



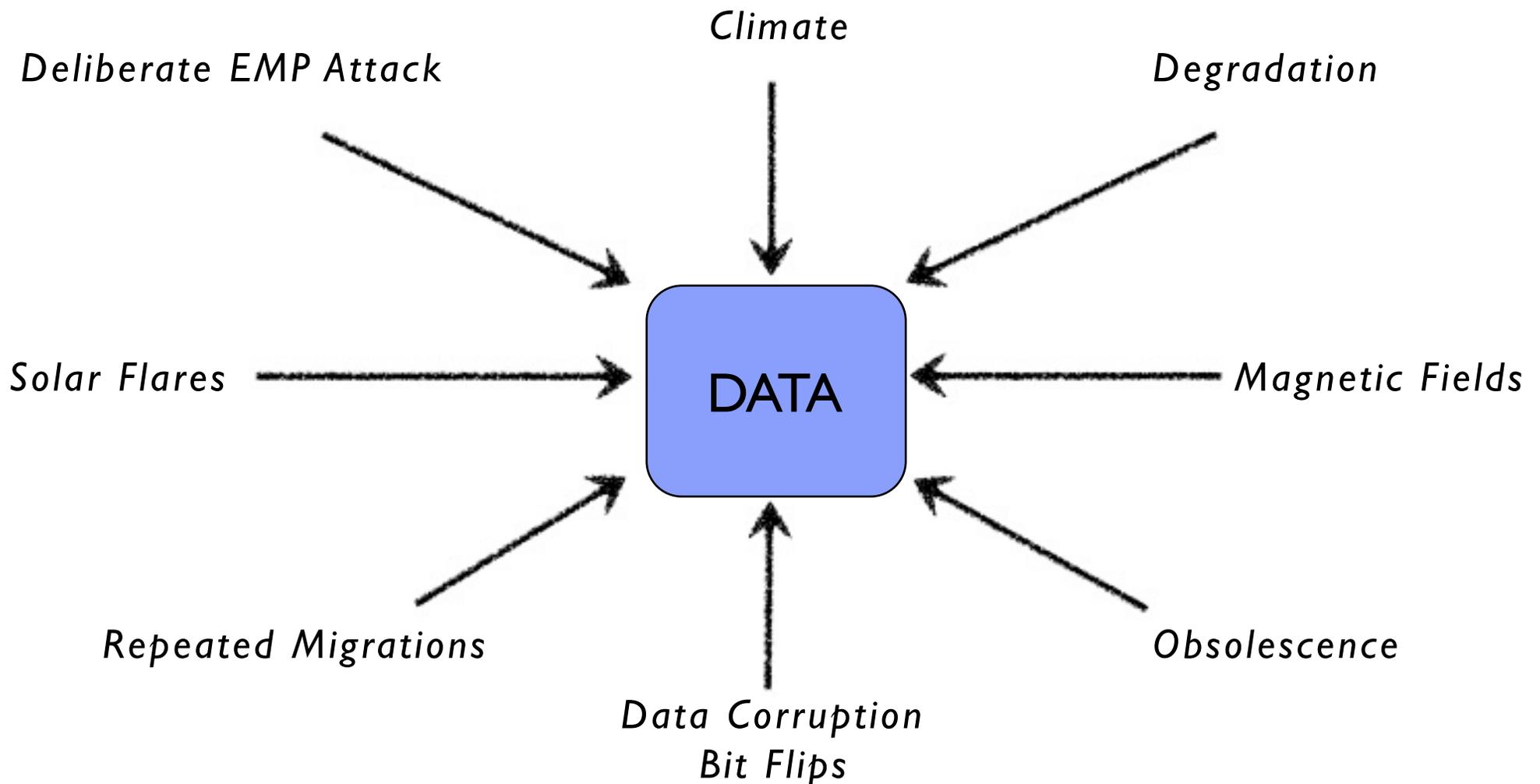
## Introduction to **DOTS**

100 Year Digital Archiving Safe From  
Malware & EMP Attacks

*September 19, 2017*

# The Digital Archive Problem

Current methods for archiving digital data on magnetic media create risk and uncertainty...



# The Key to Successful Archiving

Throughout history, all **successful** archiving has used media where you can **SEE** the information



# The Digital Archive Solution

## **DOTS** - Digital Optical Technology System

\*

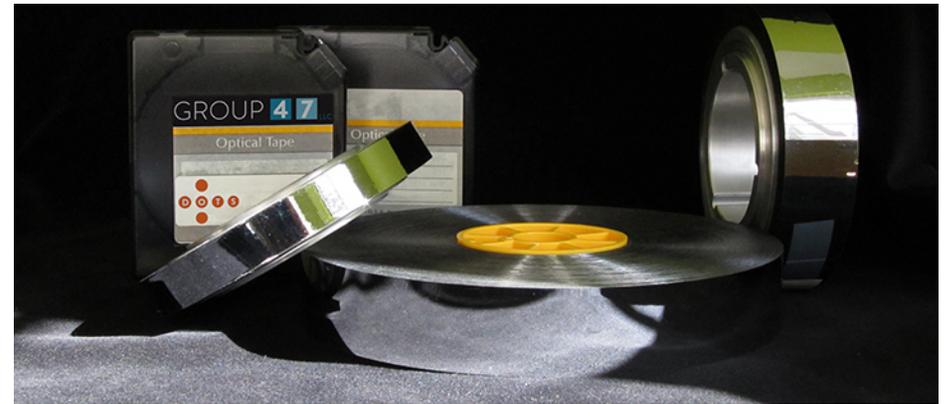
The *only* digital storage media that stores data visually,  
and can be easily retrieved with a camera.

\*Low resolution example of data on 1/2" tape

# DOTS is Revolutionary in its Simplicity



A photo of a test write to DOTS media, illustrating the ability to write binary, text, and images.



## UNIQUE SOLUTION

**DOTS** is unlike **ANY** current form of digital storage. Data is recorded visually on metal alloy tape similar to old paper computer tapes, but at a microscopic density that rivals the capacity of current magnetic tapes.

## UNMATCHED ARCHIVAL LIFE

**DOTS** is archival for no less than 500 years. It is non-magnetic, chemically inert, immune to electromagnetic fields (including EMP), and can be stored in normal office environments or extremes ranging from  $-9^{\circ}$  to  $66^{\circ}$  C ( $16^{\circ}$  to  $150^{\circ}$  F).

## PLUG & PLAY COMPATIBILITY

**DOTS** drives and tape cartridges will be identical in dimension to industry standard LTO form factors, and will be “plug compatible” with existing tape archiving systems, including robotic tape libraries and support for LTFS.

## GAME CHANGING

**DOTS** will disrupt and transform the digital archiving market by eliminating the need for current practices of making new copies of magnetic media every 3 to 5 years in order to preserve 100% of targeted digital assets.

# Pragmatic Design for the Group 47 Solution

## ACCELERATING ADOPTION

The Group 47 Solution is designed for **DOTS** to be “plug & play compatible” with the existing LTO tape-based archiving systems & workflow

SAME  
LTO sized  
Cartridges



SAME  
Labeling  
Conventions



SAME  
External Drive  
Dimensions



SAME  
Robotic Tape Library  
Systems



SAME  
Support of  
LTFS and Operating  
Software



# DOTS and Group 47



Over **\$120 million** of R&D invested by KODAK to successfully develop, manufacture, test, and validate **DOTS** archival technology for Intelligence Community.

In spite of technical success creating a solution, when **DOTS** was ready for manufacturing, KODAK shuttered **DOTS** due to concerns of film sales being “cannibalized” by **DOTS** .\*

GROUP **47**

Group 47 was formed to acquire the **DOTS** technology from KODAK, improve upon it using current off-the-shelf technologies, and bring it to market.

Group 47 acquired:

- All 36 related **DOTS** patents
- All Trade Secrets
- All Project Documentation
- Complete Detailed Manufacturing Procedures
- Unobstructed access to past and current Kodak employees who worked on **DOTS**

\* Contained in documents acquired by G47

GROUP **47**

PROPRIETARY

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# NEW Patents Awarded to Group 47

(12) <b>United States Patent Rosen</b>	(10) Patent No.: <b>US 9,208,813 B2</b> (45) Date of Patent: <b>Dec. 8, 2015</b>
(54) <b>DIGITAL OPTICAL TAPE STORAGE SYSTEM</b>	(12) <b>United States Patent Rosen</b>
(71) Applicant: <b>Group 47, Inc.</b> , Woodland Hills, CA (US)	(10) Patent No.: <b>US 9,508,376 B2</b> (45) Date of Patent: <b>Nov. 29, 2016</b>
(72) Inventor: <b>Daniel Scott Rosen</b> , Thousand Oaks, CA (US)	(54) <b>ARCHIVING IMAGERY ON DIGITAL OPTICAL TAPE</b>
	USPC ..... 382/164; 369/100, 112, 122; 358/474, 358/487; 347/239, 255 See application file for complete search history.
	(71) Applicant: <b>Group 47, Inc.</b> , Woodland Hills, CA (US)
	(72) Inventor: <b>Daniel Scott Rosen</b> , Thousand Oaks, CA (US)
	(73) Assignee: <b>Group 47, Inc.</b> , Woodland Hills, CA (US)
	(56) <b>References Cited</b> U.S. PATENT DOCUMENTS 4,661,941 A * 4/1987 Bell ..... G11B 7/0031 347/248

- First NEW Patent granted by U.S. Patent Office with multiple claims covering Group 47's unique visual approach for writing and reading digital data.
  - A vast improvement over KODAK's original design.
- The second NEW patent granted covers Group 47's method for archiving images (whether images of photos, videos, or documents) that removes all file format dependencies.
  - The new method for archiving images and sound has quickly become one of the most compelling aspects of **DOTS** for all potential customers, since, with it, **DOTS** can guarantee image and sound files can be read securely decades into the future, without concern for operating system.
- A third patent has been granted, and six additional patents have been filed

# Long-Term Digital Archive Options

## MAGNETIC MEDIA VS. **DOTS™**

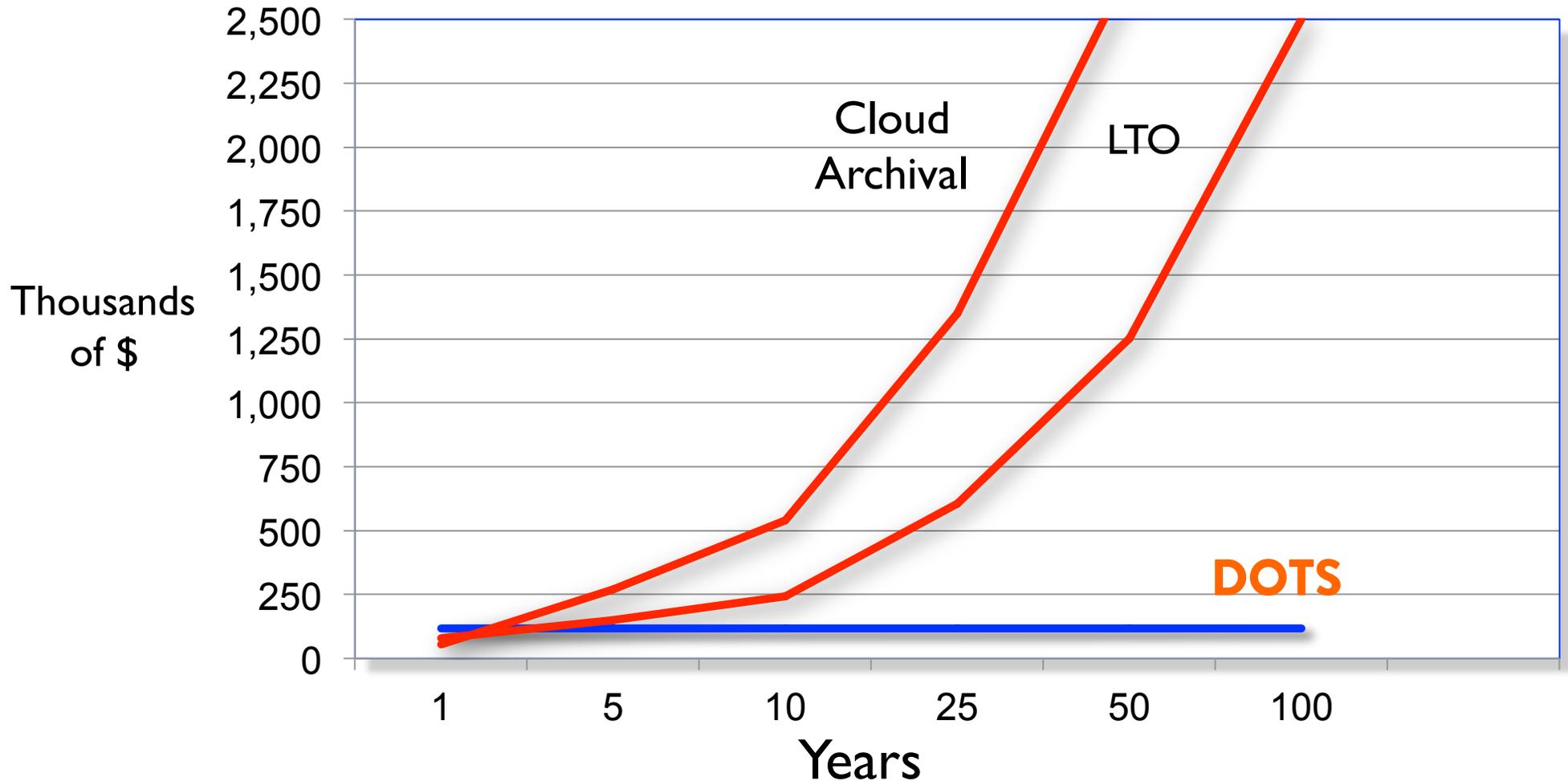
Archiving on Magnetic Media	Archiving with <b>DOTS</b>
<ul style="list-style-type: none"><li>Record to magnetic media</li></ul>	<ul style="list-style-type: none"><li>Record to <b>DOTS</b> media</li></ul>
<ul style="list-style-type: none"><li>Store in a climate-controlled facility</li></ul>	<ul style="list-style-type: none"><li>Store on a shelf at ANY temperature from 15° to 150° F</li></ul>
<ul style="list-style-type: none"><li>Monitor disk integrity and check tape regularly for degradation &amp; re-pack</li></ul>	<ul style="list-style-type: none"><li><b>DONE</b></li></ul>
<ul style="list-style-type: none"><li>Migrate the data before magnetic data loss</li></ul>	
<ul style="list-style-type: none"><li>Risk of data loss / corruption due to media degradation, migration, hardware obsolescence, EMP, solar flares, etc.</li></ul>	
<ul style="list-style-type: none"><li><b>REPEAT EVERY 3 – 5 YEARS</b></li></ul>	

# High Energy Costs of Magnetic Media Archiving

- Data centers with multi Petabyte disk arrays require massive A/C
  - *“Energy costs will emerge as the second-highest operating cost in 70% of worldwide data center facilities.”*  
Gartner, Inc.
  - *For every watt currently consumed by a data center, it requires 70% more energy to cool the equipment.*  
Data Center Energy Efficiency, ©2016 The Mitre Corporation
  - *In 2012, the Federal Government spent \$25 Billion in IT costs alone to maintain “Cold Data.” Another \$20 Billion plus was spent to power and cool that data.*  
Federal Government Source

# The TCO of Digital Archiving Options

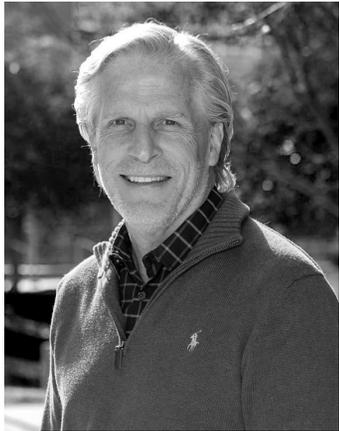
## MAGNETIC MEDIA VS. DOTS



### Parameters Based on 2017 Analysis

- 1) Magnetic media requires a controlled environment (temperature and humidity). Archival storage vaults for magnetic media have an average monthly cost of \$3.09/cu. ft. of storage, due to the stringent environmental controls.
- 2) DOTS and LTO cartridges are approx. .0083 cu. ft. in size.
- 3) Based on information from a major storage vendor, their cost to migrate one magnetic tape cartridge is \$75.00 plus the cost of the media.
- 4) For this comparison, we are assuming 1 Pbyte of data, a cost of \$50 per LTO-5 tape and \$140 for DOTS, and that each tape is filled to capacity. Amazon Glacier storage assumes no data access. No accounting for inflation.

# GROUP 47 Executive Leadership



**Steve DeWindt**  
**Chairman & CEO**

Senior operating & management executive with strong global P&L management experience & proven track record of driving market share & revenue. Many senior positions including Chairman & President OptionEase; CEO Sparxent; EVP & COO Celergy Networks; President Computer2000; CEO Ameriquest Technologies; President BlueRoads; Director Worldwide Sales Intel.



**Rob Hummel**  
**President & Founder**

Has held senior positions at Disney, DreamWorks, SONY, Warner Bros., Technicolor. Recognized leader on motion picture technology, preservation and restoration. Member of Motion Picture Academy's Science and Technology Council.



**Dan Rosen**  
**CTO**

TRW, Lead Engineer designing and developing weapons, image processing, and intelligence systems for Dept of Defense, DIA, CIA, NSA and other agencies; DALSA Digital Cinema; VP Technology, Warner Bros.; CTO, Kodak's Cinesite; Chief Engineer DreamWorks Animation.

For detailed executive bios go to: <http://group47.com/about-us/>

# Central Intelligence Agency



## Excerpts from the Request for Proposal that led to a contract for a proof of concept of **DOTS**

- *“...This digital record retention storage and archival system requires the capability to be stored in a normal office environment with extreme temperatures...”*
- *“...Additionally this digital record retention storage and archival system requires the capability to be archived for no less than 100 years, non-magnetic, chemically inert, and immune from electromagnetic fields including EMPs.”*

# Central Intelligence Agency



## **DOTS** Can Save the Federal Government Billions in Power and HVAC Costs for Maintaining Cold Data

- Intelligence Community is archiving *approximately 800,000 Terabytes a week – that is \$80 million in media alone per week.*
- “Kings Ransom” is being spent on migration and HVAC to preserve Cold Data
- Want to be at the front of the line when **DOTS** hardware and media become commercially available

# Central Intelligence Agency



Doug Wolfe

Deputy Director Science and Technology

- Group 47 successfully completed **DOTS** proof of concept contract, and was awarded payment on completion in Mid-2015. [Video of proof of concept project is available from Group 47 upon request.]
- In reference phone call with Iron Mountain, Doug Wolfe, as CIA CIO, stated **DOTS** had been proven to work.

# National Archives and Records Administration [NARA]



**Mike Wash**  
Chief Information Officer



- Worked successfully on behalf of the Intelligence Community to get **DOTS** officially recognized by the Archivist of the United States as an approved archiving solution [Enabled Federal Government to issue contract to Group 47 for proof of concept of **DOTS** technology]
- Has estimated that there is a pipeline of 1.2 Zetabytes [1,200,000,000 Terabytes] of digital assets from the last 30 years flowing into NARA for archiving – that is \$120 billion in just media

# National Archives and Records Administration [NARA]



- On reference call with Iron Mountain, Mike Wash [Former CIO of NARA, Now CTO of Bureau of Engraving and Printing] made these points:
  - **DOTS** is only solution that offers both stable media and the assurance that data can be interpreted at any point in the future.
  - Reaffirmed estimate that NARA has over 1.2 Zetabytes [1.2 Billion Terabytes] of digital assets from the last 30 years that need to be migrated and stabilized on **DOTS** media.
  - At 1.2 Terabytes per future **DOTS** cartridge, the government would need no less than 2 billion cartridges – Two copies for long-term storage in separate geographical locations, and Wash says there's a strong case for a third copy as the access copy.

GROUP **47**



Contact

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