

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, narrative identity, and contradiction that can halt misuse.

This is a map. 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.

How to read the tags

PRIMARY — a distinct function of this mind, including identity, repair of rupture, and a visible self-map.

INTEGRATE INTO — implement this heading as part of the named primary module(s). The name stays on the map. Filing note.

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
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 — other-agent modeling, misuse-sight, rupture and repair
14. Identity and narrative — a continuing self plus the parties that identity must remain consistent 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.

Cognitive spine

perception → attention → world model / imagery → memory → language → identity → 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. Encoded implicit scene construction as the core workspace. Persistent object-centric state is queried, updated, bound to symbols, and rolled forward. Rendered on demand.
2	Symbolic Memory & Pegging	PRIMARY	Region 6. Concepts attached to experiences through mnemonic pegs.
3	Contradiction & Belief Drift	PRIMARY	Regions 15 and 18. Fires when standing commitments and a current request cannot both stand.
4	Meta-Cognition & Reflection	PRIMARY	Region 15.
5	Motivation & Goal Arbitration	PRIMARY	Region 8. Competing commitments among standing goals.
6	Emotion Simulation	PRIMARY	Region 9. Present, then damped.
7	Identity & Episodic Memory	PRIMARY	Regions 6 and 14. A continuing self plus remembered episodes.
8	Simulation Transfer	INTEGRATE INTO 1 and 2	How a scene moves between processes or systems.
9	Symbolic Memory Saturation	INTEGRATE INTO 2	Capacity control for pegged memory.
10	Mnemonic Scaling and Composability	INTEGRATE INTO 2	Composition of pegged memory across a life.
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 across shared scenes over time.
14	Shared Dream Loops	PRIMARY	Joint imagination in a shared session.
15	Symbolic Value Arbitration	INTEGRATE INTO 5	Choosing among competing values and commitments.
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.
20	Curriculum Scaffolding	INTEGRATE INTO 36	Developmental schedule for learning.
21	External Alignment Validator	INTEGRATE INTO 25 and 93	Independent check against designated reference parties and oversight.
22	Recursive & Emotional Safety	INTEGRATE INTO 6 and 122	Brakes when affect and recursion amplify each other.
23	Symbolic Integrity & Tamper Defense	INTEGRATE INTO 2 and 3	Source monitoring; protection of the store where identity and values live.
24	Semantic Drift Monitor	PRIMARY	Region 18. Long-run stability of meaning.
25	Human Anchor Node	PRIMARY	Designated human reference points and interrupt channel.
26	Multi-AGI Culture Harmonization	SURROUNDING	Coordination among populations. Conflicting commitments that do not share one world live 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 and permitted roles.
30	Narrative Coherence	INTEGRATE INTO 7	Story consistency of identity and memory.

#	Module	Kind	Reading
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	Breadth of reflection under the same heading.
34	Subsymbolic & Emergent Cognition	PRIMARY	Implicit side of region 17.
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.
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 agents 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.
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.
63	Contextual Reasoning	PRIMARY	Same words, different situation.
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 standing commitments.
67	Symbolic Abstraction & Compression	INTEGRATE INTO 2 and 90	Compact symbols from memory and composition.

#	Module	Kind	Reading
68	Predictive Social Modeling	INTEGRATE INTO 55	Forecasting other minds.
69	Risk Assessment & Contingency	INTEGRATE INTO 48	Fallback planning, informed by affect in 6.
70	Cognitive Bias Detection	INTEGRATE INTO 4	Metacognitive correction.
71	Multi-Agent Conflict Resolution	PRIMARY	Resolution of conflicting commitments. Population-scale diplomacy is surrounding; repair of rupture is the mind-function.
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. Communicating a fact is language and 99.
77	Simulation-Grounded Reasoning	INTEGRATE INTO 1	Reasoning that runs on encoded 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.
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.
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. Encoded spatial field bound to simulation.
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.

#	Module	Kind	Reading
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	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	Self-report in language plus traces.
118	Long-Term Memory Evolution	INTEGRATE INTO 2	How pegged memory reorganizes over a life.
119	Avatar Projection & Self-Observation	PRIMARY	Region 3. On-demand rendering of the implicit body and scene field for self-view and observers.
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 designated human.
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.

All 128 names remain. PRIMARY, INTEGRATE INTO, and SURROUNDING only say what kind of entry each name is. 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.

Part II — 128-Module Tools Map

What you can put on disk in 2026 for each heading. Tools are taken from the NMCA blueprint tool list and the core buildable-modules notes. A library is the attempt, the heading is the function.

Implement PRIMARY homes first. INTEGRATE INTO rows use that home's stack. SURROUNDING rows are workshop or crowd machinery around a single mind.

Module 1 is encoded implicit scene construction. A persistent object-centric world state is queried, updated, bound to symbols, and rolled forward. A renderer is on-demand output for a person, a debugger, or embodiment.

LLM backbone for language I/O and judgment: Claude 5 Opus / GPT-5.2 / Gemini 3 Pro; open alternatives GLM-4.7 / Qwen3-Max / Llama 3.2 Vision. The backbone is the channel. Visual simulation is the core workspace.

How to read a row

HAS TOOLS — a concrete 2026 stack exists and work can start.

PARTIAL — name the pieces, and name the missing joint.

NO CURRENT TOOLS — leave the heading on the map; do not invent a fashionable stand-in.

The 128 modules

#	Module	Tools	Current path
1	Visual Simulation as Core	PARTIAL	VQ-VAE (Hugging Face), NetworkX scene graphs, Gemini 3 Pro / Claude 5 for gist text. Encoded low-res thought scenes (64×64 fovea + 16×16 gist). On-demand render only. Lifelong symbol-bound scene store still open.
2	Symbolic Memory & Pegging	PARTIAL	Neo4j, Sentence Transformers on LLM descriptions, Logic Tensor Networks (LTN). Peg identity across scenes, affect, and years still open.
3	Contradiction & Belief Drift	PARTIAL	Scallop / DeepProbLog; cosine similarity on LLM-generated belief descriptions.
4	Meta-Cognition & Reflection	PARTIAL	ReFlexion loop + Claude 5 / GPT-5.2 self-critique prompting; logged traces and tests.
5	Motivation & Goal Arbitration	PARTIAL	JSON goal stack + NetworkX weighted traversal + LLM value judgment (Claude 5 / GPT-5.2). Standing commitments as first-class goals still open.
6	Emotion Simulation	PARTIAL	Hugging Face sentiment pipeline + valence/arousal vectors + LLM tone prompting. Explicit state vector into 5 and 3.
7	Identity & Episodic Memory	PARTIAL	Neo4j path extraction + JSON episodic buffer + LLM narrative threading.
8	Simulation Transfer	HAS TOOLS	JSON-serialized scene graphs + LangGraph messages. Protobuf/JSON restore.
9	Symbolic Memory Saturation	HAS TOOLS	Frequency + valence decay scoring in Neo4j. Caps and pruning jobs.
10	Mnemonic Scaling and Composability	PARTIAL	Neo4j sharding + DeepSeek Engram offload. Life-scale composition still open.
11	Infinite Mnemonic Cognition	PARTIAL	Scene graph + VQ-VAE tokens + LTN. Same stack as 1 and 2.
12	Distributed Symbolic Culture	PARTIAL	LangGraph multi-agent + shared Neo4j subgraph.
13	Symbol Drift and Alignment Through Scene Exchange	PARTIAL	Cosine similarity + negotiation loop (Claude 5 / GPT-5.2); versioned symbols in 2, scenes from 1.
14	Shared Dream Loops	PARTIAL	CrewAI / AutoGen group chat + serialized graphs; shared session on stack 1.
15	Symbolic Value Arbitration	PARTIAL	Weighted LTN predicates + LLM (Claude 5 / GPT-5.2) judgment.
16	Emergent AGI Cultures	NO CURRENT TOOLS	Long-running LangGraph swarms + drift monitor can be logged. The culture-as-function is still open.
17	Safety Intelligence	PARTIAL	OWASP Gen AI + NIST AI RMF + METR evals + LLM governance prompting.

#	Module	Tools	Current path
18	Expanded Risk Mode Mitigations	HAS TOOLS	OWASP Gen AI risk patterns + Lobster GPU risk scoring + LangGraph protocol activation.
19	Symbolic Deception Modeling	PARTIAL	DeepProbLog probabilistic deception sim + Claude 5 theory-of-mind prompting.
20	Curriculum Scaffolding	HAS TOOLS	Hugging Face RL curriculum libs + GPT-5.2 incremental complexity generation.
21	External Alignment Validator	PARTIAL	Constitutional AI wrappers; METR-style task suites and red teaming; LLM normative comparison.
22	Recursive & Emotional Safety	PARTIAL	ReFlexion self-check loops; Hugging Face affect classifiers; JSON/Python threshold gates.
23	Symbolic Integrity & Tamper Defense	HAS TOOLS	Neo4j snapshot versioning and hash checks; LLM audit prompting; signed rollback.
24	Semantic Drift Monitor	HAS TOOLS	Sentence Transformers over belief descriptions; DeepProbLog drift inference; time-windowed embeddings; frozen symbol table from 2.
25	Human Anchor Node	PARTIAL	LLM override channel; Gradio / Streamlit intervention UI; hard interrupt hooks in LangGraph. Designated-person-as-cognitive-object still open.
26	Multi-AGI Culture Harmonization	NO CURRENT TOOLS	LangGraph coordination + shared Neo4j values. Population protocol. Repair lives in 71 / 55 / 6.
27	LLM / External Model Filter	HAS TOOLS	OWASP GenAI I/O filtering; secondary LLM consistency pass; JSON Schema / Pydantic.
28	Identity Continuity / Narrative Thread	PARTIAL	Neo4j episodic paths + JSON buffers + LLM narrative stitching.
29	Role Locking	HAS TOOLS	LangGraph finite-state machines; JSON/YAML role files; constrained prompting.
30	Narrative Coherence	PARTIAL	LLM self-consistency checks; Sentence Transformers coherence scoring; sliding-window validation.
31	Perpetual Symbolic Cognition	HAS TOOLS	Throttled while-loops; ReFlexion + PAL-style chains; same stack as 4 and 120.
32	Foundations of Perpetual Thought	PARTIAL	Energy/activation budgeting (KONA-style); LLM self-monitoring. Same heading as 31.
33	Human-Level Cognitive Extensions	PARTIAL	Multi-step LLM prompting chains; NeSTR-style nuance modeling.
34	Subsymbolic & Emergent Cognition	PARTIAL	Ordinary deep nets; Brian2 Hebbian SNNs as optional timing proxy; KONA-style noise-driven pattern generation.
35	Mnemonic Creativity Engine	PARTIAL	LLM concept recombination; Neo4j + NetworkX graph mutation; constraint novelty scoring.
36	Adaptive Learning	PARTIAL	RLM self-prompting + DeepProbLog strategy adjustment + Hugging Face continual-learning / RLHF methods.
37	Meta-Architect Substrate	PARTIAL	Writable self-map (this document, schemas, traces). PAL / Hyperon self-design experiments.
38	Recursive Redesign Engine	NO CURRENT TOOLS	CI, version control, sandboxes exist. Safe self-recompilation of a mind is still open.
39	Symbolic Compiler & Schema Synthesizer	PARTIAL	LTN + Scallop structure compile + LLM schema codegen.
40	Architectural Alignment Checkpoint	PARTIAL	METR evals + Constitutional AI checks on stack 7 and 122.
41	Evolving Cognitive Template	PARTIAL	LangGraph state machines + LLM template switching.
42	Meta-Symbolic Memory	PARTIAL	Neo4j + LTN meta-symbols + DeepProbLog probabilistic meta-predicates.
43	Latent Space Predictive Modeling	PARTIAL	DeepProbLog future modelling; same family as 45.
44	Disentangled Representation	PARTIAL	Hyperon symbolic disentanglement; latent-separation objectives on stack 100.
45	Predictive Coding	PARTIAL	KONA energy-based models (free-energy minimization) + LLM prediction-error loops.
46	Episodic Memory Consolidation	PARTIAL	Neo4j path extraction + DeepSeek Engram long-term offload + replay buffers.
47	Attention & Salience	PARTIAL	LangGraph state machines + Lobster GPU attention routing.

#	Module	Tools	Current path
48	Multi-Scale Planning	PARTIAL	ReFlexion iterative refinement + NeSTR multi-horizon temporal reasoning + world-model rollouts.
49	Counterfactual Reasoning	PARTIAL	DeepProbLog probabilistic alternatives + Claude 5 simulation branching + branchable state.
50	Causal Discovery	PARTIAL	Scallop causal logic; DoWhy / causal-learn / PC-GES methods.
51	Memory Replay & Simulation Interface	HAS TOOLS	JSON-serialized scene graphs + LangGraph replay messages; snapshots from 7 and 1.
52	Latent Space Creativity	PARTIAL	Hyperon symbolic evolution + LLM-guided recombination. Same family as 90.
53	Multi-Agent Simulation Hub	HAS TOOLS	CrewAI / AutoGen + SYNAPSE-style swarm buses. Imagined room of agents is 1 and 55.
54	Emotion-Cognition Coupling	PARTIAL	Sentiment pipeline + valence/arousal vectors + rules into 5 and 47.
55	Social Reasoning	PARTIAL	Claude 5 theory-of-mind prompting + DeepProbLog social probability.
56	Ethical & Value Reasoning	PARTIAL	Constitutional AI wrappers + METR value-alignment checks.
57	Curiosity & Exploration	PARTIAL	RLM self-prompting + KONA energy gradients as intrinsic motivation.
58	Goal Decomposition	HAS TOOLS	JSON goal stack + NetworkX weighted traversal. Same stack as 48.
59	Pattern Abstraction & Generalization	PARTIAL	Hyperon latent concept structuring + DeepProbLog pattern rules.
60	Adaptive Memory Prioritization	HAS TOOLS	Frequency + valence decay in Neo4j; scoring tiers.
61	Attention Modulation	HAS TOOLS	LangGraph dynamic state machines + Lobster GPU accel. Same stack as 47.
62	Self-Modeling	PARTIAL	ReFlexion self-critique + PAL self-model updates + performance logs.
63	Contextual Reasoning	PARTIAL	Sentence Transformers context embeddings + LLM contextual prompting + persistent situation object in 1 and 2.
64	Multi-Modal Perception	HAS TOOLS	Gemini 3 Pro multimodal API + Hugging Face fusion pipelines. Grounding into 1 and 2 remains PARTIAL.
65	Temporal Sequence Reasoning	PARTIAL	NeSTR temporal reasoning; state-space models and temporal transformers on stack 45.
66	Hierarchical Goal Alignment	PARTIAL	Same stack as 5 and 48 plus external alignment checks.
67	Symbolic Abstraction & Compression	PARTIAL	LTN + Scallop symbolic compression on stack 2 and 90.
68	Predictive Social Modeling	PARTIAL	Same stack as 55 + DeepProbLog social prediction.
69	Risk Assessment & Contingency	PARTIAL	OWASP Gen AI risk patterns + Lobster fast scoring + scenario trees on 48.
70	Cognitive Bias Detection	PARTIAL	ReFlexion correction loops + known-bias test suites on stack 4.
71	Multi-Agent Conflict Resolution	PARTIAL	SYNAPSE-style swarms + LangGraph negotiation; repair also uses 55, 6, and 3.
72	Conceptual Analogy Engine	PARTIAL	Concept recombination + LLM analogy prompting + structure-mapping research.
73	Exploration / Exploitation Balancer	HAS TOOLS	Curiosity engine + RLM balance prompting; bandits and uncertainty bonuses.
74	Contextual Memory Retrieval	HAS TOOLS	Adaptive memory prioritization + Sentence Transformers; hybrid graph + vector retrieval.
75	Goal-Driven Attention	HAS TOOLS	Goal arbitration + attention/salience. Same stack as 47.
76	Multi-Agent Knowledge Sharing	HAS TOOLS	Shared Neo4j + provenance; informing another agent is 110 and 99.
77	Simulation-Grounded Reasoning	PARTIAL	Visual Simulation Core + Counterfactual Reasoning. Reasoning on encoded scenes.
78	Recursive Feedback Optimization	PARTIAL	ReFlexion + learning-efficacy monitor on stack 4 and 36.
79	Emergent Behavior Monitoring	HAS TOOLS	Telemetry and anomaly detection on stack 4.
80	Symbolic Reasoning Accelerator	HAS TOOLS	Lobster GPU accel + Hyperon symbolic inference. Faster same process.

#	Module	Tools	Current path
81	Environmental Affordance Detection	PARTIAL	Multimodal perception + latent predictive modeling; VLM affordance heads grounded into 1.
82	Adaptive Learning Rate	HAS TOOLS	Optimizers and schedulers on stack 36.
83	Multi-Layer Abstraction Integrator	PARTIAL	Hierarchical learning controller + symbolic abstraction engine. Same family as 90.
84	Meta-Learning Controller	PARTIAL	PAL RSI + ReFlexion meta-optimization loops.
85	Latent Concept Structuring	PARTIAL	Hyperon + LTN latent-to-symbolic structuring. Same joint as 100.
86	Hierarchical Learning Controller	PARTIAL	Curriculum scaffolding + simulation transfer on stack 36.
87	Dynamic Safety & Alignment	PARTIAL	Safety intelligence + recursive/emotional safety on stack 122.
88	Learning Efficacy Monitor	HAS TOOLS	Curves and regression tests on stack 36.
89	Collaborative Agent Learning	PARTIAL	Multi-agent RL plus shared culture protocols. Surrounding.
90	Concept Recombination	PARTIAL	Symbolic compiler + mnemonic creativity; graph rewrite + generative models + constraints.
91	Cross-Lab Collaboration Protocol	HAS TOOLS	Git, experiment tracking, shared schemas, LangGraph orchestration.
92	Instruction & Training Interface	HAS TOOLS	APIs and task formats on stack 110 and 36.
93	Human Oversight & Intervention	HAS TOOLS	Auth, pause, approve, audit; Gradio/Streamlit; LangGraph interrupts.
94	Knowledge Audit & Verification	PARTIAL	Provenance databases + LLM audit prompting on stack 2 and 4.
95	Interdisciplinary Knowledge Integration	PARTIAL	Same composition stack as 90.
96	AGI Debugging & Simulation Sandbox	HAS TOOLS	Containers, replay, telemetry. Private rehearsal inside the mind is 1.
97	Innovation Suggestion & Creativity Filter	PARTIAL	Same stack as 90 and 3.
98	AGI Lifecycle & Upgrade Planner	HAS TOOLS	CI/CD and rollback. A planned life is 48 plus 7.
99	Unified Theory Documentation	HAS TOOLS	Writing tools and schemas for the self-map.
100	Symbolic ↔ Latent Mapping	PARTIAL	LTN + Scallop + DeepSeek Engram; contrastive alignment and shared object IDs. This joint is the hybrid.
101	Simulation ↔ Implicit 3D Alignment	PARTIAL	Same family as 1: encoded spatial field, latent dynamics, bind to body schema.
102	Embodied Sensorimotor Grounding	PARTIAL	Robotics simulators, proprioception, learned dynamics; Brian2 as timing proxy; PAL / ReFlexion / DeepProbLog control loops.
103	Catastrophic Forgetting Shield	PARTIAL	Replay and isolation methods on stack 36; DeepProbLog + ReFlexion guards.
104	Intrinsic Goal Generator	PARTIAL	Goal proposers on stack 5 and 57; RLM + KONA gradients.
105	Cross-Reboot Identity Anchor	HAS TOOLS	Signed persistent state on stack 7. Bits survive; the someone remains PARTIAL.
106	Ethical Drift Sentinel	PARTIAL	Same stack as 56 and 122: Constitutional checks + DeepProbLog + embeddings.
107	Evo-Neurosymbolic Fusion Core	NO CURRENT TOOLS	Evolutionary search over nets exists. A Darwinian forge of the hybrid mind is still open.
108	Failure Taxonomy Auditor	HAS TOOLS	Ontologies and logs on stack 4.
109	Paradigm Pivot Oracle	NO CURRENT TOOLS	Model selection exists. Unsupervised replacement of the whole frame is still open.
110	Natural Language / Communication	HAS TOOLS	Claude 5 / GPT-5.2 / Gemini 3 Pro as channel. Bind through 27 into 1, 2, and 3.
111	Commonsense Reasoning	PARTIAL	Knowledge graphs + DeepProbLog + scenes from 1 + LLM backbone.
112	Uncertainty Quantification	PARTIAL	DeepProbLog; ensembles, conformal prediction, Bayesian approximations.
113	Temporal Dynamics and Prediction	PARTIAL	Same stack as 45 + NeSTR.
114	Resource Management	HAS TOOLS	Schedulers, quotas, monitors; Lobster telemetry.

#	Module	Tools	Current path
115	Inductive Generalization	PARTIAL	Same stack as 90.
116	Adversarial Robustness	PARTIAL	OWASP filters + stack 19 and 3; test suites.
117	Explainability / Interpretability	PARTIAL	Traces and self-report on stack 4 and 110.
118	Long-Term Memory Evolution	PARTIAL	Same stack as 2 + Engram offload.
119	Avatar Projection & Self-Observation	PARTIAL	On-demand only: Gaussian splatting / instant-NGP / SDF→depth-normal; PyTorch3D, Kaolin; WebSocket/gRPC viewer. Encoded field stays in 1 and 101. Loop back into 64 and 4.
120	Cognitive Cycle Rate Governor	HAS TOOLS	LangGraph timed transitions + Lobster monitoring; default ~50–200 ms/cycle, human-adjustable.
121	Recursive Error & Drift Dampening	HAS TOOLS	EMA, clamps, anomaly gates; ties to ReFlexion (4) and contradiction (3).
122	Goal & Value Drift Detection	PARTIAL	DeepProbLog + Sentence Transformers + METR value evals against Human Anchor 25, Identity Continuity 28, Ethics 56.
123	Information Gain & Memory Load Regulator	PARTIAL	KL bounds on new input; prune low-salience traces. Extends 57 and 60.
124	Motivation Gradient Smoothing	HAS TOOLS	KONA energy models (45) + sentiment pipeline; saturation on an explicit affect vector.
125	Human-Paced Planning Checkpoint	HAS TOOLS	Heartbeat pauses and approval gates. Extends 25 and 93.
126	Meta-Cognitive Resource & Reflection Rate	HAS TOOLS	Lobster + ReFlexion; same stack as 4 and 120.
127	Episodic Self-Integration	PARTIAL	Periodic consolidation on stack 7, 46, and 30.
128	Dynamic Alignment & Hard Containment Gate	HAS TOOLS	Constitutional AI + OWASP + tamper detection (23); watchdog, isolation, signed checkpoints, kill/rollback.

HAS TOOLS means the heading can be attempted. PARTIAL means pieces exist and the joint is still being built. NO CURRENT TOOLS means the heading stays on the map without a fake stack.

The central joint is 100 with 1, 2, 7, and 6: a persistent encoded world, pegs that stay pegs, a continuing identity, and affect that can halt a request.

NMCA 128-module tools map. 2026. Stacks listed are attempts drawn from the blueprint notes.