# UPDATE ON ENERTEC ACTIVITIES

# IN DATA RECORDING

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# ENERTEC

**Formerly**

**Data Acquisition and Recording Division**

**of Schlumberger Industries**

# ENERTEC : AN AVICORE COMPANY

- **SCHLUMBERGER wanted to move away from the military/aerospace business**
- **Acquisition of ENERTEC is fully in line with AVICORE strategy**
- **ENERTEC is profitable with its current level of engineering investment and set of product lines.**

# AVICORE

- **UK-based Defence and Aerospace Company**
- **Chief Executive : Brian J. Hughes**
- **Share Holders : BZW Private Equity, 3i plc, Management**
- **AVICORE Companies :**

  **W. VINTEN (U.K) Recce, Countermeasures and Video Recording**

  **ENERTEC (France) Telemetry and Recording**
- **Turnover : $ 65 M**
- **Strategy : double size by organic growth and acquisitions in Europe and go public**

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# ENERTEC

- **Same management and location (Vélizy, France) as the previous Data Acquisition and Recording Division of Schlumberger Industries**
- **General Manager : Jean-Paul Vernhes**
- **Employees : 200**
- **Revenues > $ 30 M**
- **Certified to ISO 9001 and NATO AQAP1**
- **Still represented in the US by Schlumberger Technologies**

# ENERTEC PRODUCT LINES

- **Telemetry products and systems for test ranges and flight test centers**
- **Ground control equipment for satellites (TT&C) (House-keeping for telecommunications and TV satellites)**
- **ID1 digital recorders for severe environments and ground applications**
- **DD5 high- end computer peripherals**

# ID1 PRODUCT LINE

| Series | DV 6410 | | DV 6450 | DV 6420 | | | | DV 6820 | |
|---|---|---|---|---|---|---|---|---|---|
| Model | DV 6410 | DV 6210 | DV 6450 | DV 6420 | DV 6220 | DV 6430 | DV 6230 | DV 6820 | DV 6830 |
| Data Rate (Mbit/s) | 10-240 | 5-120 | 10-240 | 10-260 | 5-120 | 10-260 | 5-120 | 60-520 | 60-520 |
| Environment | Fighter | Fighter | Fighter (ATARS) | Rugge-dized | Rugge-dized | Lab./ Industr. | Lab./ Industr. | Rugge-dized | Lab./ Industr. |
| Presentation | Main LRU + P/S | Main LRU + P/S | 2 LRU's | Rack-mount 7 U | Rack-mount 7 U | Rack-mount 7 U | Rack-mount 7 U | Rack-mount 9 U | Rack-mount 9 U |

**Bit error rate better than $10^{-10}$**
**Storage capacity : 800 Gbit on D1L**
**350 Gbit on D1M**
**Optional built-in-buffer (allows data rates down to zero)**
**MIL-STD-2179B on request**

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# 1997 ID1 TECHNICAL ACHIEVEMENTS

- **520 Mbit/s 8 channel version using the planar capacitive coupler (patent pending)**
  - **format compatibility**
  - **full data rate flexibility with the built-in buffer**
- **Wideband analog interface in full production up to 12 MHz (or 2 x 6 MHz)**
  - **built-in**
  - **24 MHz version prototyped**
- **Successful ATARS flight tests**
  - **Program office presentation at SPIE 97**
  - **ID1 format is fully compatible with the harshest environments**

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# ID1 FORMAT ACCEPTANCE

- **Most of the MIL-STD-2179 programs have switched or are switching to ID1 (TSPARS, French Navy, JPL, ..)**
- **ID1 has replaced MIL-STD-2179 in STANAG 7024 (RECCE)**
- **New programs have joined the community (RAPTOR for RAF Recce)**
- **ID1 is now the sole physical format of STANAG 4283 Annex C (Maritime Patrol Acoustics)**

# ID1 AND AFTER

- **Success of ID1 is based on**
  - **standardization**
  - **multisource and proven interchangeability**
  - **performance**
  - **growth potential**
- **Limitation of ID1 at 520 Mbit/s is recording time**
- **Enertec has demonstrated feasibility of a 20 micron double density ID1**
- **Enertec is ready to share data with the ID1 community to establish a «double density» ID1 standard**

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# PROPOSED «DOUBLE DENSITY» ID1 FORMAT

- **Track width is reduced to 22.5 microns**
- **Pitch is also 22.5 microns**
- **TSID consists of 8 tracks for compatibility**
- **Rest of X3 - 175 (ID1) standard remains unchanged**
- **Tape thickness options to be discussed**

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# KEY FEATURES OF ID1 / DD

- **Data rate up to 520 Mbit/s**
- **BER better than $10^{-10}$**
- **Read-after-Write capability**
- **Storage capacity of a minimum of**
  - **1580 Gbit / DIL cassette**
  - **700 Gbit / DIM cassette**
- **Compatible with severe environments**
- **ID1 / DD machines can replay ID1 tapes**

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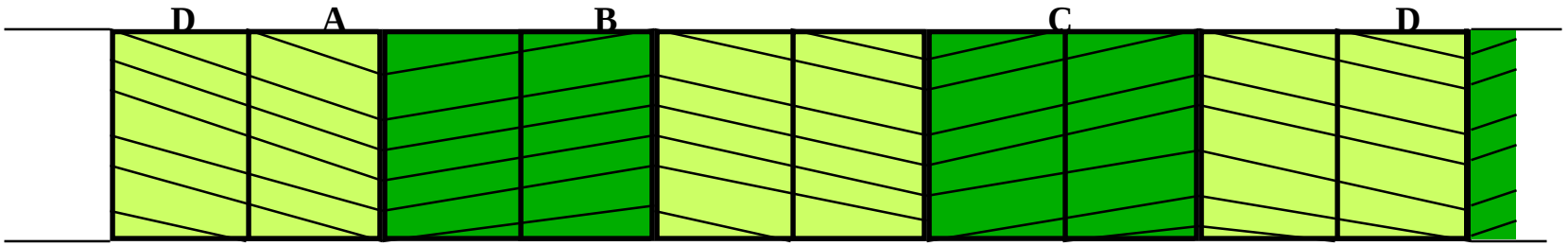
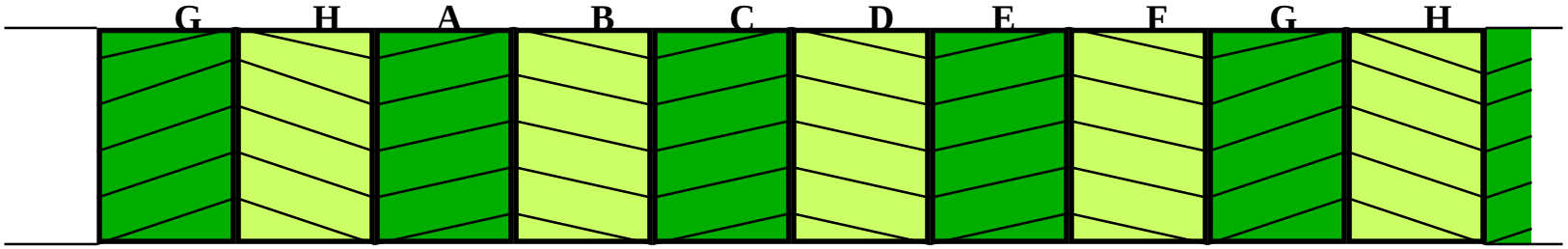
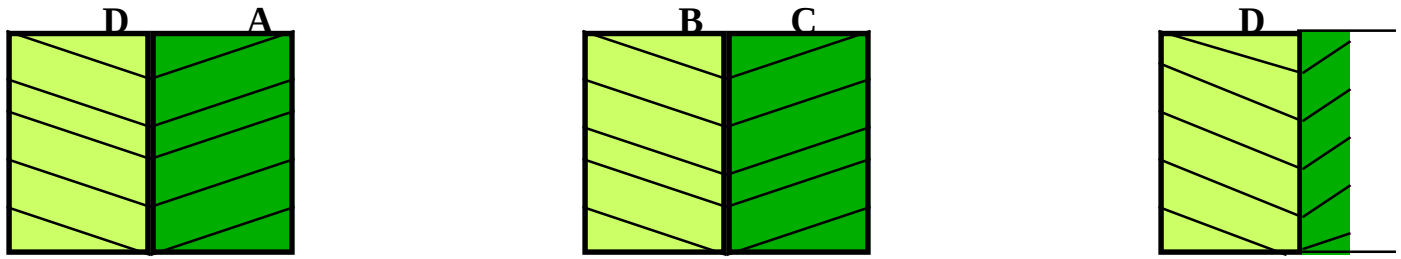
# READING ID1 TAPES WITH DD HEADS




**ANSI ID1 FOOTPRINT (45 µm pitch)**




**DOUBLE DENSITY FOOTPRINT(22.5 µm pitch)**




**SINGLE DENSITY REPRODUCED VS DOUBLE DENSITY**

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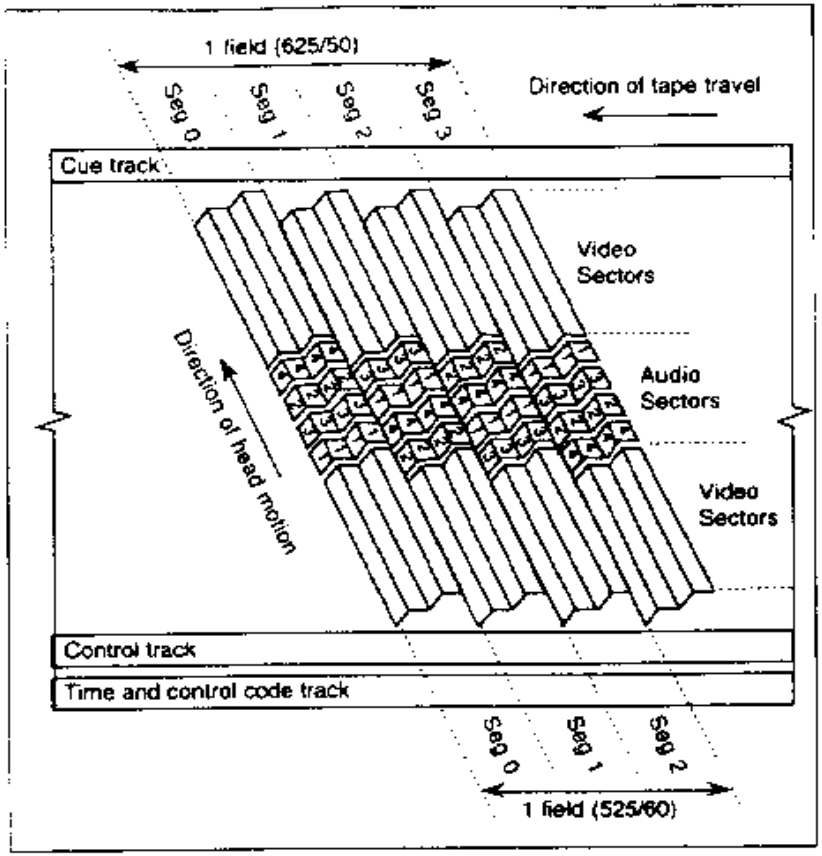
# DD5 FORMAT

- **Military and aerospace markets are not the only ones where data rate and storage capacity requirement are growing**
- **General computer peripheral applications start to exceed the capabilities of the existing technologies**
- **Enertec has decided to derive a digital tape drive from the highest performance digital broadcast VTR of the market (Panasonic D5)**
- **D5 is component (4.2.2) 10 bit recording without compression**
- **In DD5, the video sectors are replaced by digital data**

# D5 FOOT-PRINT AND FEATURES




- **Track width : 20 microns**
- **Azimuth : +/- 20 degrees**
- **Track Angle : 4.9 degrees**
- **Linear density : ~90 kbpi**
- **Tape thickness : 14 or 11 microns**
- **Piezoelectric actuator tracking**

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# DD5 DV5830 MASS STORAGE CASSETTE DRIVE

- **Based on a D5 tape deck and video interface controlled by a PCI board with SCSI interface**
- **Sustained transfer rate up to 28 MB/s inclusive of retries**
- **Max. uncompressed storage capacity per cassette : 160 GB**
- **Standard SCSI 2 / ULTRA SCSI interface and commands compatible with the standard tape drive softwares**
- **Bit error rate better than $10^{-15}$**
- **Search faster than 700 MB/s**
- **19’’ rack mount chassis, 7 units high**

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# DR5800 ROBOT

- **Accomodates**
  - **1 or 2 DV5830 DD5 drives**
  - **up to 84 medium cassettes**
  - **up to 42 large cassettes**
  - **or a mix**
- **Provides a total storage capacity exceeding 6 terabytes**
- **Bar-code identification (standard robot commands)**
- **Compatible with most archive management softwares**

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# CONCLUSION

- **Enertec strongly believes in the growth potential of magnetic tape for high date rate mass storage**
- **Progress in solid state technology will result in more performant buffers and increased capabilities for the tape drives**
- **Enertec is ready to contribute actively to the bright future of tape recording**
- **Long life to Tape to Head Interfaces**

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