

M C P S E R V E R

N O C O D E

C L O U D H O S T E D

Bottom Turn Mechanics MCP

Model the physics of surfing maneuvers with precision.

Bottom Turn Mechanics MCP gives your AI client the ability to run fluid dynamics and physical modeling for surfing. You can calculate G-forces, check if a specific board fits a wave condition, and predict how a maneuver will actually play out based on surfer flexibility and wave speed.

A+

Quality Score 100/100

surfing

fluid-dynamics

physics-engine

performance-analysis

biomechanics



The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest
managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.

— Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256

Encryption at rest

Ed25519

PKI vault signatures

24h TTL

Ephemeral session keys

V8 Isolate

Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT`https://edge.vinkius.com/{token}/mcp`

Claude



Cursor



VS Code



Windsurf



Grok



Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

06 — Honeypot Trap System

Phantom credentials are injected into isolated environments. If a honeypot is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1)
Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

Get started at cloud.vinkius.com — connect your AI agent in under 60 seconds.

Bottom Turn Mechanics MCP

4 tools available

Cloud-hosted on Vinkius

You can now bring high-level physics modeling into your AI chat. This MCP lets your agent act as a surf physics consultant, calculating the exact forces involved in a bottom turn. Instead of guessing if a board will work in a certain swell, you can run simulations to see how the rocker and volume interact with wave speed. You can also look at the biomechanics of a turn, specifically how the transition between crouching and standing affects efficiency. It's a tool for anyone who wants to move past intuition and start using hard data to understand how waves, boards, and body movement intersect.

Core Capabilities

01 — Fluid Dynamics Modeling

Your agent uses this to calculate speed and G-forces for specific turn setups.

03 — Biomechanical Analysis

Your agent evaluates the efficiency of the compression and extension phases during a turn.

02 — Board Suitability Checks

The AI checks if a surfboard's specs match the wave and maneuver requirements.

04 — Maneuver Prediction

The AI simulates the probability of a successful maneuver based on physical inputs.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/bottom-turn-mechanics — connect your AI agent in three steps.

- 01 Connect your MCP-compatible client to Vinkius.
- 02 Provide the wave speed, board specs, or surfer data in your prompt.
- 03 Your agent calls the specific physics tool needed for the calculation.
- 04 The MCP returns the calculated forces, suitability scores, or predicted outcomes.

You connect the MCP to your client and start asking questions about surfing physics.

Built For

This MCP is built for people who want to apply mathematical modeling to surfing performance.

Surf Designers

They use the tool to test how different board volumes and rockers will behave in specific wave conditions.

Surf Coaches

They use the biomechanical data to help surfers understand the efficiency of their body positioning.

Physics Enthusiasts

They use the modeling tools to simulate the fluid dynamics of surfing maneuvers.

What Changes When You Connect

- 01 Calculates peak G-forces for specific turn configurations.
- 02 Provides suitability scores for surfboards based on wave speed and rocker.

-
- 03** Simulates maneuver success probabilities using surfer flexibility data.
-
- 04** Analyzes the efficiency of body transitions during turns.
-

Real-World Applications

Board Design Testing

Test how a new board shape might handle a specific turn radius before a physical prototype is made.

Wave Condition Analysis

Determine the required speed and forces needed to execute a turn in a specific swell.

Performance Coaching

Analyze the efficiency of a surfer's compression and extension to improve turn mechanics.

Maneuver Simulation

Predict if a specific turn is likely to succeed given the current wave speed and surfer flexibility.

4 Tools Available

#	TOOL	DESCRIPTION
01	get_board_suitability	This tool checks if a specific surfboard is the right choice for a planned bottom turn. It looks at board specs against the intended maneuver.
02	analyze_compression_extension_efficiency	This tool evaluates how well a surfer manages the transition between crouching and standing during a turn. It focuses on the biomechanical efficiency of the movement.
03	predict_performance_outcome	This tool simulates the likely result of a maneuver. It uses wave speed, turn radius, and surfer flexibility to find a success probability.
04	get_turn_physics_summary	This tool provides a full breakdown of the forces and requirements for a specific turn. It covers the physics needed for a set configuration.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U What are the physics requirements for a turn with a 5m radius in a 10m/s wave using a 30L board with 0.2 rocker?



For a 5m radius turn in a 10m/s wave, the required speed is 8.5 m/s, the peak G-force is 2.4, and the optimal radius is 5.2m with a high stability rating.

U Is a 25L board with 0.1 rocker suitable for a tight turn in a fast wave?



The suitability score is 0.4, indicating low suitability for tight turns due to the low rocker and high drag coefficient.

U Predict the outcome for a surfer with 0.8 flexibility performing a turn in a 12m/s wave.



The predicted outcome is a High Speed Glide with a 85% success probability and an expected G-force of 1.8.

Frequently Asked Questions

01 What AI clients can I use with this MCP?

You can use this MCP with any compatible client like Claude, Cursor, Windsurf, or VS Code.

02 Can I use this to design a new surfboard?

Yes, you can use the suitability and physics tools to see how different board specs like volume and rocker will perform in specific waves.

03 Does it account for the surfer's physical ability?

Yes, the prediction tool uses surfer flexibility as a key input to simulate the success probability of a maneuver.

04 What kind of data do I need to provide for a turn summary?

You'll typically need to provide the turn radius and the wave speed to get a breakdown of the forces involved.

05 How does it calculate board suitability?

It compares the board's physical characteristics against the intended turn configuration and wave conditions.

Go Live in 60 Seconds

Get your connection token from cloud.vinkius.com, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

`https://edge.vinkius.com/[TOKEN]/mcp`

CLIENT	WHERE TO CONFIGURE
 Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
 Cursor	Settings → Features → MCP Servers → "+" Add New MCP Server" → Type: SSE → Paste endpoint
 VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add <code>"bottom-turn-mechanics": { "url": "..." }</code>
 Windsurf	MCP Settings → <code>mcp_settings.json</code> → Add endpoint URL
 ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
 Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

-  Ask ChatGPT 
-  Ask Claude 
-  Ask Perplexity 
-  Ask Gemini 
-  Ask Grok 

READY TO CONNECT

Bottom Turn Mechanics is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and
start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

INDEPENDENT PLATFORM DISCLAIMER

Vinkius is an independent platform and is not affiliated with, endorsed by, sponsored by, verified by, or otherwise authorized by Bottom Turn Mechanics. All third-party trademarks, logos, and brand names are the property of their respective owners. Their use in this document is strictly for informational purposes to identify service compatibility and interoperability.

DOCUMENT INFORMATION

Generated	September 2026
MCP Server	Bottom Turn Mechanics MCP
Server ID	01a0a6d4-c0a9-7396-8feb-c43dafb092c8
Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

LICENSE & USAGE

This document is generated automatically by the Vinkius PDF Engine. Content reflects the MCP server configuration at the time of generation and may change as updates are deployed. For the most current information, visit vinkius.com/en/ai-agent-connect/bottom-turn-mechanics.