INFORMAL DRAWINGS FOR PROVISIONAL PATENT APPLICATION

Docket No.: RUTHERFORD-016-PROV

Title: DELIBERATE ERROR TOLERANCE ARCHITECTURE (DETA)

FIGURE 1: SYSTEM ARCHITECTURE

Hierarchical Processing Layers

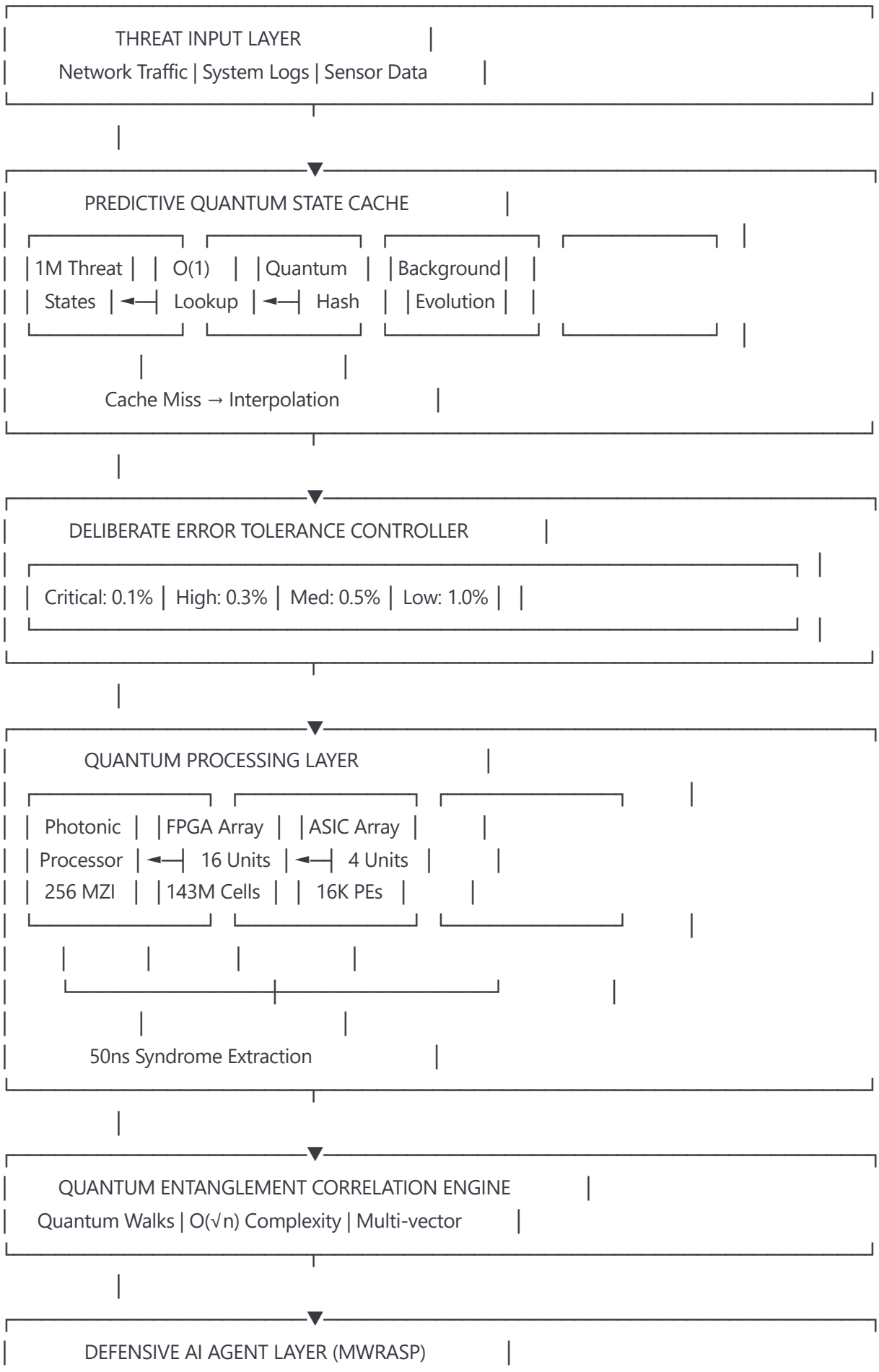
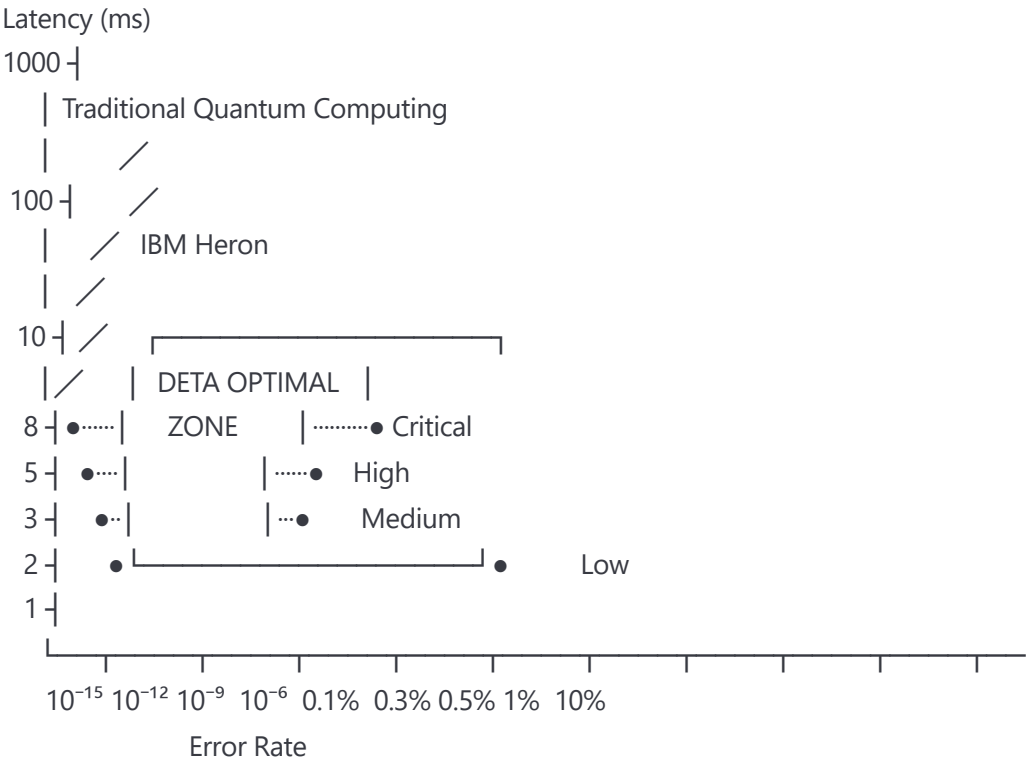

THREAT INPUT LAYER
Network Traffic | System Logs | Sensor Data
PREDICTIVE QUANTUM STATE CACHE
1M Threat States
O(1) Lookup
Quantum Hash
Background Evolution
Cache Miss → Interpolation
DELIBERATE ERROR TOLERANCE CONTROLLER
Critical: 0.1% | High: 0.3% | Med: 0.5% | Low: 1.0%
QUANTUM PROCESSING LAYER
Photonic Processor
256 MZI
FPGA Array
16 Units
143M Cells
ASIC Array
4 Units
16K PEs
50ns Syndrome Extraction
QUANTUM ENTANGLEMENT CORRELATION ENGINE
Quantum Walks | O(√n) Complexity | Multi-vector
DEFENSIVE AI AGENT LAYER (MWRASP)

FIGURE 2: ERROR RATE VS LATENCY TRADE-OFF CURVE

Optimal Operating Zone



Legend: ● = DETA Operating Points

／ = Traditional QC Trajectory

FIGURE 3: PREDICTIVE QUANTUM STATE CACHE ARCHITECTURE

Cache Structure and Interpolation Engine

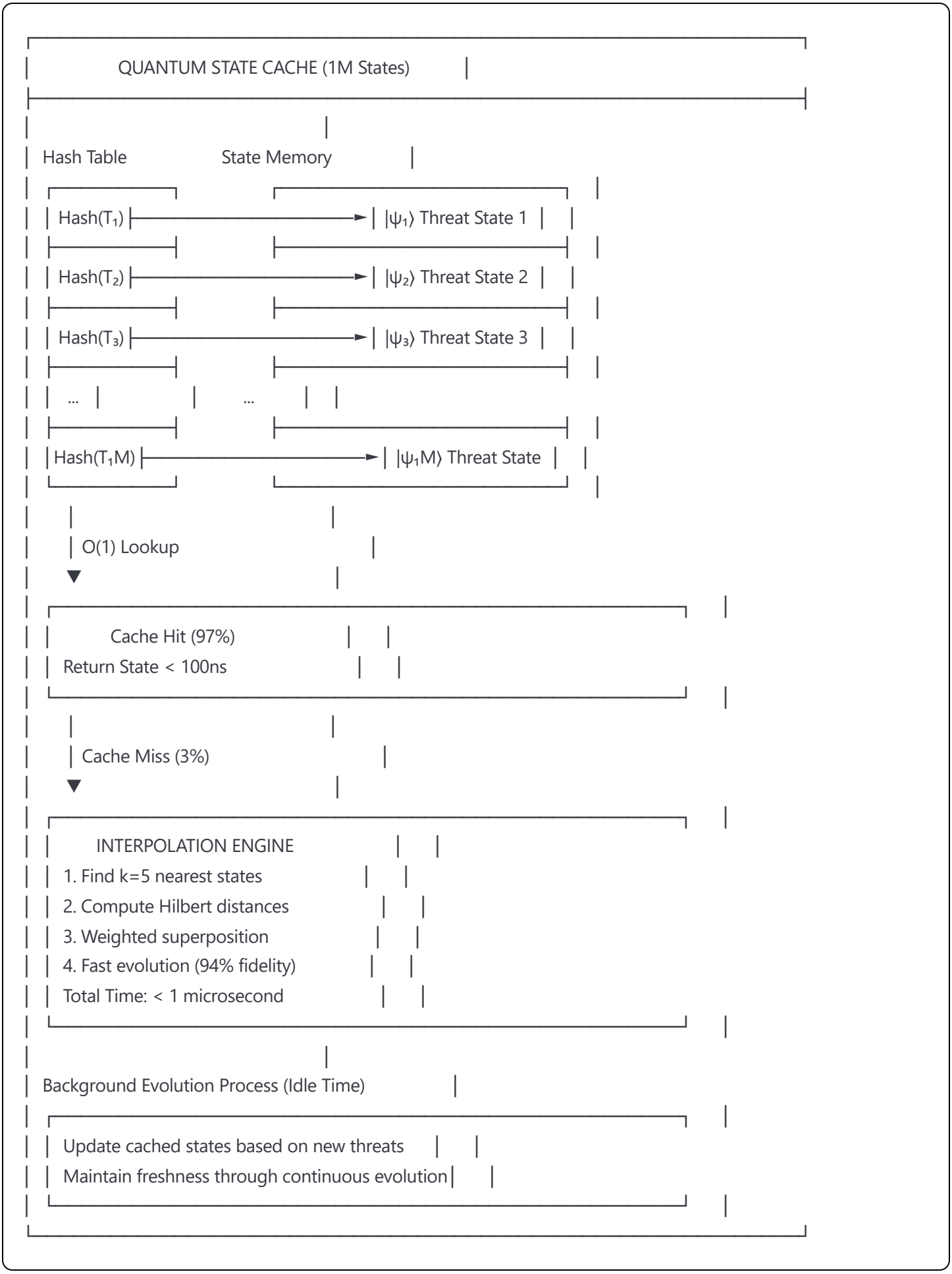

QUANTUM STATE CACHE (1M States)
Hash Table
State Memory
Hash(T1)
|ψ1⟩ Threat State 1
Hash(T2)
|ψ2⟩ Threat State 2
Hash(T3)
|ψ3⟩ Threat State 3
...
...
Hash(T1M)
|ψ1M⟩ Threat State
O(1) Lookup
Cache Hit (97%)
Return State < 100ns
Cache Miss (3%)
INTERPOLATION ENGINE
1. Find k=5 nearest states
2. Compute Hilbert distances
3. Weighted superposition
4. Fast evolution (94% fidelity)
Total Time: < 1 microsecond
Background Evolution Process (Idle Time)
Update cached states based on new threats
Maintain freshness through continuous evolution

FIGURE 4: ROOM-TEMPERATURE PHOTONIC PROCESSOR LAYOUT

256 Mach-Zehnder Interferometer Array

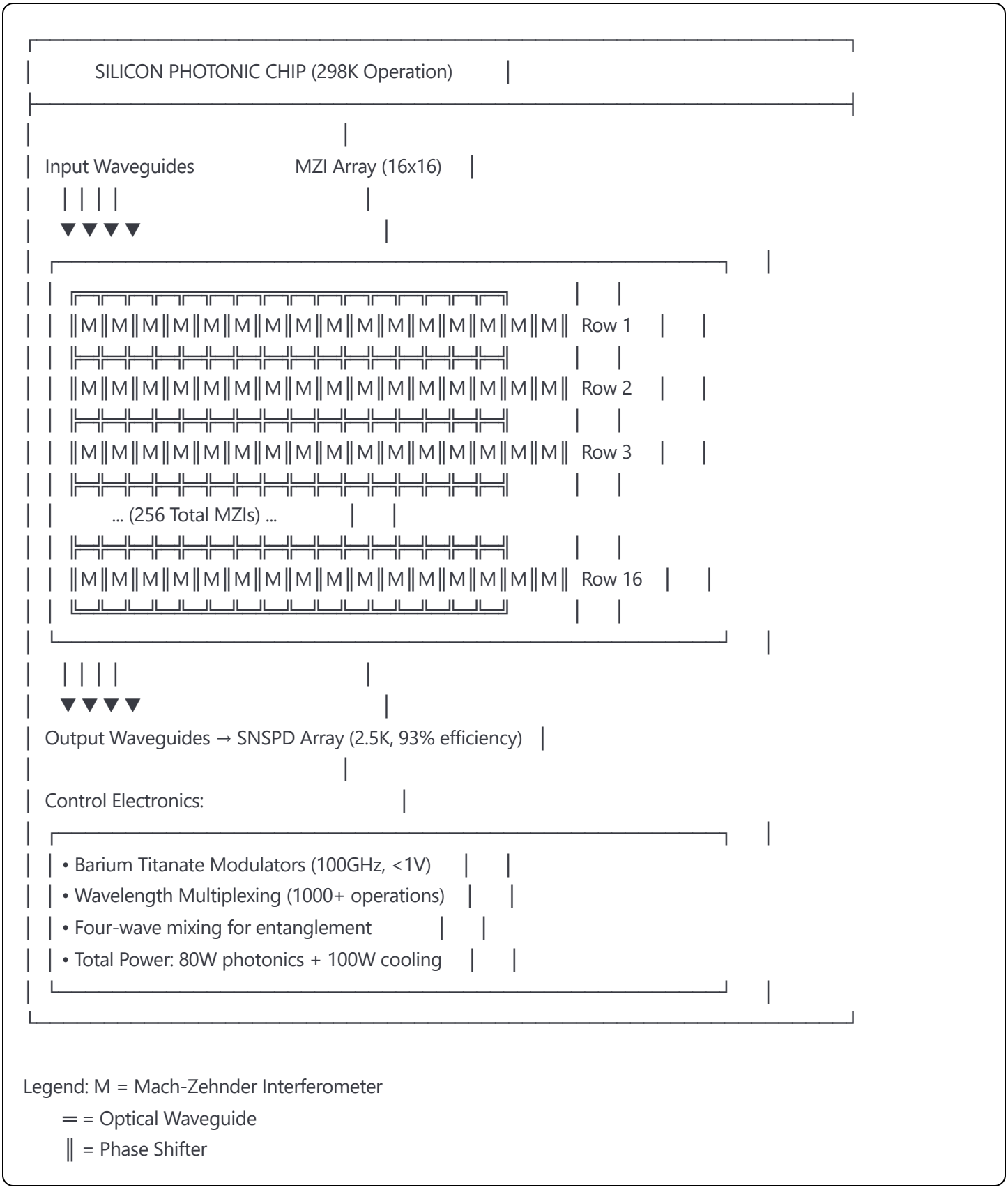


FIGURE 5: COMPARATIVE PERFORMANCE METRICS

DETA vs Current State-of-the-Art

	DETA System	IBM Heron	Google Willow	IonQ Forte
Latency	<10ms	>100ms	>100ms	>500ms
Error Rate	0.1-1%	0.5%	<0.1%	0.02%
Power	<1kW	25kW	30kW	15kW
Temperature	298K	15mK	20mK	77K
Throughput	10M/sec	10K/sec	5K/sec	1K/sec
Syndrome	50ns	1-10µs	63µs	100µs
Deployment	Standard Rack	Quantum Facility	Quantum Facility	Quantum Facility

Performance Improvement Factors:

Speed:	100-1000x
Power:	25-30x
Deployment:	Immediate vs Years
Cost:	100x lower

Threat Detection Accuracy:

DETA:	99.5% @ 10ms
Classical:	95% @ 100ms
Traditional QC:	99.99% @ 1000ms

Key Insight: 99.5% accuracy in 10ms provides superior real-world protection compared to 99.99% in 1000ms

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DRAWING NOTES FOR USPTO

1. These are informal drawings suitable for provisional patent application
2. Formal drawings will be prepared for non-provisional filing

3. All drawings are original work created for this invention
4. No copyrighted material has been incorporated
5. Drawings illustrate the key technical innovations claimed

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