

MCP SERVER

NO CODE

CLOUD HOSTED

Jump Trajectory Analysis MCP

Calculate precise flight paths and landing impacts using physics.

Jump Trajectory Analysis MCP provides physics-based simulations for calculating jump flight paths, peak height, and landing impact. Your AI client uses this to model projectile motion, air resistance, and landing slope geometry to predict exactly how a jump will perform.

A+ Quality Score 100/100

projectile-motion

aerodynamics

trajectory

physics-engine

jump-analysis



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.

Jump Trajectory Analysis MCP

4 tools available

Cloud-hosted on Vinkius

You can use this MCP to run high-fidelity physics simulations for any jump scenario. Instead of guessing how a takeoff angle or air resistance will change your flight, you can get exact numbers. It accounts for the specific geometry of your landing slope and the aerodynamic profile of your body position. You'll get data on flight distance, maximum height, hang time, and landing velocity. Whether you are modeling a ramp jump or a natural terrain leap, the math handles the projectile motion and drag for you. You can test how different body positions change your distance or predict the exact coordinates where you'll hit the ground to ensure a safe landing.

Core Capabilities

01 — Projectile Motion Modeling

Your agent uses this to calculate flight paths based on takeoff speed and angle.

02 — Aerodynamic Drag Analysis

The AI calculates how body positioning changes flight distance through air resistance.

03 — Landing Slope Geometry

Your client factors in the angle of the landing zone to predict impact conditions.

04 — Verticality Analysis

The MCP calculates the maximum altitude reached relative to the takeoff point.

05 — Impact Prediction

Your agent determines exact landing coordinates and velocities.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/jump-trajectory-analysis — connect your AI agent in three steps.

- 01 Connect your MCP-compatible client to Vinkius.
- 02 Provide takeoff parameters like speed, angle, and lip height to your agent.
- 03 The agent calls the specific physics tool needed for your question.
- 04 The MCP runs the projectile motion and aerodynamic calculations.
- 05 Your agent delivers the precise flight metrics or coordinates.

Connect your client to Vinkius and start running physics simulations immediately.

Built For

This MCP is built for anyone needing precise physics calculations for aerial movement. You can hand off complex trajectory math to your agent to get instant results.

Action Sports Engineers

They use the tool to model ramp designs and landing safety.

Game Physics Developers

They use the simulations to validate movement mechanics and jump behaviors.

Aerodynamics Researchers

They use the sensitivity analysis to study how body profiles affect drag.

What Changes When You Connect

- 01 Accounts for air resistance and landing slope geometry in every calculation.
- 02 Provides exact landing coordinates to assist in safety planning.

- 03

Compares different aerodynamic profiles to optimize flight distance.
- 04

Delivers specific metrics like hang time and impact velocity.

Real-World Applications

Ramp Safety Design

Model a jump with a specific lip height and landing slope to ensure the impact is within safe velocity limits.

Flight Path Planning

Determine the necessary takeoff speed and angle to clear a specific gap.

Aerodynamic Optimization

Compare an upright body position against a tucked position to see how much distance you gain.

Verticality Checks

Calculate the peak altitude of a jump to ensure it clears overhead obstacles.

4 Tools Available

#	TOOL	DESCRIPTION
01	calculate_jump_flight_metrics	This tool provides a full performance overview including distance, height, time, and impact speed.
02	get_peak_altitude_details	Use this to focus specifically on verticality and the maximum height reached during flight.
03	analyze_aerodynamic_sensitivity	This tool compares how different body positions and aerodynamic profiles affect your total flight distance.
04	predict_landing_impact	Get exact landing coordinates and impact conditions to verify safety.

See It in Action

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

- U** Calculate the flight metrics for a jump with 15 m/s takeoff speed, 30 degree angle, 2m lip height, and a 10 degree landing slope.



The jump will cover a flight distance of 24.5 meters, reach a maximum height of 3.2 meters above the lip, have a hang time of 1.8 seconds, and impact with a velocity of 16.2 m/s.

- U** What is the peak height if I jump at 20 m/s with a 45 degree angle and a 1m lip height?



The peak height reached is 10.2 meters above the takeoff lip, resulting in an absolute peak height of 11.2 meters from the ground.

- U** How does changing my body position from upright (1.0) to tucked (0.5) affect my distance for a 12 m/s jump at 25 degrees?



Using an aerodynamic profile of 1.0 results in a distance of 14.2 meters, while a tucked profile of 0.5 increases the distance to 16.8 meters.

Frequently Asked Questions

01 What physics factors does this MCP include?

The simulations account for projectile motion, air resistance, and the geometry of the landing slope.

02 Can I use this to test different body positions?

Yes, you can use the aerodynamic sensitivity tool to compare how different profiles affect your flight distance.

03 How does it handle landing slopes?

The tool incorporates landing slope geometry into its calculations to predict impact conditions and coordinates.

04 Which clients can I use with this MCP?

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

05 Does it calculate vertical height?

Yes, it can calculate the maximum height reached during flight relative to the takeoff lip or the ground.

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>"jump-trajectory-analysis": { "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

Jump Trajectory Analysis 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

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DOCUMENT INFORMATION

Generated	September 2026
MCP Server	Jump Trajectory Analysis MCP
Server ID	01a0a031-f3eb-738e-b827-968ed34ed083
Platform	Vinkius Cloud for AI Agents
Endpoint	<code>https://edge.vinkius.com/{token}/mcp</code>

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