Storage Expansion Planning
Super DLTtape™ Technology

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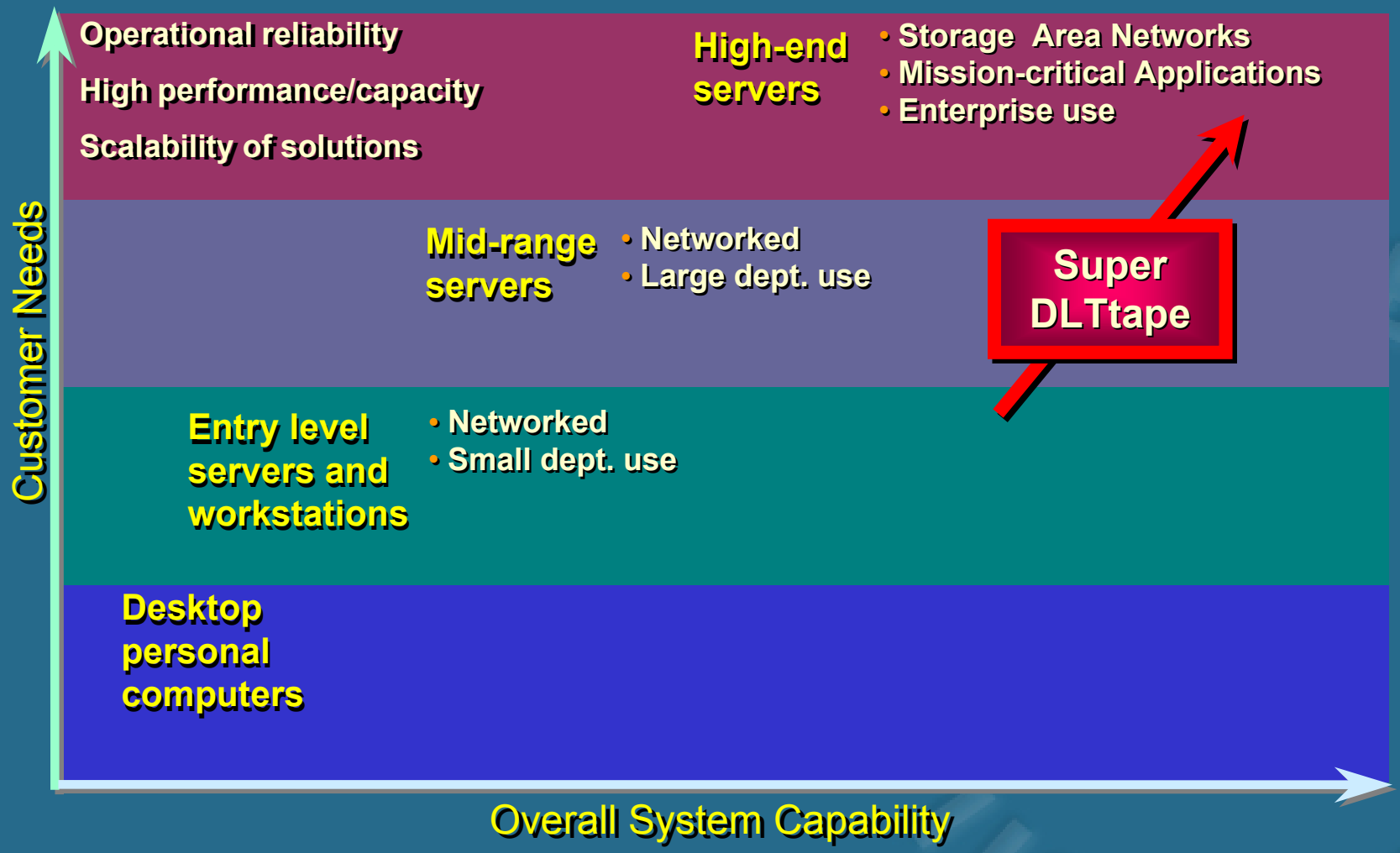
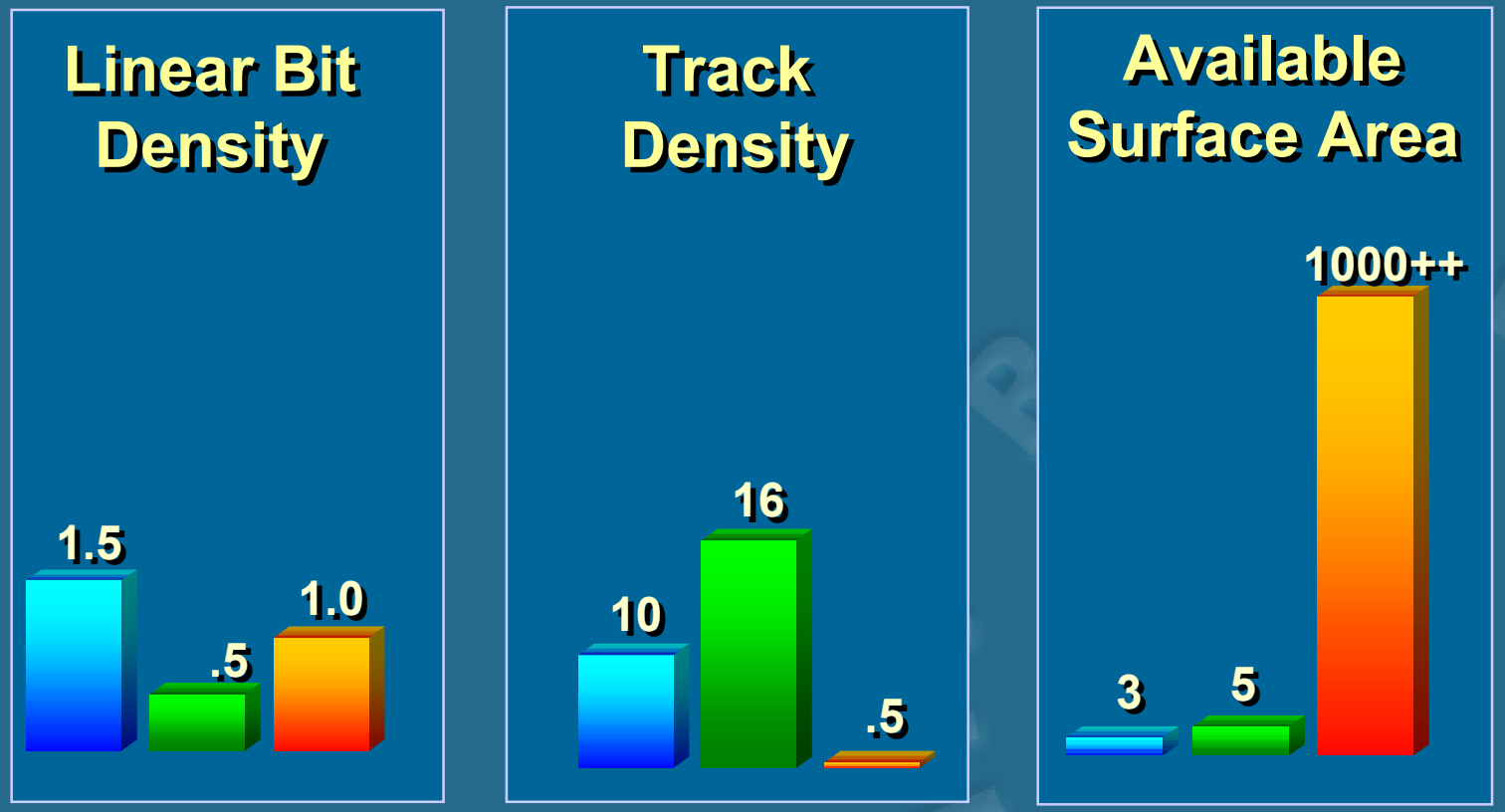
Super DLTtape Applications



The Opportunity for Tape



Super DLTtape Platform

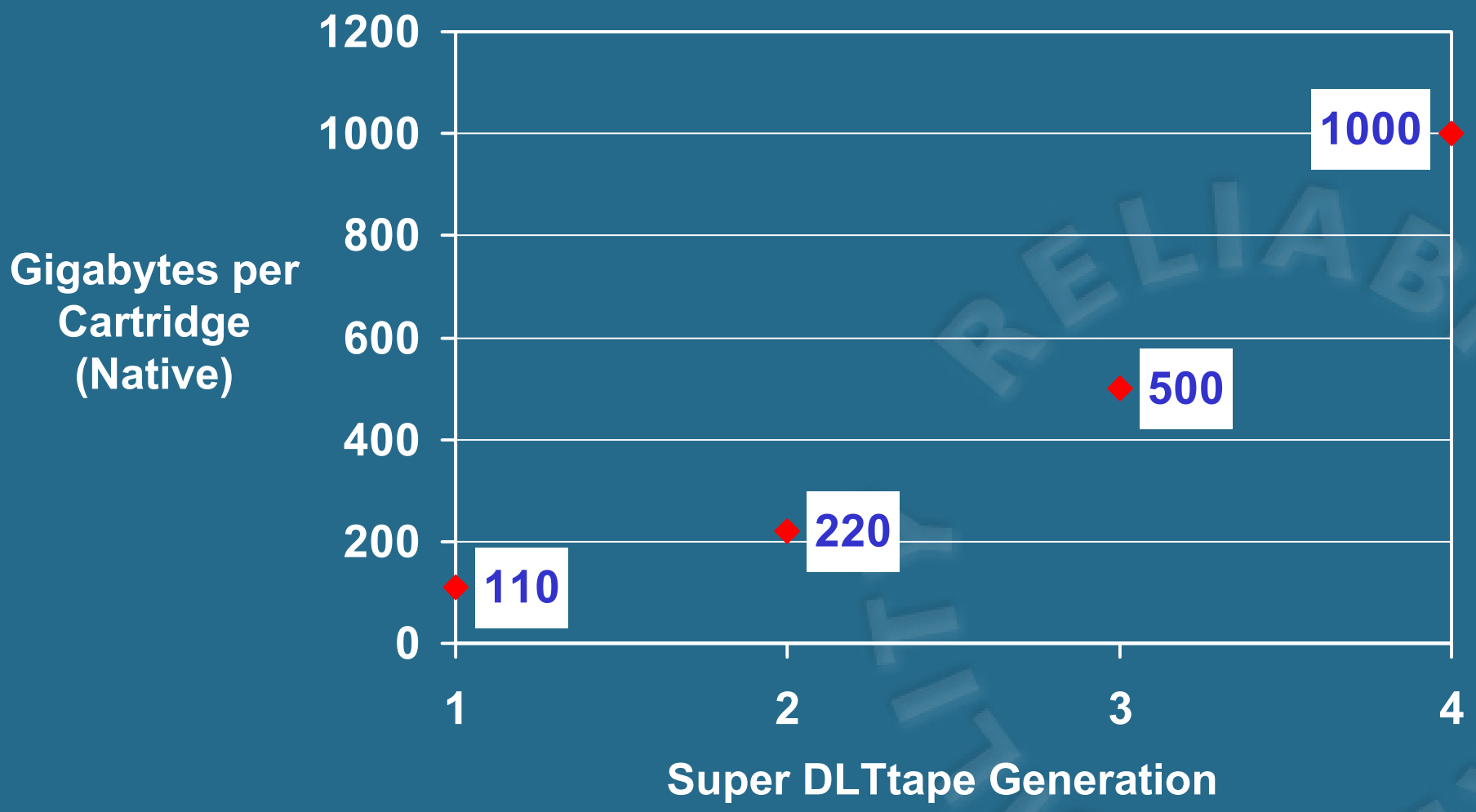
Goals for Technology Development

- Initial Capacity Greater Than 100GB
- More than 10MB/sec data transfer rate
- Up to one terabyte and 100 MB/sec (native) over multiple generations
- Improved data access
- Backward read compatibility to previous DLTtape products

Super DLT1 Specifications

- Capacity — 110GB (Native)
- Transfer Rate — 11MB/sec (Native)
- Read/Write Channels — 8
- Tracks Density — 1000 per inch (TPI)
- Linear Density — 131K bits/inch (BPI)
- Tape Speed — 116 ips
- Time to data nominal — 15 seconds
- Backward Read Compatible to DLT4000, DLT 7000, DLT 8000

Super DLTtape Growth Plan



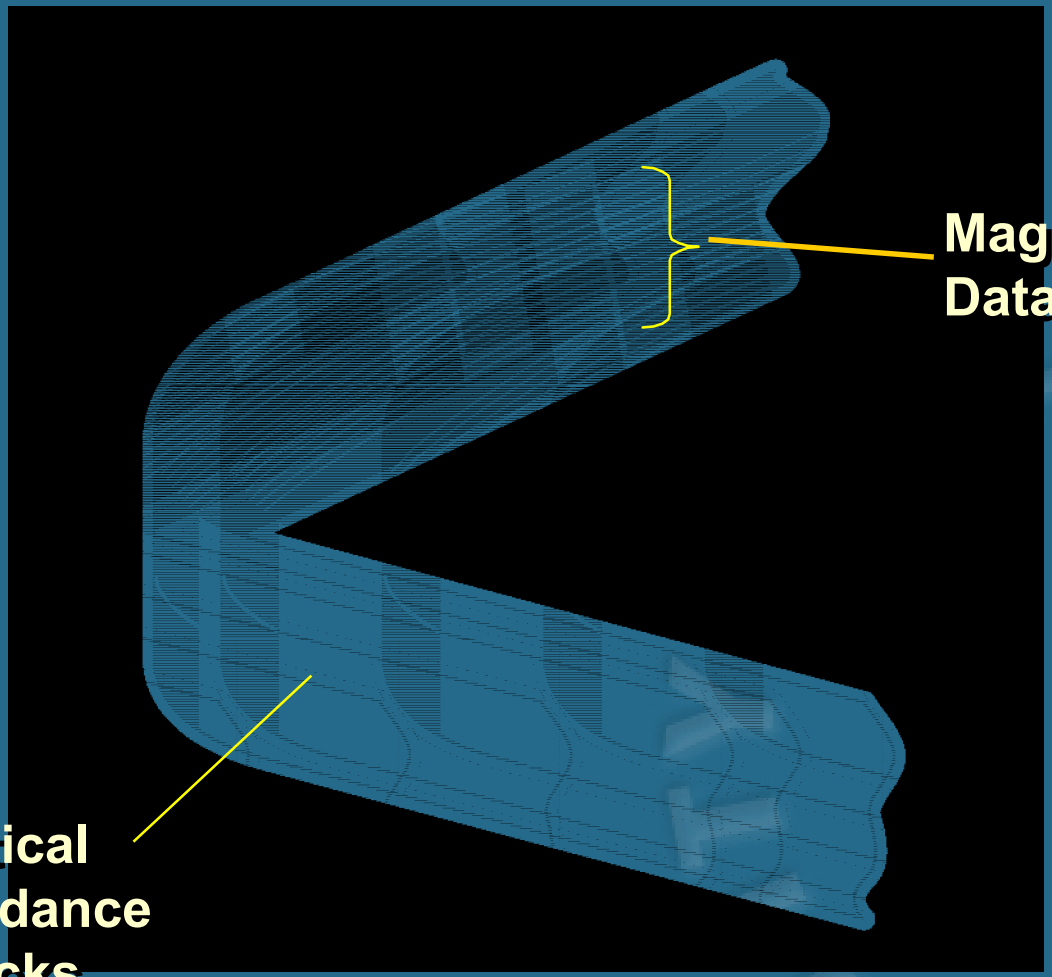
Super DLT Enabling Technologies

- Laser-Guided Magnetic Recording (LGMR) with Optical Servo
- Magneto Resistive Cluster (MRC) Heads
- Advanced Cartridge and Media
- PRML Channel
- DLTtape Read Compatibility
- Modular “Plug and Play” Design

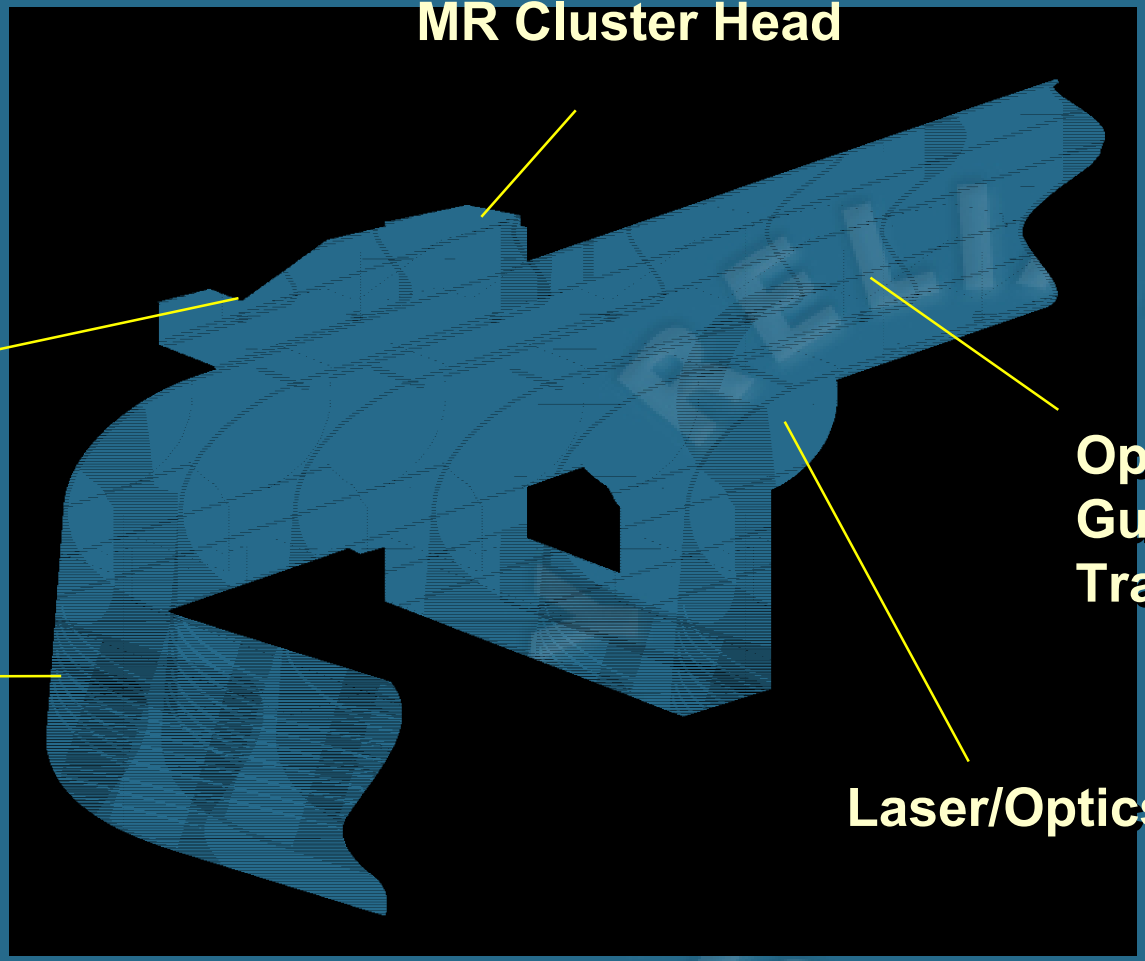
LGMR - Laser-Guided Magnetic Recording

- Enables greater track densities & capacity
  - Native Capacity from 100GB to 1TB
    - 500GB capacity already demonstrated
- Servo - Closed-loop optical for precise tracking
  - Located on backside
- Data - High-density magnetic write and read

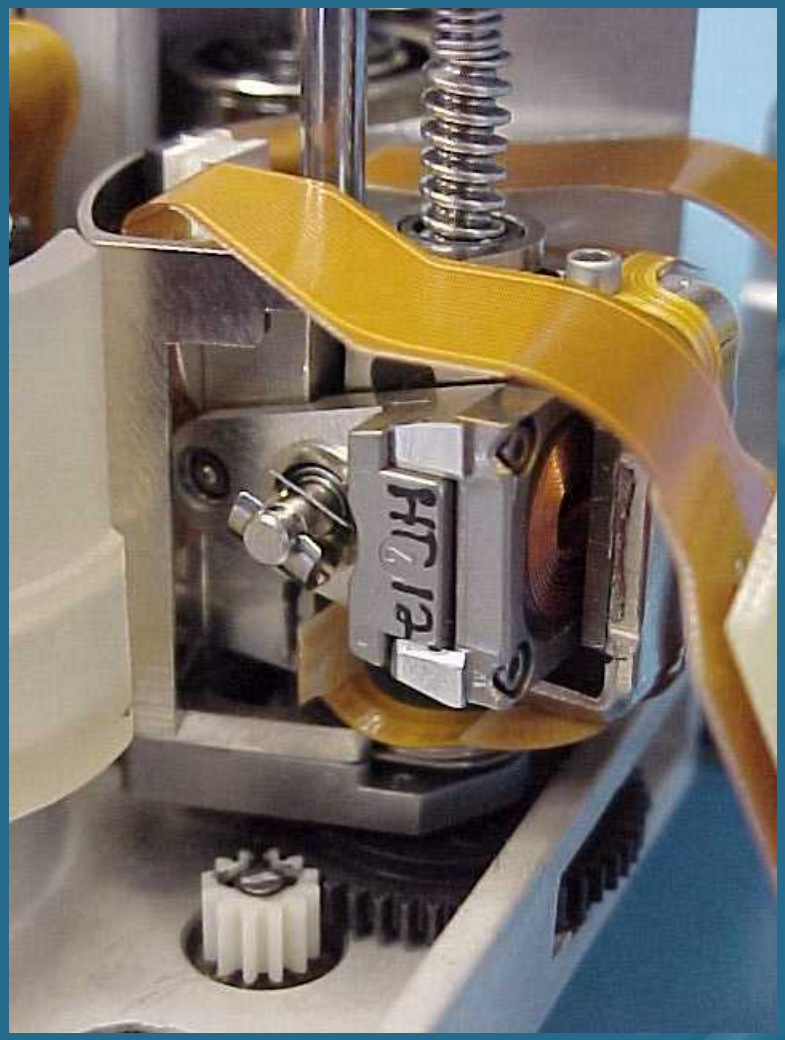
LGMR Servo and Data Tracks



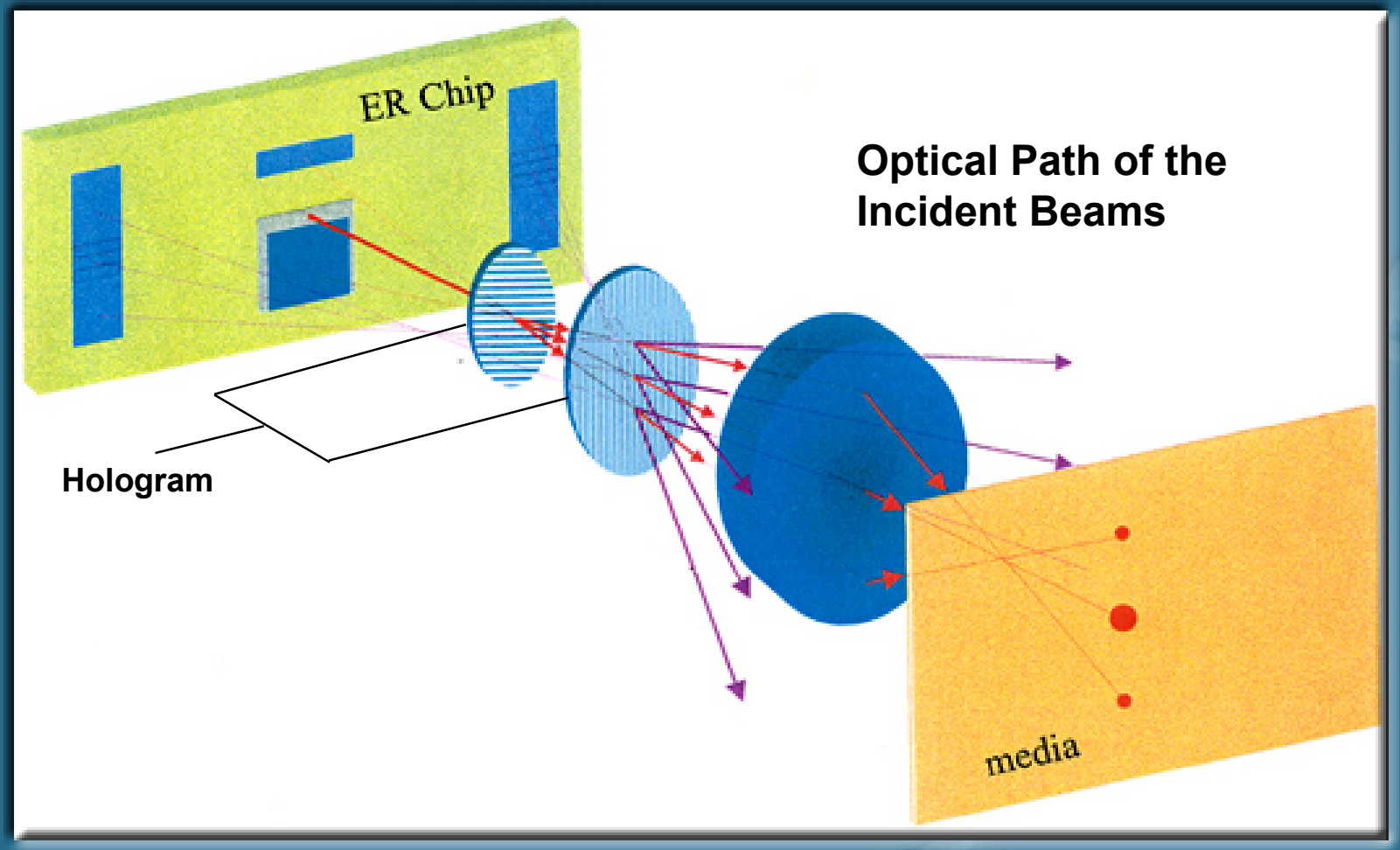
Super DLT Pivoting Optical Servo



POS Optical Servo Actuator



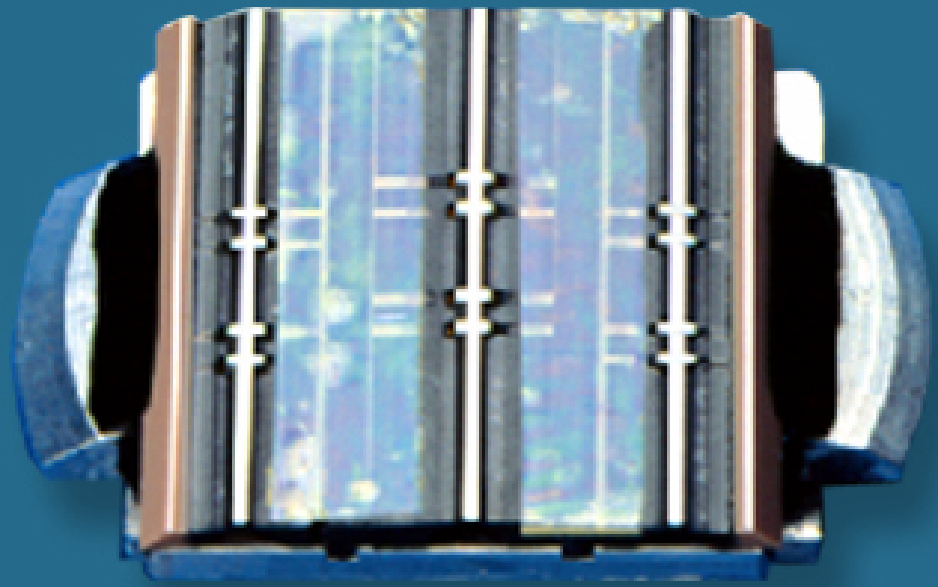
Three-Beam Optical Tracking System



LGMR Attributes

- Servo data is indelible - tracks cannot be magnetically erased
- 100% of the media area and head elements are used for recording
- Three-hologram beam system for reliability
- Utilizes 15% of demonstrated capability of optical tracking
  - Similar application on CD and DVD at 16,000 tpi

Super DLT MRC Head



DLT 7000 Head

Super DLT
Magneto Resistive Cluster Head

MRC Head Attributes

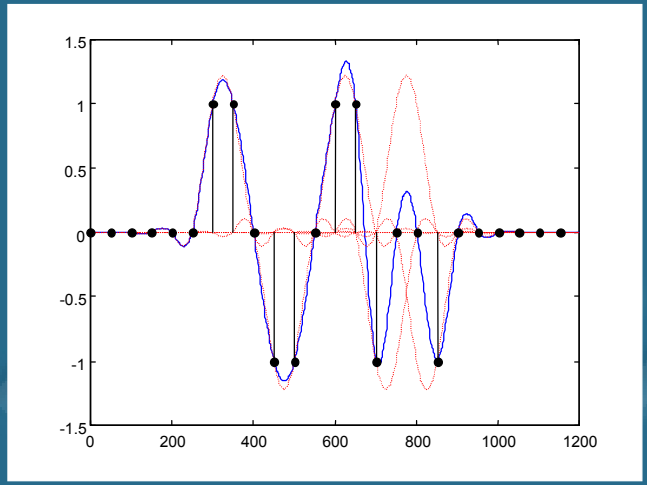
- Precision track alignment provided by thin film manufacturing process
  - Elements on each head island produced on a single die
- Scales easily to provide additional parallel channels
  - Supports development even greater transfer rates as system performance levels increase

PRML Channel

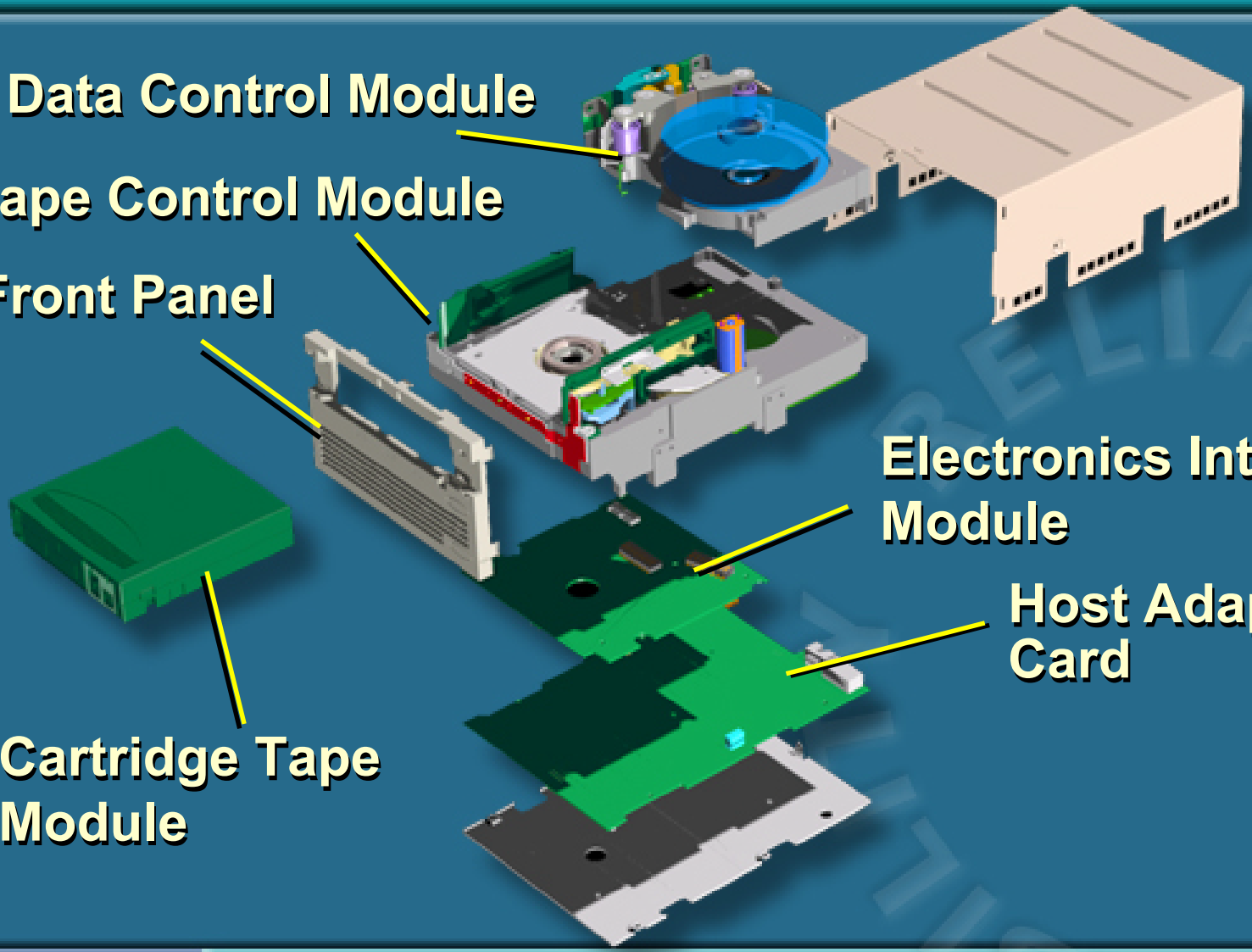
- A Partial Response Maximum Likelihood channel co-developed by Quantum and Lucent/Bell Labs
- Extends PRML channel technology to high-performance tape drives
- Higher encoding efficiency and bit densities for greater capacity and performance

PRML Attributes

- Higher linear bit densities generate interference
- PRML allows adjacent bits to interfere in controlled ways
- Spreads the information for each bit across a larger space on tape
- Samples amplitude values to extract that information back from the waveform



Super DLTtape Modular Design

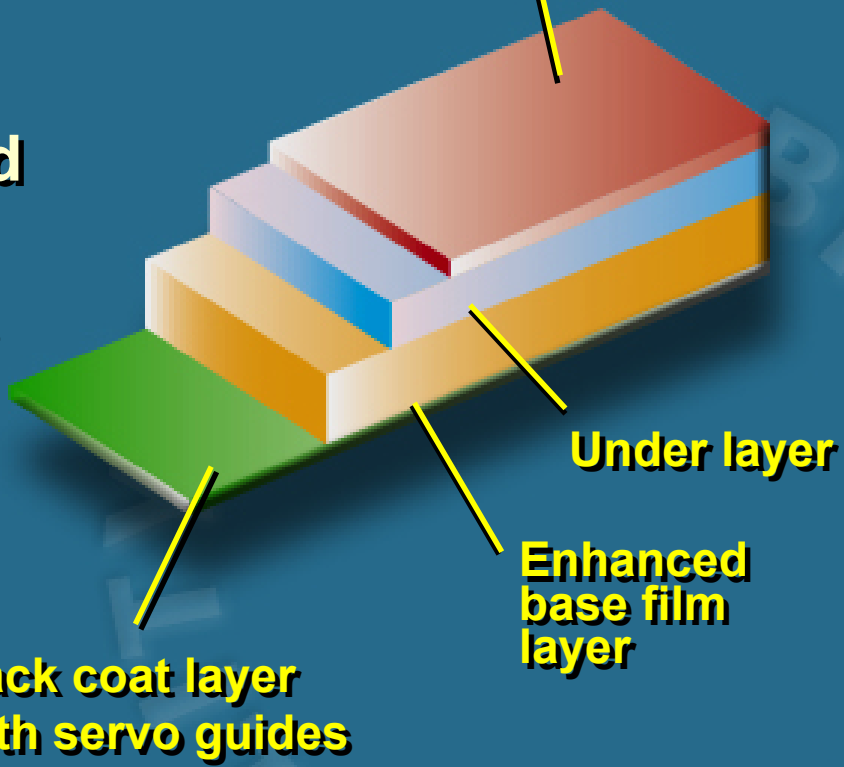


Modular Design

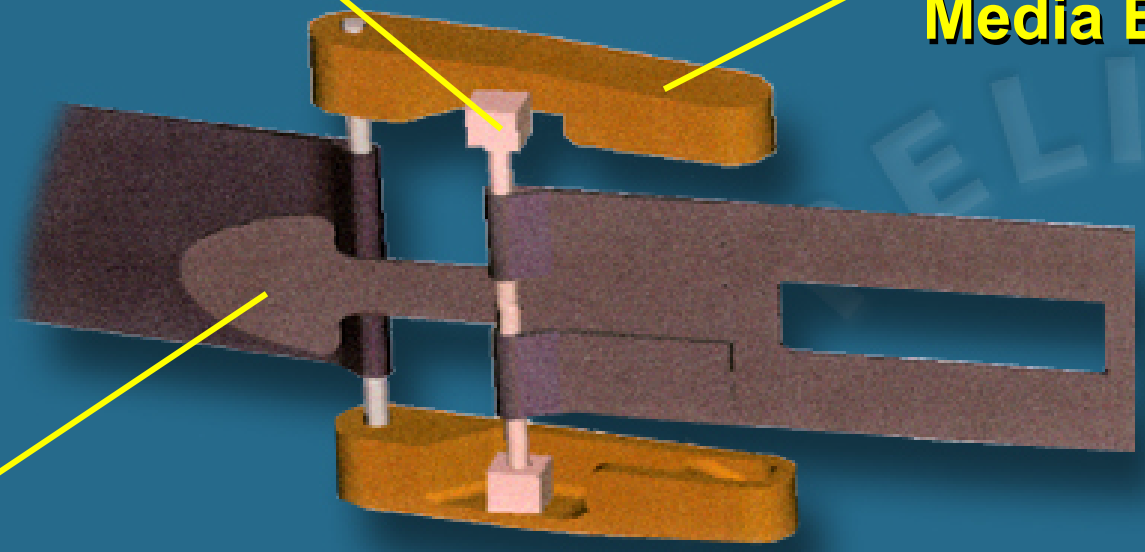
- Ability to Provide Multiple Products From a Single Design Platform
- Major Drive Components Fully Testable as Modules
- Easily Configured in Manufacturing
- Facilitates Development of New Products and Interfaces

Advanced Metal Powder Media

- Advanced technology supports multiple generations of Super DLTtape product
- Reliable, proven multi-coated Metal Particle media
- Back coating contains guide tracks for the optical servo



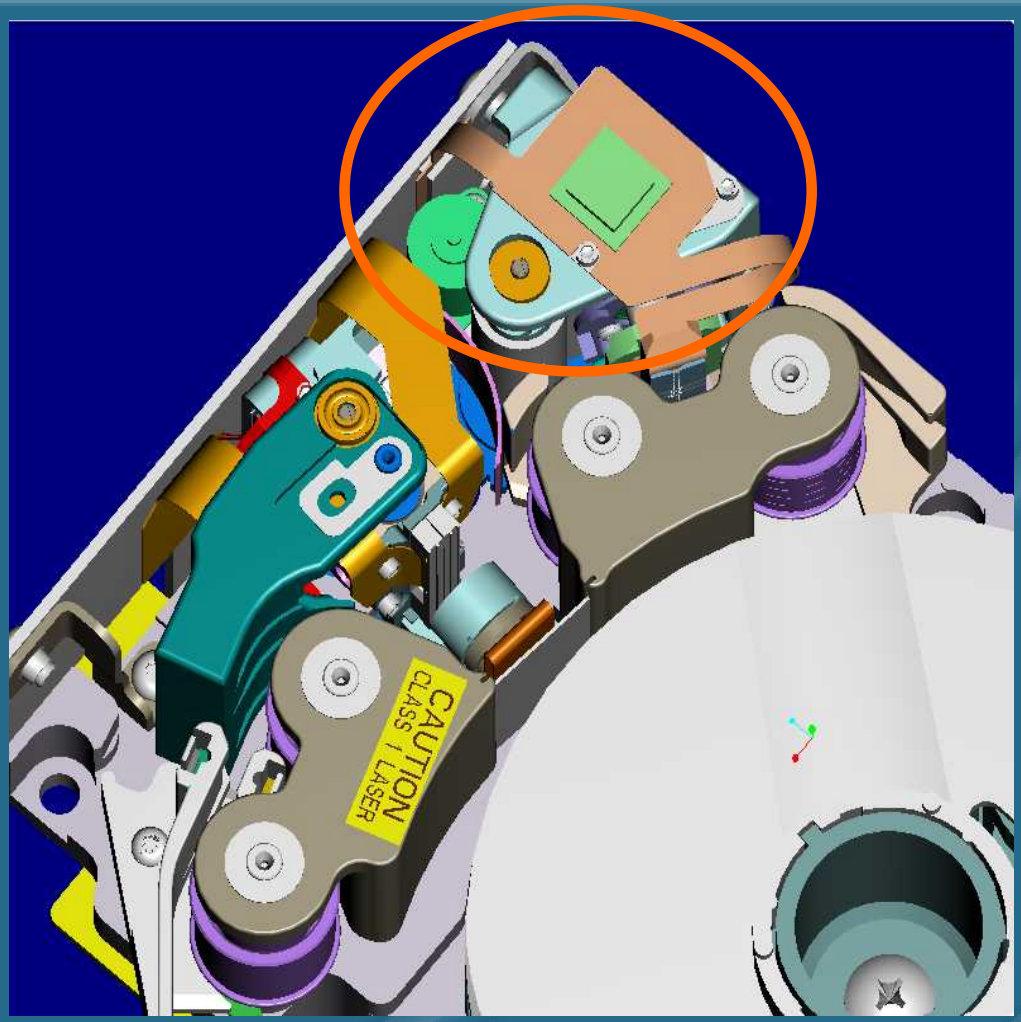
Super DLT Positive Buckling System



DLT-Format Read Head Module

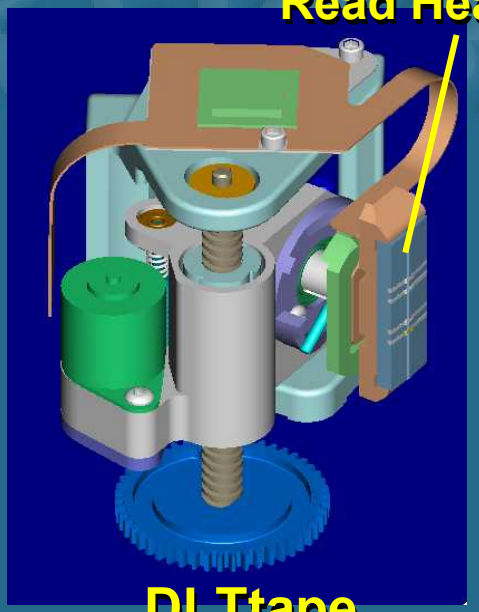
Design Features

- The self-contained BRC head module provides read capability for DLTtape IV formats
- Includes head azimuth alignment for SPR formats
- Head assembly retracts when not in use to reduce head wear and contamination



Backward Read Head Module

- The backward read head is activated by insertion of a DLTtape IV cartridge
  - Read compatible with DLT 4000 / DLT 7000 / DLT 8000 formats
- Super DLT MRC head reads only Super DLT formats
  - Optimized for high density



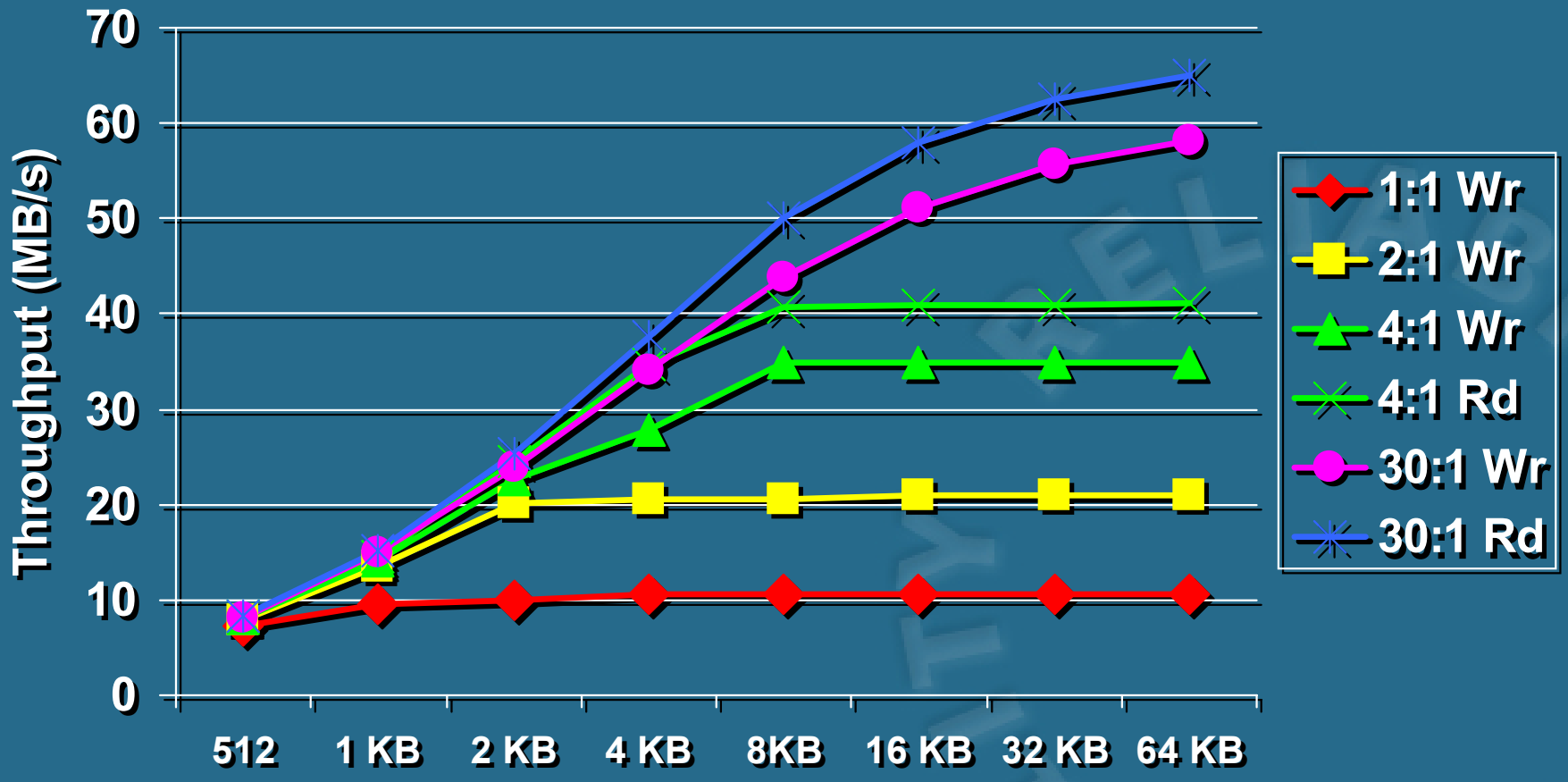
DLTtape Compatibility Module

Super DLTtape
Advancing Performance

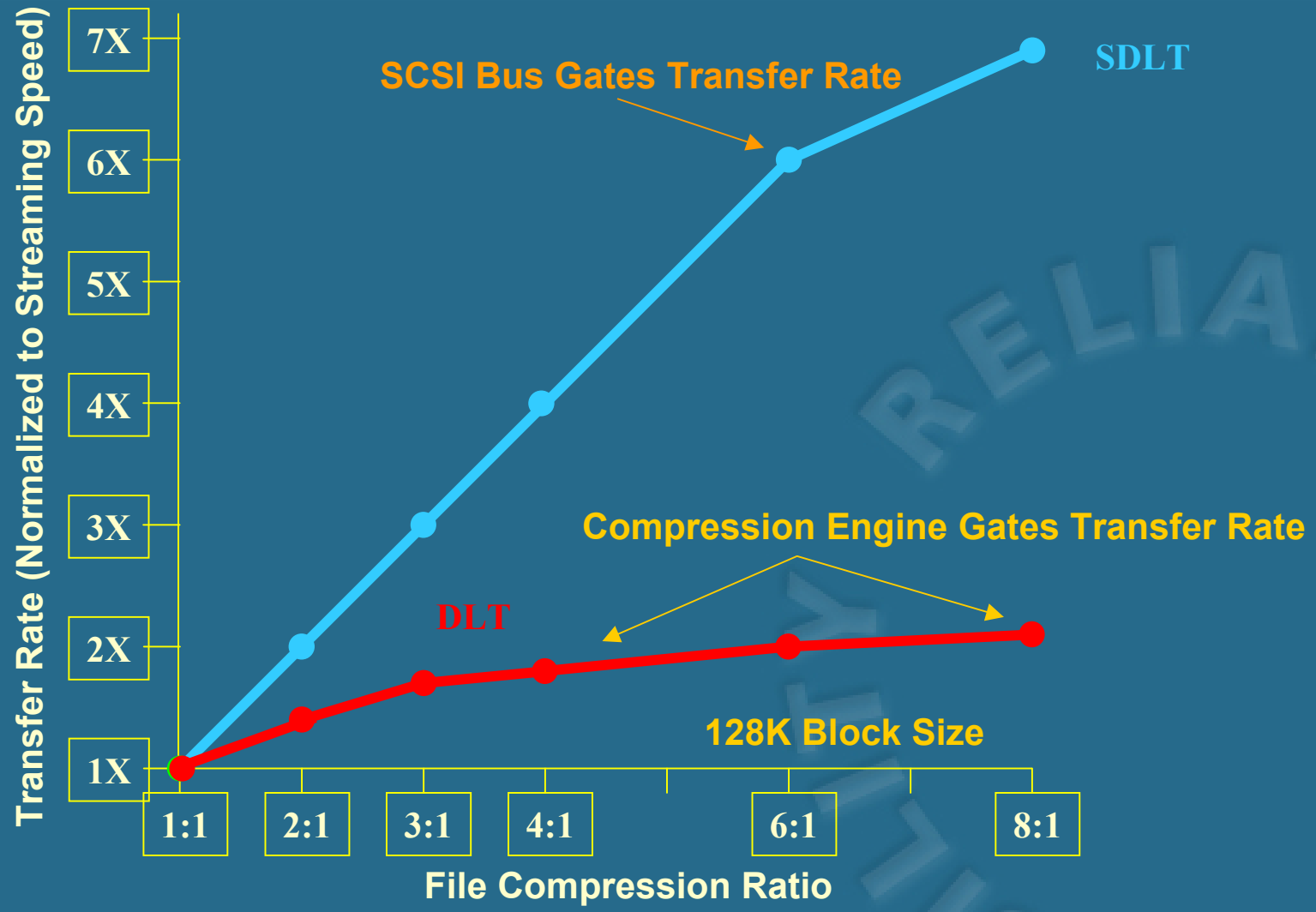
Super DLT Performance Overview

- Super DLT performance integrates
  - Experience gleaned from seven DLT generations
  - Advanced, ground-up hardware design
- Substantial performance improvements
  - Drive read/write performance
  - Interface performance
- Extensive diagnostics and error detection

Performance vs. Block Size and Compression Ratio, Write & Read



Backward Read Compatibility



Super DLT Linear Performance