NEXUS OS

INVESTOR & COMPETITION BRIEFING · 2026

LOCAL-FIRST COMPUTATIONAL ENGINEERING

From plain-language spec to verified, manufacturable 3D hardware. AI compiles the engineering intent. Deterministic math and physics build and verify the part.

BOTTLENECK

14–21 days

to under 1 day. Compress design, remodeling, verification.

MEASURED

1.7–71.6 s

Compute + verification: lattices, manifolds, cooling jackets.

BUILT-IN

100% Local

& air-gapped. Zero cloud CAD / IP exposure.

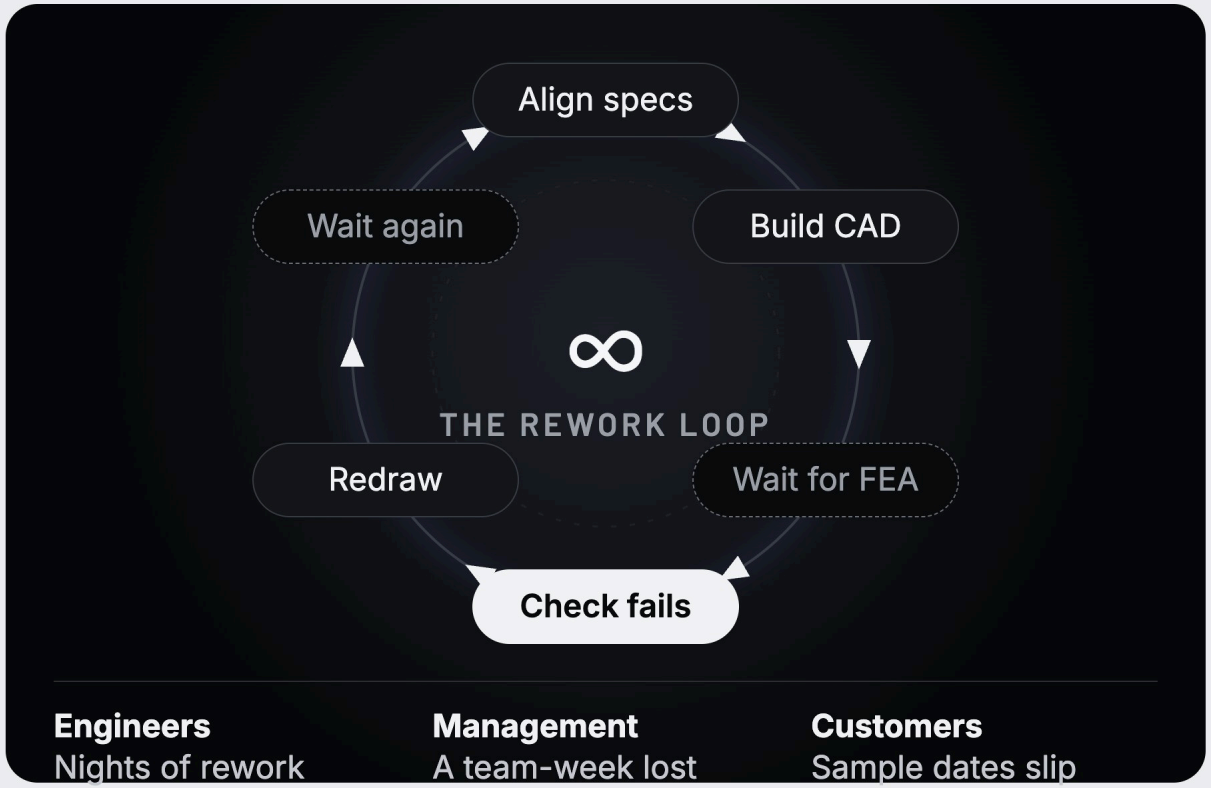
VALIDATED

TRL 4

Physical parts printed.[1] U.S. provisionals on file.

THE PROBLEM

MOVE ONE HOLE 2 MM.
LOSE A FULL WEEK OF ENGINEERING.



In AI-server cooling, semiconductor tools and robotics, a small port or thermal change cascades into CAD remodeling and repeated FEA / flow checks.

TRADITIONAL WORKFLOW

14–21 days

≈112 engineering hours at the 14-day baseline.

WITH NEXUS OS — TARGET

Under 1 day

<2 minutes compute + engineer review. ~50 verified design options per day.

Sources: original briefing pp. 6–7, 30. 14–21 days is a team estimate; 112 h = 14 days × 8 h.

HOW NEXUS OS WORKS

THREE DETERMINISTIC LAYERS. ZERO HALLUCINATED GEOMETRY.

Nexus OS separates language understanding from mathematical geometry and physical verification.

01 · READ & COMPILE — BUILT-IN

Local LLM compiles intent into a typed block graph

Plain-language specs compile into strict block_graph_v0 JSON. The model never draws raw geometry.

20,000

training cases · 3,600 (18%) error-correction and closed-loop repair

02 · COMPUTE — BUILT-IN

Dual geometry kernels + 56 physics & math principles

Exact dimensions from closed-form and numerical solvers: IAPWS-IF97 fluids, pipe flow, thermal resistance.

72

deterministic operations · 38 shape primitives + 34 hardware generators

03 · VERIFY — BUILT-IN

Automated gatekeeper blocks non-compliant geometry

Audits thickness, watertightness, pressure drop and port openness before STEP, STL and 3MF export.

10^{-9}

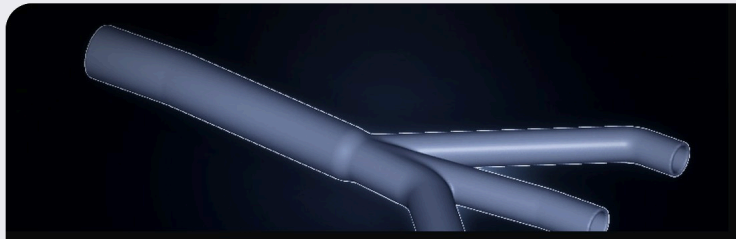
flow conservation · 5 rays per sealing face, 24 spokes per port

VERIFICATION GATE — Wall thickness · Watertightness · Pressure drop · SHA-256 fingerprint

Source: implementation inventory, briefing pp. 14–16. 10^{-9} is the flow-balance tolerance.

UNDER THE HOOD

TWO GEOMETRY ENGINES. INDUSTRIAL-GRADE NUMERICAL RIGOR.

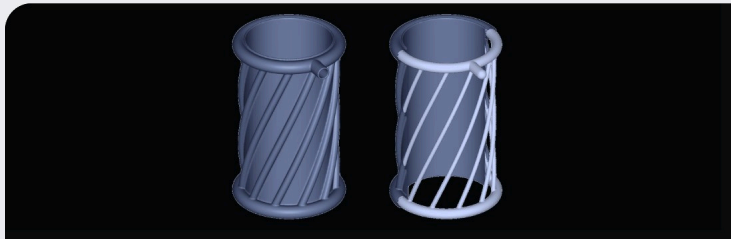


ENGINE 1 · EXACT CAD / BREP

NATIVE STEP

OpenCascade BREP · precision interfaces

Holes · Chamfers · ISO threads · O-ring grooves · Flanges



ENGINE 2 · IMPLICIT FIELD / SDF

PICOGK

Physics-driven internal topologies

TPMS gyroid cold plates · Helical jackets · Lattices · CVD channels

ENGINEERING RULES THAT CONNECT THE STACK

Port v1

INTERFACE STANDARD

Typed fluid, flow, pressure, bore and seal rules.

≥95%

2-LAYER C3D10 MESH

Thin walls meshed for CalculiX FEA.

15,000,000

SAMPLES / TILE

Out-of-core SDF tiles, no GPU bottleneck.

56

MATH & PHYSICS RULES

Darcy-Weisbach, SIMP, Hill-Mandel.

Sources: briefing pp. 11, 15–16; implementation Blueprint. STEP preserves exact boundary geometry.

PROVEN PERFORMANCE · TRL 4

THREE COMPLEX PARTS. EACH UNDER TWO MINUTES.

Instant re-solve when specs change.



Real prints of Nexus OS output. Clear resin instead of metal, with internal channels dyed so every one is visible.

FLUID MANIFOLD
48.7 s
1 inlet, multi-branch

COOLING JACKET
71.6 s
Spiral channels

LATTICE BLOCK
1.7 s
Graded cellular infill

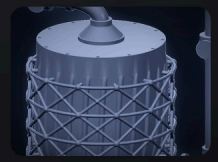
CHANGE A REQUIREMENT. THE DESIGN FOLLOWS.



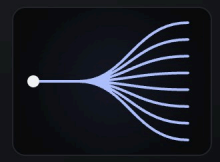
A · DOUBLE THE LOAD
600 N → 1,200 N
42.52 → 55.18 cm³
(+29.8%)



B · TIGHTEN PRESSURE
500 Pa → 200 Pa
Solved: 199.96 Pa



C · MOVE HOTSPOT
40% → 60%
Junction relocates 18 mm



D · 8-OUTLET BLOCK
<1% spread
All 8 outlets balanced

Sources: internal runs, briefing pp. 11–13. Geometry + 1-D models; IAPWS-IF97 water.

INDUSTRIAL TRUST, SECURITY & SUSTAINABILITY

BUILT FOR FABS AND DEFENSE-GRADE IP: 100% LOCAL. ZERO NUMERIC HALLUCINATION.

Security architected by a former TSMC equipment engineer with graduate cybersecurity research at SMU.

27.7% of tracked attacks hit manufacturing. #1 sector, 5 years.

$5.5M average industrial breach cost.

US$84M single fab outage loss · TSMC 2018.



01 · Strict local enclave
Sensitive CAD files stay inside the building.

02 · Numeric grounding guard
Every model number is checked against the request.

03 · One-time HMAC-SHA256 token
High-risk builds need engineer sign-off. 5-minute token.

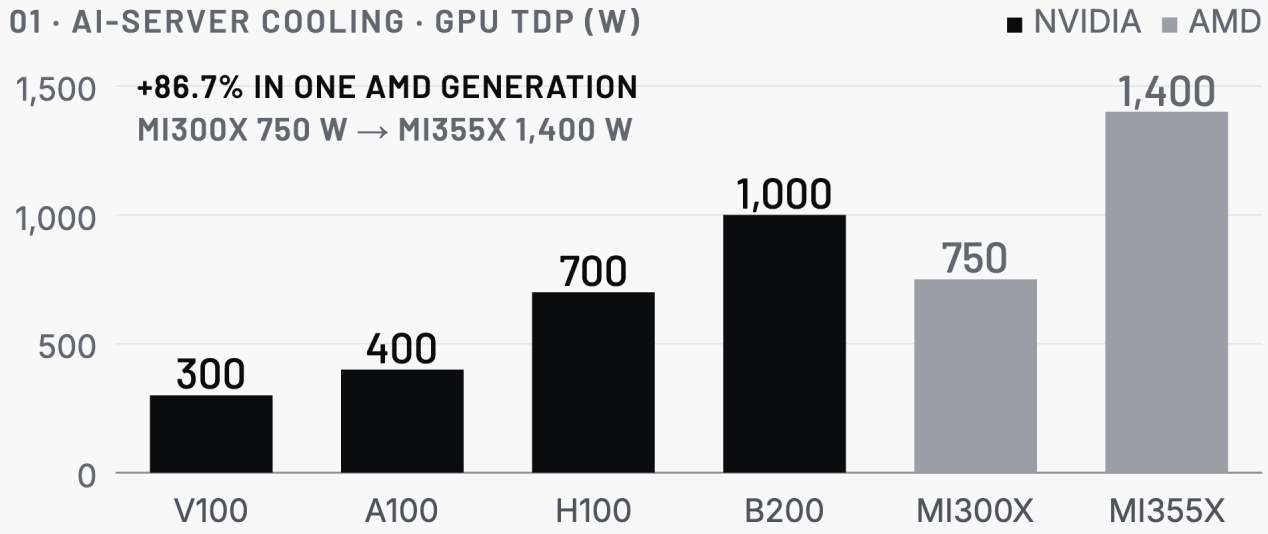
04 · Isolated 180 s workers
Hung jobs restart. 10 SQLite snapshots roll daily.

SECURE BY DESIGN = SUSTAINABLE BY DESIGN Zero cloud inference · Solve once, no re-generation · Fewer failed trial prints

Sources: IBM X-Force 2026; IBM Cost of a Data Breach; TSMC 2018 (NT$2.6B at NT$31/US$).

STATIC CAD WORKFLOWS ARE BREAKING.

01 · AI-SERVER COOLING · GPU TDP (W)



Liquid cooling: **53%** of AI chips (2026) → **~60%** (2027) · HBM4E, 2027

02 · SEMICONDUCTOR & TAIWAN HUB

>60% foundry output

~92% <10 nm logic

~90% AI servers

03 · HUMANOID & INDUSTRIAL ROBOTICS

603k → 806k

robots / yr by 2029 · ~10,000 parts per Optimus

04 · RAPID QUALIFICATION WINS THE ORDER

+15.5%

Fastest verified sample wins the production contract.

US$49.0B **GLOBAL ENGINEERING DESIGN SOFTWARE MARKET**
CAD / CAM / CAE software + services · Grand View Research, 2025

Sources: NVIDIA / AMD; TrendForce; Micron; IFR; Tesla; Wohlers Report 2026; GVR.

COMPETITIVE MATRIX

WHY EXISTING TOOLS CANNOT DELIVER RAPID, VERIFIED CUSTOM HARDWARE.

	LEGACY CAD / CAE SolidWorks · NX · Ansys	IMPLICIT MODELING nTop	CLOUD TEXT-TO-3D Public APIs	NEXUS OS Local deterministic AI
Spec-change remodeling speed	Days to weeks of feature-tree repair	Hours of manual block rewiring	Seconds, but non-engineering mesh	**Seconds to <2 mins** from typed specs
Deterministic BREP + implicit SDF	BREP strong, implicit weak	Implicit strong, BREP secondary	Mesh only; no exact CAD	**Unified** OpenCascade BREP + PicoGK SDF
Built-in physics & printability gate	Separate manual CAE workflow	Requires expert setup	Zero physical checks	**Automated** pressure, thickness & C3D10 mesh checks
Deployment & IP security	Desktop / hybrid cloud	Desktop / cloud license	Public cloud APIs; IP risk	**100% air-gapped** local network (127.0.0.1)
Compounding factory memory	Static, isolated files	Static scripts	Stateless prompts	**Local design graph** + private factory LoRA flywheel

INTENT + DETERMINISTIC GEOMETRY + REVIEWABLE CHECKS, IN ONE LOCAL WORKFLOW.

Source: competitive Blueprint; representative workflows by tool category.

BUSINESS MODEL & SWITCHING-COST MOAT

LAND WITH A PAID PART BENCHMARK. LOCK IN AS THE ENGINEERING BRAIN.

01 · LAND

Paid custom-part benchmark

A high-pain cold plate or gas manifold. The customer pays a pilot fee against strict pass / fail acceptance criteria.

02 · EMBED

Annual on-premise enterprise license

After acceptance: recurring annual site licensing on the customer's private network.

95–99% FASTER · 100× OPTIONS

03 · EXPAND

Domain physics packs & multi-site seats

Semiconductor CVD, two-phase cooling and aerospace lattice packs. More lines, more sites.

STRUCTURAL RETENTION · THE 4-LAYER LOCK-IN MOAT

01 · Proprietary design graph

Every requirement and check becomes searchable know-how.

02 · Private factory LoRA

Local logs tune an adapter to the factory's own machines.

03 · Port v1 library lock-in

Standard blocks snap together with verified flow.

04 · SHA-256 traceability

Signed print packages embed us in ISO handoffs.

FULL-STACK HARDWARE & AI BUILDERS. RAISING TO SCALE COMMERCIAL PILOTS.



Szuyi Sung
FOUNDER & CEO
AI applications, computational UI/UX, product strategy. U.S. AI MBA. Prior UK tech founder.



Ned Cheng
CTO & CO-INVENTOR
Former TSMC equipment engineer. Graduate cybersecurity research at SMU.

Full-stack execution in-house. Intent dataset, dual-kernel math engine and local interface, built by us.

FROM NEXUS OS TO NEXUS AETHER

01 · Nexus OS — TODAY · TRL 4
Deterministic engine, local LLM, Port v1, printed parts.

02 · Nexus Aether — NEXT
3D spatial workspace: voice, text and gesture, re-verified live.

03 · Assemblies — SCALE
Snap-together Port v1 parts, verified across full loops.

CURRENT ROUND · USE OF FUNDS

US$250k–500k

PRE-SEED · NON-DILUTIVE GRANTS · STRATEGIC PILOT CAPITAL

01 3–5 paid benchmarks in AI cooling & semi equipment.

02 Advance 2 U.S. provisionals to full utility patents.

03 Ship Nexus Aether v1 on-premise workstation.

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