

 **SaveMyMemories.org**



Preserve those Memories: Can Technology Standards Make Archiving on Optical Media Reliable for Consumers?

OSTA, CDs21, DCAj, Ecma Join Forces to
Establish Industry Standard in 2007

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Why is Optical Disc Media Needed?

- Digital Photography has an increasing need for high volume data storage
 - Cameras with Over 1000 Mega Pixels
- Other methods of storage are not suited for long term storage.
 - Hard drives, DV tape, Flash memory

Why Optical Disc for Photo Archive?

- Long life
- Universal compatibility
 - Format
 - Physical
 - Logical
 - Application software
- Resistant to environmental effects
- Easily Removable for offsite storage
- Low cost
- Ease of labeling for quick identification of contents
- Readily available

Long life

- Archive grade optical discs are designed to last in excess of 30 yrs
- Recordable optical discs are “write once” – not possible to erase.
- No moving parts, Non Contact Recording (hard drives, tapes will fail from wear)

Universal Compatibility

- Format
 - Physical: Form factor consistent;
CD, DVD, Blue laser
 - Logical: Mac, Windows, Linux, Unix, “set top”
recorders
 - Application software, UDF, Video, MPV

Most Popular Playback Platform

- Optical discs are a consumer product which have a tendency to stay available for longer periods.
- CD and DVD Players
 - >2Billions of Players Installed WW
- PC's with Built-In CD/DVD Drives
 - >1 Billion Drives Installed WW

Resistant to Environmental Effects

- Temperature
- Humidity
- Magnetism
- Static electricity
- Water damage
- Shock/vibration

Not All Media Are Created Equal!

- Varying Degrees of Life Expectancy
 - Some media may last for less than a year, while others may last 100 years or more according to laboratory tests
- Variables such as material and process design, process quality can greatly affect media life

What Does the End User Need?

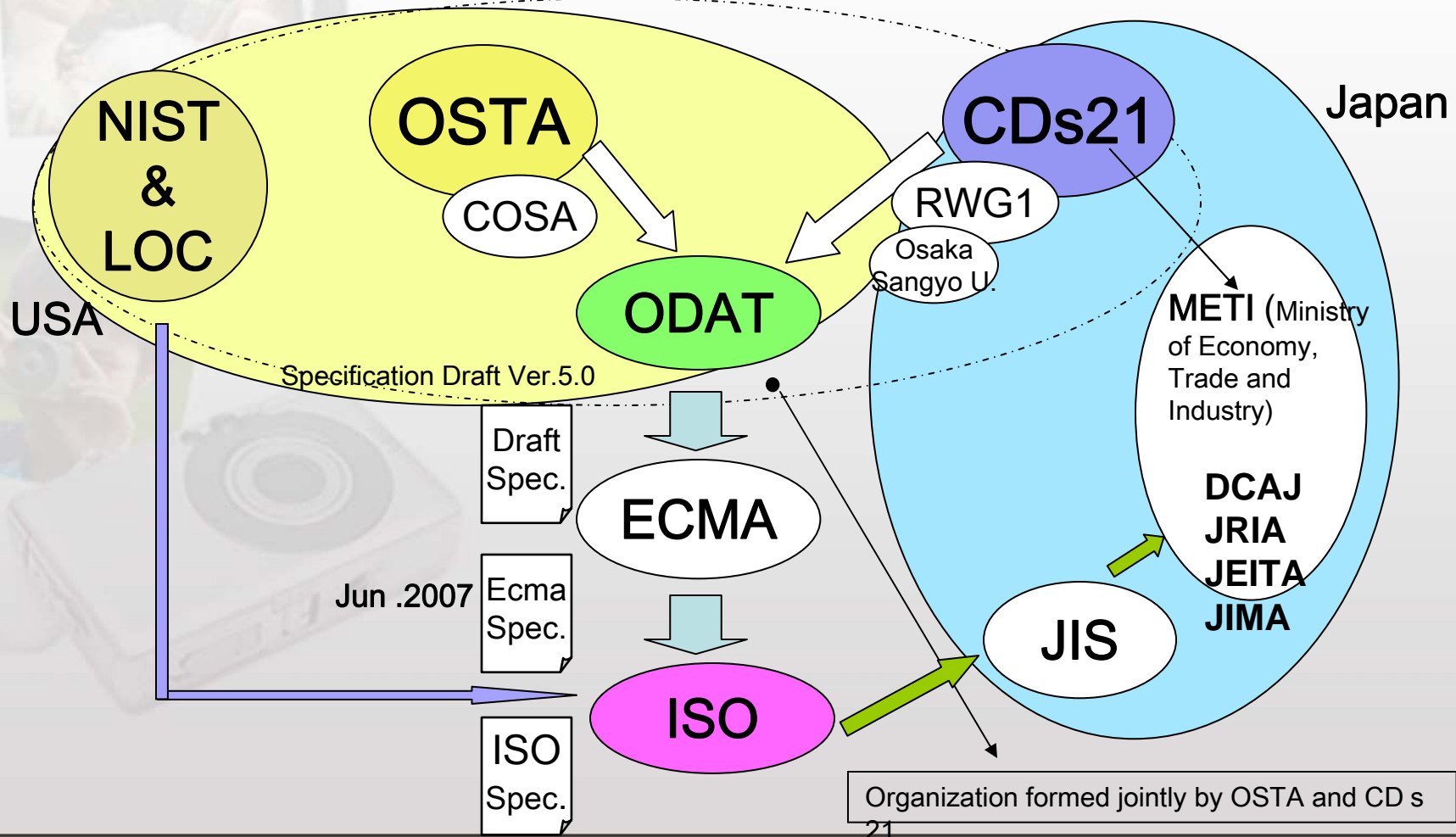
- Established standardized practices for media archive life testing and classification
- Evaluation and Verification of Media Lifetime
- Media that is easily recognized as Archival Grade

Standardization Initiative

- ODAT group initiated work item on DVD archival life estimation test method
- Program moved to Ecma in June 2006
- Now in Finalization stage
 - Target June 2007
 - Followed by ISO by “fast track”

Collaboration Between OSTA and CDs21

Optical Media Archive Life Estimation Test Method (I S O)



What Is Next?

- Industry is working together on Implementation steps
- Program in development to establish testing, reporting, and messaging
- Delivery of high reliability, long archival life media to the market

Technical Details

- Media Life Estimation test method is based on accelerated aging tests
- Media Error rate is monitored as a function of stress conditions
- Target is to predict life with 95% accuracy

Acceleration test model

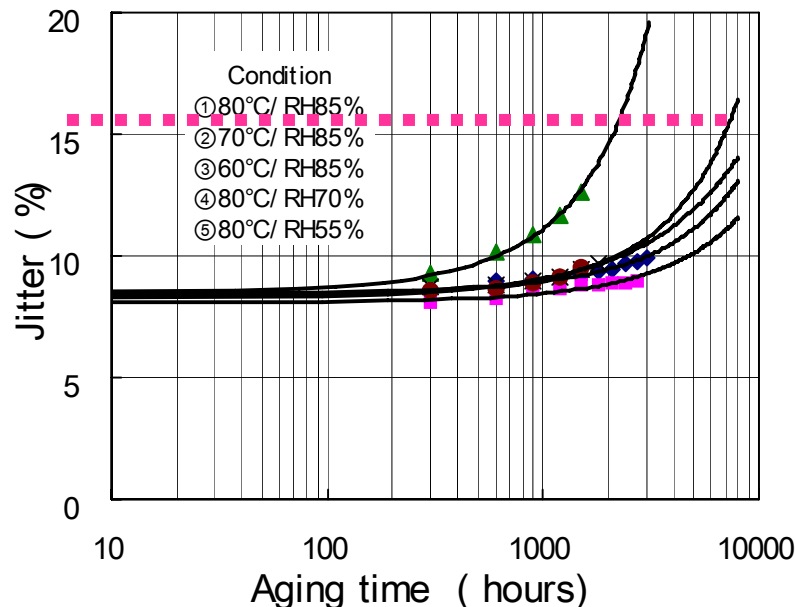
	Arrhenius model	Eyring model
Stress Condition	Temperature	Temperature & Humidity
Equation	$t = D_0 \exp\left(\frac{E_s}{kT}\right)$	$t = AT^d \cdot \exp\left(\frac{E_s}{kT}\right) \cdot \exp\left\{R\left(B + \frac{C}{T}\right)\right\}$

t=life time,
 T=temperature, R=Relative humidity,
 Es=activation energy , k=Boltzmann's constant
 D,k,A,B,C=constants

Measurement results

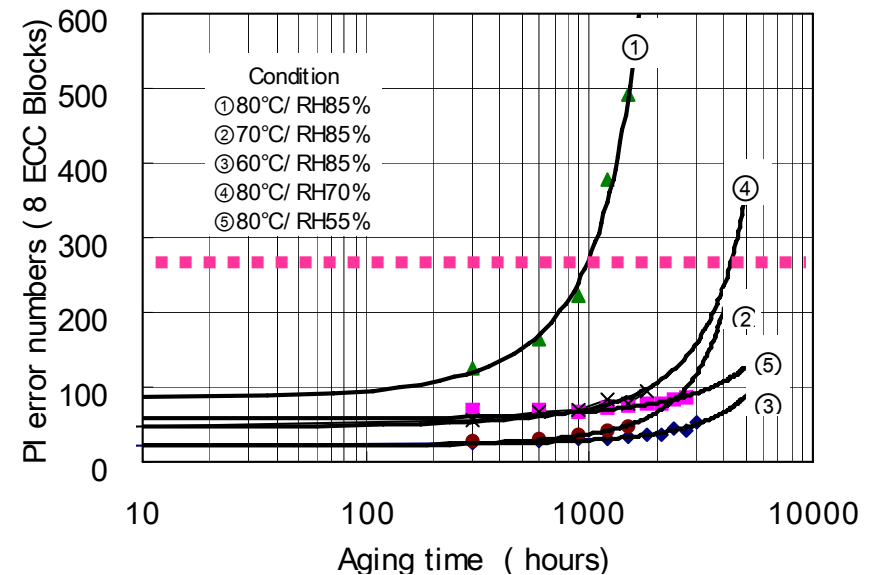
Typical measurement results of each stress condition.

(a) Jitter



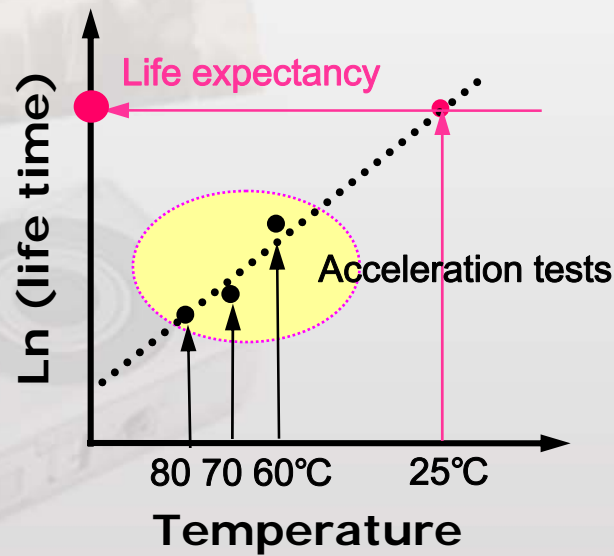
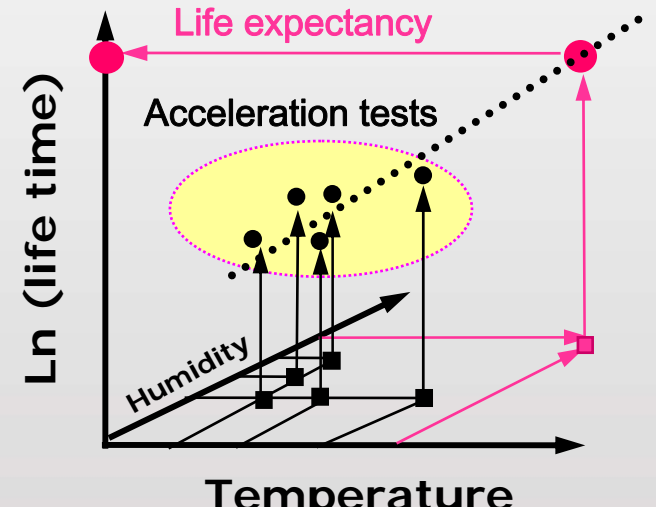
Life time= time of Jitter value reached 5.73 nsec.
 (15% of Channel clock)
 Jitter value= Channel clock to data

(b) PI Error



Life time= time of PI error number reached 280
 (PI error number=Total number of 8 ECC blocks)

Acceleration test model

	Arrhenius model	Eyring model
Stress	Temperature	Temperature & Humidity
Estimation model	 <p style="text-align: center;"> $\ln t_1 - \ln t_2 = \frac{E_s}{k} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$ </p>	 <p style="text-align: center;"> $\ln(t_{50\%}) = \ln(A) + \left(\frac{E_s}{k} \right) \times T^{-1} + B \times R$ </p>



Thank You

Long Live Optical Discs!