



# Cuneiform Technologies, Inc.

## *Preservation Matters*

Library of Congress  
Storage Architectures Meeting

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[www.cuneiformtech.com](http://www.cuneiformtech.com)

# The Challenge Of Digital Data Preservation



- The worldwide exponential growth of data is continuing with no end in sight, and is projected to increase from 2.8ZB (a Zetabyte is a billion terabytes) created & replicated in 2012 to 44ZB by 2020. Doubling every two years<sup>1</sup>.
- Long-Term Archive has very different requirements than traditional 'backup', and current storage technologies simply fail to meet those demands.

Performance Considerations	Financial Considerations
Never Changing – Permanent & Tamper Proof – Cannot be erased or altered.	Low Total Cost of Ownership (\$/GB/Year) Environment + Volume + Labor + Media Cost
Very High Media Longevity & Stable Data Authenticity – 10-100+ Years without No Media Degradation	No Forced Migration
Data Recovery NOT Tied to Specific Hardware – No Format / Media Obsolescence	No Forced Media Replacement
Immune to EMP Attack, Fire, Flood, Bit Rot, Fingerprints Corrosion, and other environmental considerations	No Need for Regular Data Confirmation
Medium to Very High Latency	Minimal Hardware Replacement
History Proves Data Should Be Represented Visually	No Strict Environmental Demands (15-150°F / -9° to 66° C and 0-100% humidity)

<sup>1</sup> IDC Digital Universe Study, December 2014

# Your Data Sealed in Steel

- Steel as a medium

- Stainless steel has a proven track record

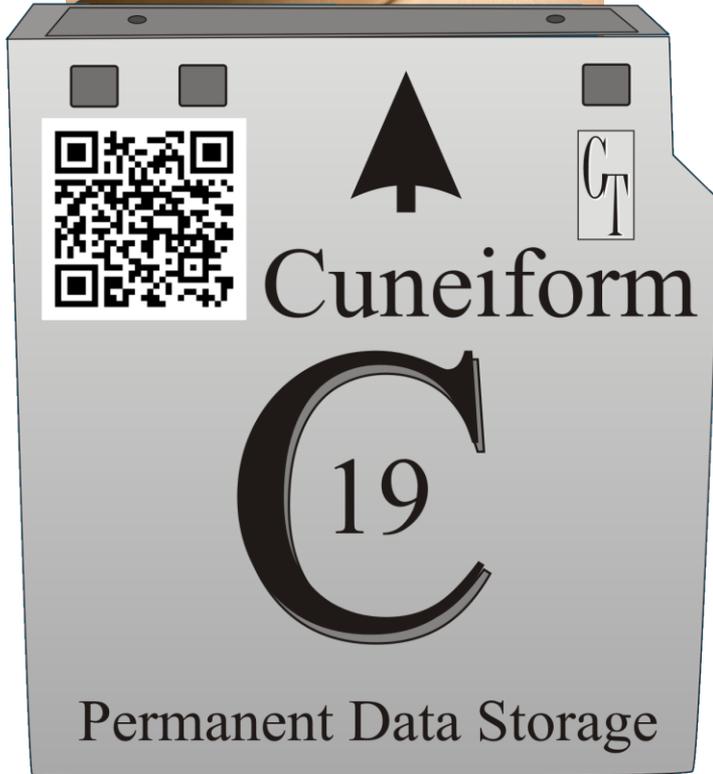
- Chrysler Building
- Gateway Arch
- Niagara Hudson Building



- We start with a .01 mm thick, 19 mm wide by 300 meters long, band of 316 type stainless steel

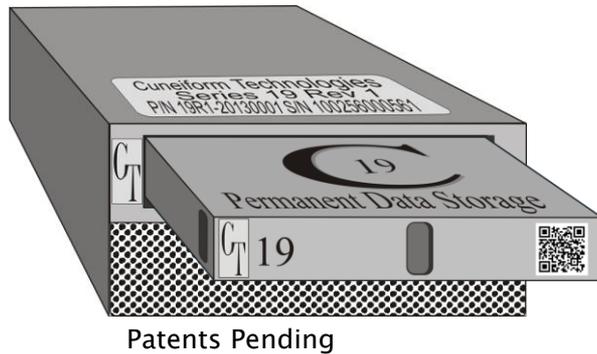


# Stainless Steel Band Loaded in Magazine

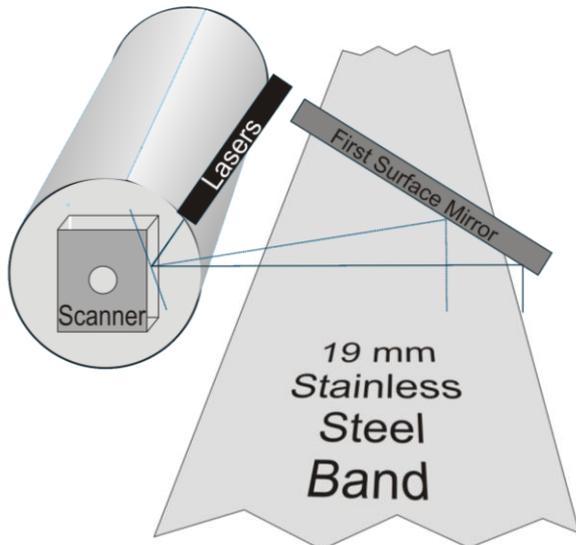


- Two types of archive magazines:
  - ABS plastic
  - Stainless Steel with hermetic seals
  - Double Sided Media
- Optimized for library automation

# Magazine Based Reader/Writer Transport



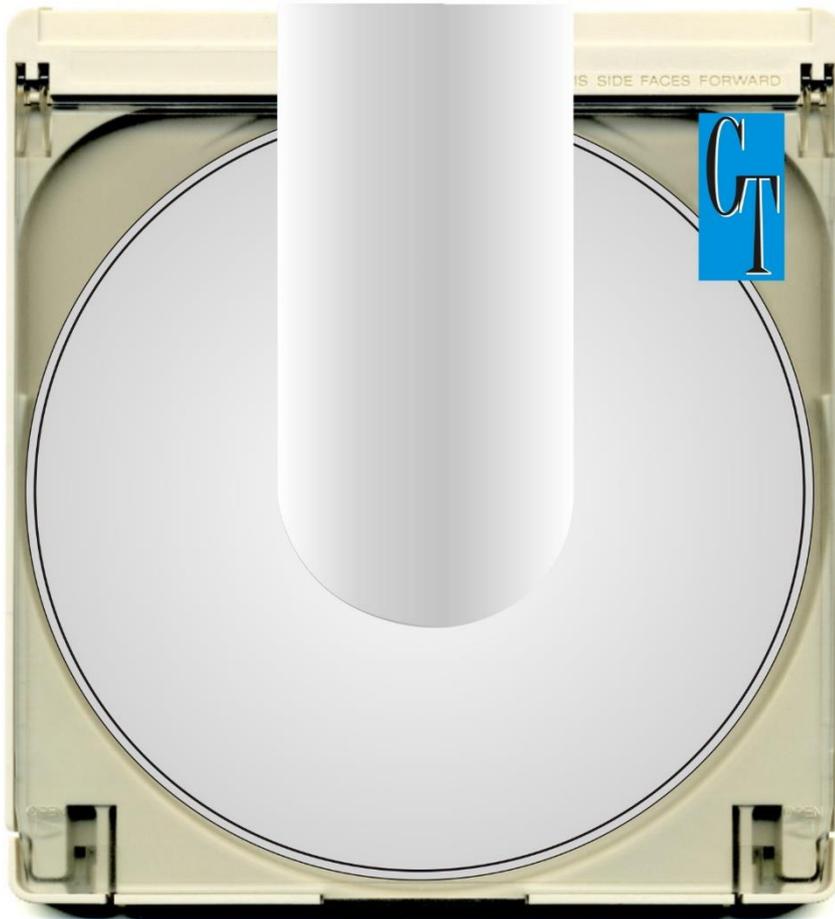
- Automated or manual insertion into transport
  - ‘Picker’ friendly tabs and coding
- Transport uses generic 1000 base-T & fiber interface
- Industry standard transport size
- Femtosecond laser technology
- Dual sided media
- Analog capable



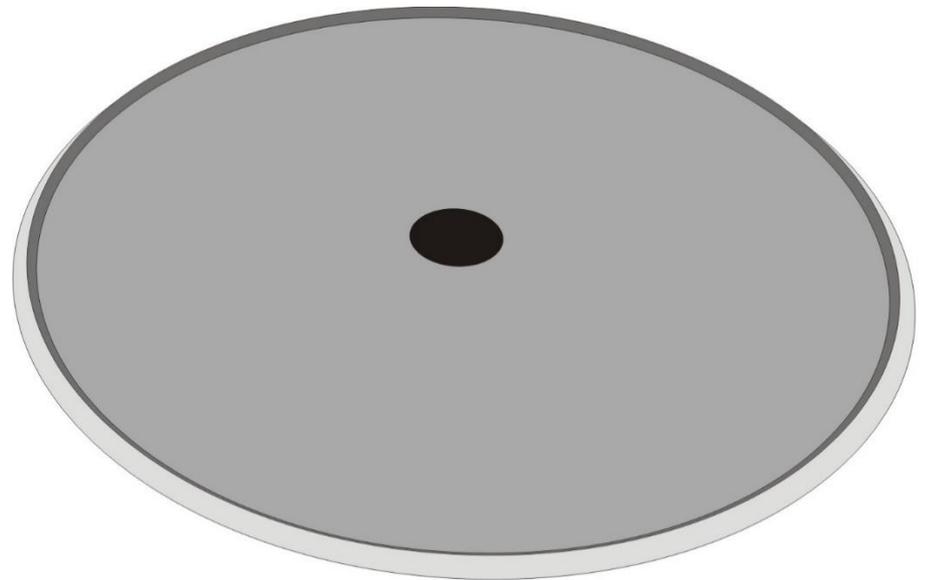


And now for something  
completely different...

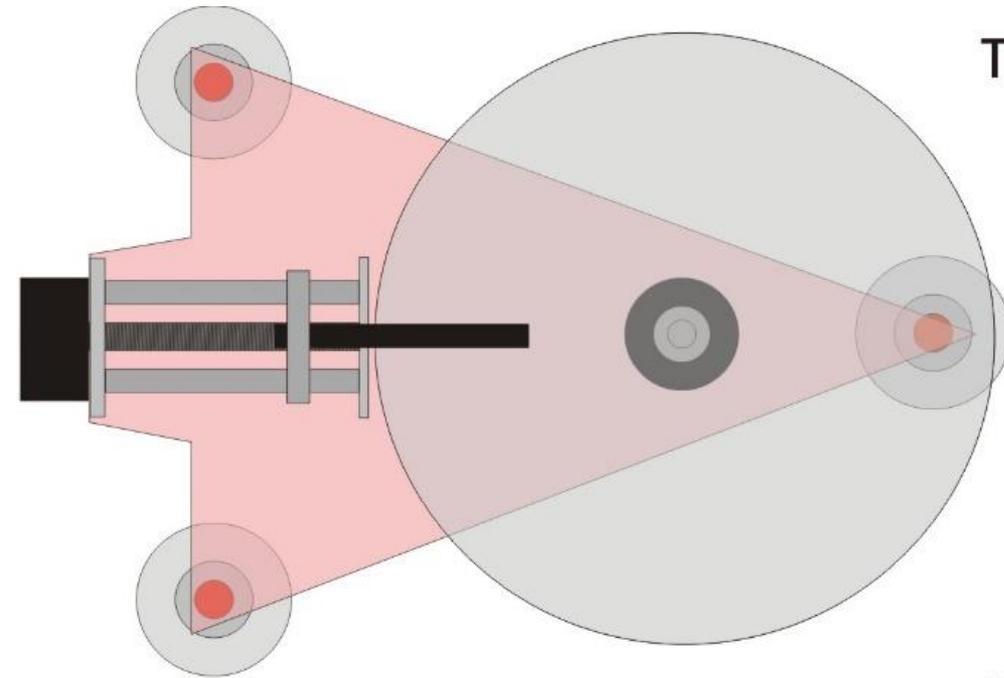
# Stainless Steel Ribbed Disc Media



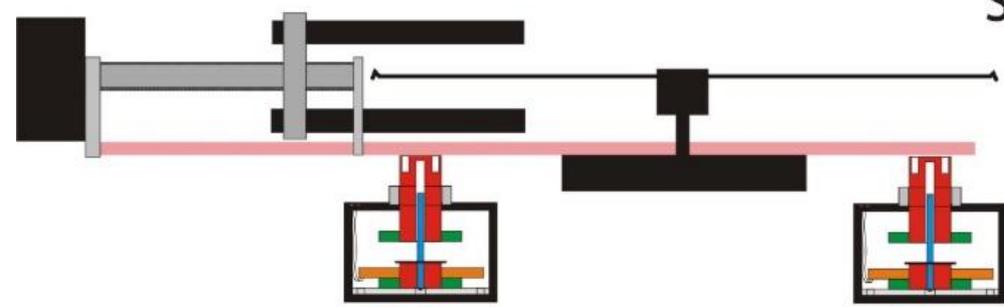
- New target market
- Same laser technology
- Double sided
- Optically readable
- Analog capable
- Same robust environment stability



# Stainless Steel Disc Media Drive



Top View

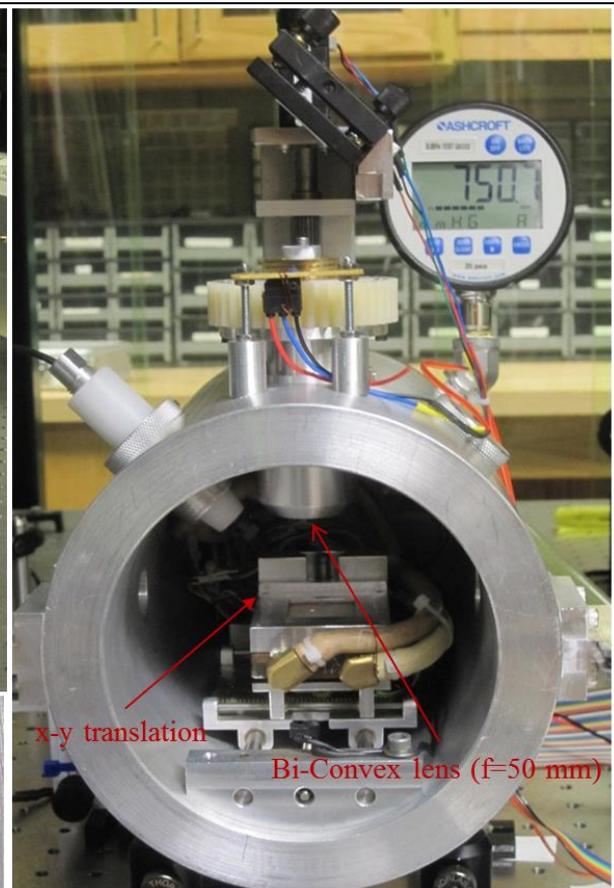
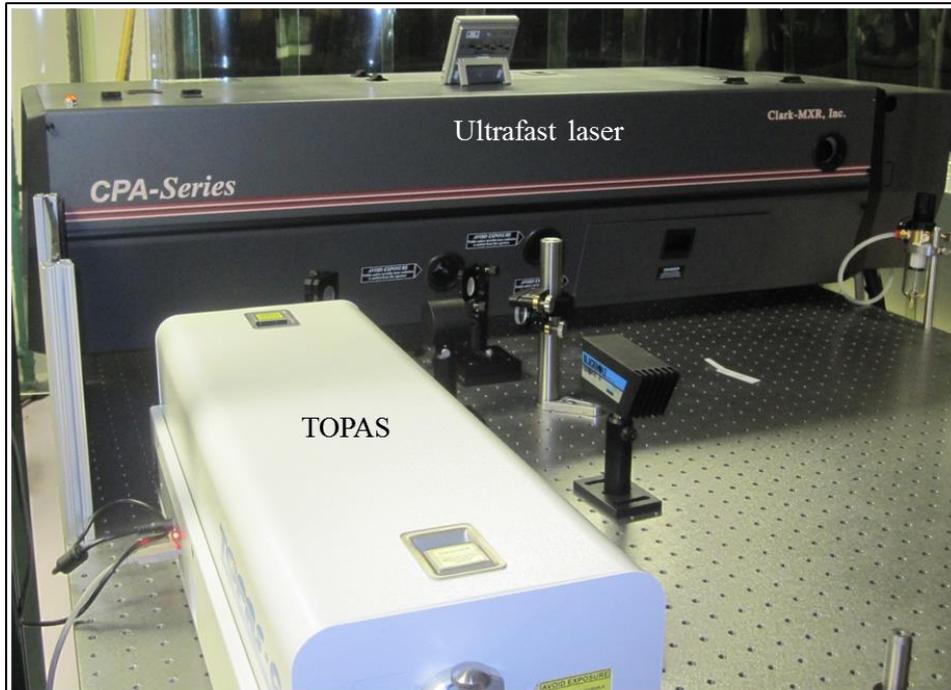


Side View

- Active damper floating transport
- Non-formatted media (low cost)
- Designed for lower volume market
- Writes both sides at once
- Robotic friendly transport interface

Patent Applied

# Proving the Concept



Single Shot per location,  
Laser Energy- 1.6 mJ/pulse,  
Center Wavelength – 775 nm,  
Pulse Duration – 150fs,  
Spot size about 100  $\mu\text{m}$ .



# Key Advantages of Cuneiform

- 
- Migrations can be eliminated (or moved out 10–15x longer)
  - No forced migrations
  - Superior Permanence
  - Double sided media
  - Simple concept – Visual information with no erasability
  - Commodity materials (cost effective)
  - System Components Are Proven
  - Backward Compatibility Guaranteed
  - Generation 1 can be read on hardware generation N
  - Environmentally superior media
  - Immune to: Floods, Fires & EMP
  - Stainless Steel – Hermetically Sealed Magazine

# Our Request



- We need YOUR feedback
- Go to...

<http://CuneiformTech.com/survey>