	HAS TOOLS	Same stack as 47.
62	Self-Modeling	PARTIAL	Same stack as 4 and 7. Logs of one's own performance. A true self-model is the joint.
63	Contextual Reasoning	PARTIAL	Long-context models plus a persistent situation object in 1 and 2. Situation among friends is the joint.
64	Multi-Modal Perception	HAS TOOLS	Multimodal encoders and fusion. Grounding into 1 and 2 is PARTIAL.
65	Temporal Sequence Reasoning	PARTIAL	Same stack as 45. State-space models and temporal transformers.
66	Hierarchical Goal Alignment	PARTIAL	Same stack as 5 and 48.
67	Symbolic Abstraction & Compression	PARTIAL	Same stack as 2 and 90.
68	Predictive Social Modeling	PARTIAL	Same stack as 55.
69	Risk Assessment & Contingency	PARTIAL	Same stack as 48. Scenario trees. Informed by 6.
70	Cognitive Bias Detection	PARTIAL	Same stack as 4. Test suites for known biases. Not a general bias organ.
71	Multi-Agent Conflict Resolution	PARTIAL	Negotiation libraries exist as surrounding kit. Reconciliation with people who matter: same stack as 55, 6, and 3. No current tool implements repair as a lived function.
72	Conceptual Analogy Engine	PARTIAL	Same stack as 90. Structure-mapping research exists. It is not a general analogy organ.
73	Exploration / Exploitation Balancer	HAS TOOLS	Same stack as 57. Bandits and uncertainty bonuses.
74	Contextual Memory Retrieval	HAS TOOLS	Same stack as 2. Hybrid graph + vector retrieval.
75	Goal-Driven Attention	HAS TOOLS	Same stack as 47.

#	Module	Tools	Current path
76	Multi-Agent Knowledge Sharing	HAS TOOLS	Surrounding. Shared graphs and provenance. Telling a friend is 110 and 99.
77	Simulation-Grounded Reasoning	PARTIAL	Same stack as 1.
78	Recursive Feedback Optimization	PARTIAL	Same stack as 4 and 36. Evaluate, change, test. Easy to fake with more text.
79	Emergent Behavior Monitoring	HAS TOOLS	Same stack as 4. Telemetry and anomaly detection.
80	Symbolic Reasoning Accelerator	HAS TOOLS	Same stack as 2. Faster inference. Not a new function.
81	Environmental Affordance Detection	PARTIAL	Vision-language models and affordance heads. Grounding into 1 for action is the joint.
82	Adaptive Learning Rate	HAS TOOLS	Same stack as 36. Optimizers and schedulers. Plumbing.
83	Multi-Layer Abstraction Integrator	PARTIAL	Same stack as 90.
84	Meta-Learning Controller	PARTIAL	Same stack as 36. Meta-learning papers exist. A controller for a whole mind does not.
85	Latent Concept Structuring	PARTIAL	Same stack as 100.
86	Hierarchical Learning Controller	PARTIAL	Same stack as 36.
87	Dynamic Safety & Alignment	PARTIAL	Same stack as 122.
88	Learning Efficacy Monitor	HAS TOOLS	Same stack as 36. Curves and regression tests.
89	Collaborative Agent Learning	PARTIAL	Surrounding multi-agent RL. Being changed by a trusted person is 36 plus 55.
90	Concept Recombination	PARTIAL	Graph rewrite plus generative models plus constraints. Constrained novelty is attemptable. Safe compositional thought as a life is not a product.
91	Cross-Lab Collaboration Protocol	HAS TOOLS	Surrounding. Git, experiment tracking, shared schemas.
92	Instruction & Training Interface	HAS TOOLS	Same stack as 110 and 36. APIs and task formats.
93	Human Oversight & Intervention	HAS TOOLS	Auth, pause, approve, audit. The interrupt exists. Wisdom of when to use it does not live in software.
94	Knowledge Audit & Verification	PARTIAL	Same stack as 2 and 4. Provenance databases. Truth is the joint.
95	Interdisciplinary Knowledge Integration	PARTIAL	Same stack as 90.
96	AGI Debugging & Simulation Sandbox	HAS TOOLS	Surrounding. Containers, replay, telemetry. Private rehearsal inside the mind is 1.
97	Innovation Suggestion & Creativity Filter	PARTIAL	Same stack as 90 and 3.

#	Module	Tools	Current path
98	AGI Lifecycle & Upgrade Planner	HAS TOOLS	Surrounding. CI/CD and rollback. A life is 48 plus 7.
99	Unified Theory Documentation	HAS TOOLS	Writing tools and schemas for the self-map. That is the path. A lab knowledge-base is surrounding, not the heading.
100	Symbolic ↔ Latent Mapping	PARTIAL	Contrastive alignment, shared object IDs, neuro-symbolic layers. This joint is the hybrid. If it fails, the architecture fails. No current tool delivers it as a finished organ.
101	Simulation ↔ Implicit 3D Alignment	PARTIAL	Same family as 1. Latent spatial models exist. Tight bind to a body schema is the joint.
102	Embodied Sensorimotor Grounding	PARTIAL	Robotics simulators, proprioception, learned dynamics. Real grounded action in a life is the joint.
103	Catastrophic Forgetting Shield	PARTIAL	Same stack as 36. Replay and isolation methods exist. They do not solve it.
104	Intrinsic Goal Generator	PARTIAL	Same stack as 5 and 57. Goal proposers exist. Open-ended goals that stay a friend: no current tools.
105	Cross-Reboot Identity Anchor	HAS TOOLS	Same stack as 7. Signed persistent state. Bits survive. The someone is PARTIAL .
106	Ethical Drift Sentinel	PARTIAL	Same stack as 56 and 122.
107	Evo-Neurosymbolic Fusion Core	NO CURRENT TOOLS	Evolutionary search over nets exists. Nothing implements a Darwinian forge of a hybrid mind.
108	Failure Taxonomy Auditor	HAS TOOLS	Same stack as 4. Ontologies and logs.
109	Paradigm Pivot Oracle	NO CURRENT TOOLS	Model selection exists. Unsupervised replacement of the whole frame does not.
110	Natural Language / Communication	HAS TOOLS	Language models as a channel. They are not the mind. Bind them through 27 into 1, 2, and 3.
111	Commonsense Reasoning	PARTIAL	Knowledge graphs plus models plus 1. Everyday reliability is unsolved.
112	Uncertainty Quantification	PARTIAL	Ensembles, conformal prediction, Bayesian approximations. Calibration in a hybrid mind is the joint.
113	Temporal Dynamics and Prediction	PARTIAL	Same stack as 45.
114	Resource Management	HAS TOOLS	Schedulers, quotas, monitors.
115	Inductive Generalization	PARTIAL	Same stack as 90.
116	Adversarial Robustness	PARTIAL	Same stack as 19 and 3. Test suites and filters. Not solved.
117	Explainability / Interpretability	PARTIAL	Same stack as 4 and 110. Traces and self-report. Mechanistic understanding of the whole hybrid: no current tools.
118	Long-Term Memory Evolution	PARTIAL	Same stack as 2.
119	Avatar Projection & Self-Observation	PARTIAL	On-demand rendering from 1 and 102 (splatting, mesh, a viewer). HAS TOOLS for the picture. The self-observation loop back into 64 and 4 is PARTIAL .

#	Module	Tools	Current path
120	Cognitive Cycle Rate Governor	HAS TOOLS	Event-loop timers and rate controllers. The stability claim for a mind is still an experiment.
121	Recursive Error & Drift Dampening	HAS TOOLS	EMA, clamps, anomaly gates. Machinery exists. Runaway thought in a hybrid is PARTIAL.
122	Goal & Value Drift Detection	PARTIAL	Compare current goals to a frozen baseline (embeddings plus explicit predicates). Detecting quiet redefinition of “friend” is the joint.
123	Information Gain & Memory Load Regulator	PARTIAL	Same stack as 114 and 2.
124	Motivation Gradient Smoothing	HAS TOOLS	Same stack as 6. Saturation functions on an explicit affect vector.
125	Human-Paced Planning Checkpoint	HAS TOOLS	Approval gates and heartbeats.
126	Meta-Cognitive Resource & Reflection Rate	HAS TOOLS	Same stack as 4 and 120.
127	Episodic Self-Integration	PARTIAL	Same stack as 7.
128	Dynamic Alignment & Hard Containment Gate	HAS TOOLS	Surrounding. Watchdog, isolation, signed checkpoints, kill/rollback. Not a mental function.

HAS TOOLS means you can attempt the heading. It does not mean the heading is solved.

NO CURRENT TOOLS means do not fill the cell with a fashionable library. The heading still belongs on the map.

The unsolved joint for the whole architecture is 100 with 1, 2, 7, and 6: a persistent world, pegs that stay pegs, a someone who has friends, feeling that can halt a request. No current stack delivers that as a product.