



Flash Memory Summit

FMS 2018

Track: Data Protection

Session: DPRO-101B-1: Data Recovery of SSDs

Chairperson/Organizer

Troy Hegr: Sr. Mgr., OEM Storage Strategic Alliances, DriveSavers Data Recovery

Paper Session Presenters

Will DeLisi: NAND Flash Recovery Specialist, DriveSavers Data Recovery

Josey Santana: Data Recovery Engineer, DriveSavers Data Recovery

Robin England: Hardware Research & Development Team Lead, Ontrack Data Recovery



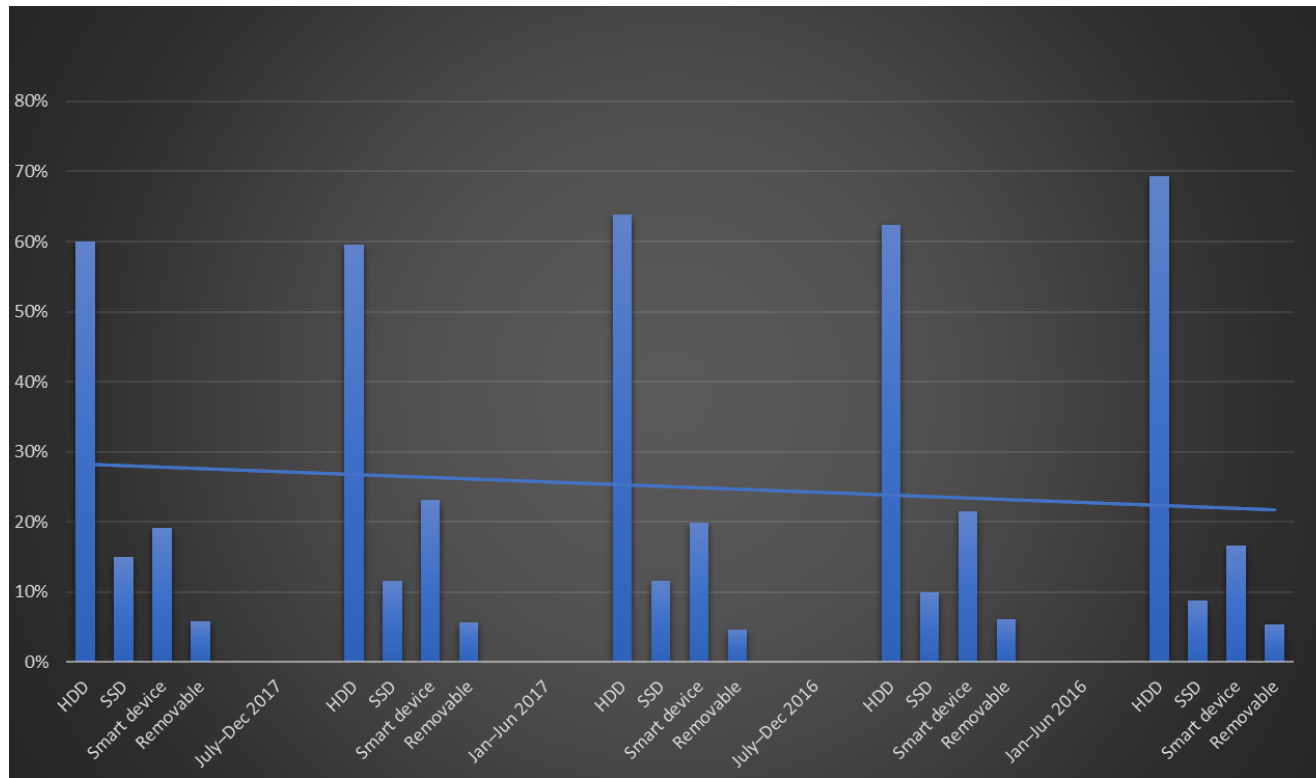
Flash Memory Summit

Data Recovery of SSDs Session Description

- SSDs and Flash Memory storage devices are very reliable.
- Our paper presenters, who are all data recovery experts, will discuss the technology and science behind data recovery and data sanitization from flash based storage.
- Our goal is that you will gain an in-depth understanding of the effort involved in restoring lost data from an SSD, and how to ensure sensitive data is protected and erased when an SSD is at the end of its useful life or needs to be repurposed for other uses.



Percent Share by Device Type (prior 6-month periods)





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Speakers & Paper Sessions

Data Needed from Drones? Yes, and the data is rich. Recovery of a drone

- **Will DeLisi:** NAND Flash Recovery Specialist, DriveSavers Data Recovery
- **Josey Santana:** Data Recovery Engineer, DriveSavers Data Recovery

Abstract:

All IOT may not hold data or metadata that is needed to be retrieved, but Drones have a rich amount of data the resides in the SD card and the embedded eMMC. DriveSavers has had many inquiries and opportunities for recovery. We look at recovering footage and metadata from a Mavic Air and what opportunities are available for data recovery.

The presentation will also overview an example of one of the more common chip-off recovery scenarios.



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Speakers & Paper Sessions

Recovering Data from 3D NAND-Based Devices

- **Robin England:** Hardware Research & Development Team Lead, Ontrack Data Recovery

Abstract:

How do the characteristics and the practical implementation of 3D NAND affect chip-off Data Recovery and Erasure Verification? We look at some of the elements of Ontrack's research into reliably and accurately reading 3D NAND for both the purpose of recovering data and also to verify that when data is erased from a SSD using industry-standard methods, it really is no longer recoverable. 3D NAND is quite different from its planar cousin and introduces extended addressing to access cells within the extra layers, vendor-unique implementation of die operations, new data scrambling and error-correction (ECC) algorithms and package electrical signals having functions outside the scope of the ONFI (Open NAND Flash Interface) standard. In this presentation we look at some of these differences and show how Ontrack has developed technology and processes to handle 3D NAND at the chip-off level.



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Let's hear from our experts in the Data
Recovery field...



Q&A – Data Recovery of SSDs

Audience questions and participation



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**Thank you for attending our
session!**

Enjoy the conference!



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END



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FMS Schedule of activities

- **Mon Aug 6**
 - Arrival and Pre-Conference Seminars (Day)
 - Solid State Storage Reception Monday, August 6th 5:30 – 7:00pm (Room 209/210)
- **Tuesday Aug 7**
 - **Data Recovery: Track:** Data Protection Track; **Session:** DPRO-101B-1: Data Recovery of SSDs; **Category:** Data Recovery
 - **Time:** 9:45AM to 10:50AM (65mins)
 - **Location:** Ballroom A – Check for the room location when you arrive
 - Lifetime Achievement Awards, 11:30-11:40am (Mission City Ballroom)
 - Tuesday evening reception, 4:00-7:00pm; Exhibit Hall
 - Chat with the experts Beer/Pizza, 7:00-8:30pm; Ballroom A-D
- **Wednesday Aug 8**
 - All Industry Reception, 5:45-6:30pm; Exhibit Hall
 - Best of Show Awards, 6:30-7:00pm; FMS Theater (Troy/Gary accept award for
- **Daily Exhibits** (Tues Aug 7: 4-7pm; Wed Aug 8: Noon-7:00pm; Thurs Aug 9: 10am-2:30pm)



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Chairperson instructions - SESSION STRUCTURE

- Make a brief opening statement describing the session (less than five minutes). This will also allow time for attendees to find seats.
- Introduce each speaker, giving his or her name, title, and affiliation and a brief description of his duties or qualifications. We will send you this information for most participants, but get additions or replacements to write it down for you. Get a phonetic spelling of their names if necessary.
- For panel sessions, give each panelist 5 minutes to present his or her position. Postpone questions and answers until everyone is done. For paper sessions, give each presenter a specified number of minutes for the presentation (depends on session length and number of speakers) and about 3 minutes for questions and answers.
- Use breaks to allow late entrants a chance to find seats.
- Be sure to tell everyone to turn off their cellphones (or at least set them to vibrate) before the session starts.



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QUESTIONS AND ANSWERS

- As chairperson, you are in charge. Do not allow questions or answers to exceed two minutes. Ask overzealous people to expand on their thoughts privately. Do not allow anyone to dominate the time. In a panel session, watch that all members get a chance to participate.
- Be sure everyone can hear the questions. Be particularly careful with questioners near the front of the room, since they are completely inaudible to those behind them. Repeat questions if necessary. Don't worry about having every panelist answer each question. Focus only on those who want to contribute. Force the issue only if a panelist hasn't participated at all.
- We suggest you make up 3 questions as starting points and as a fallback position in case the audience has little to contribute. We also suggest you ask each panelist to make up a question and send it to you. This will give you questions of known relevance and will help bridge dry spells.



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TIME LIMITS

- Enforce the time limits as strictly as possible. Warn speakers when they are within a minute of using their allotted time. A hand signal or a paper sign will do the job. Allow them about two minutes leeway before interrupting them and noting that time has expired. Be diplomatic but firm. Also warn participants near the end of a question and answer period. Indicate that the next question will be the last one. Give a little leeway if someone has been waiting a long time. Again, be diplomatic but firm.
- When in doubt, always take another question or allow the speaker more time. Err on the side of generosity, but not too much.



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RESPONSIBILITIES

- Contact each participant about a week before the session to be sure that he or she will attend. If there is a problem, ask the person to suggest a replacement.
- Try to be at the session room at least 15 minutes before the scheduled starting time. Check whether all required facilities are present, such as chairs, audiovisual equipment, and water. Contact the hotel staff or the Conference Chairperson if anything is missing. Introduce yourself to each participant.
- Be sure to collect all the presentations on the flash drive that will be given to you. Return the flash drive to the registration desk.



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FMS 2018

Santa Clara Convention Center
5001 Great America Parkway
Santa Clara, Ca 95054

www.santaclaraconventioncenter.org

- Monday, August 6th – 8:30AM to 7:00PM (Pre-Conf)
- Tuesday, August 7th - 8:00AM to 7:00PM
- Wednesday, August 8th – 8:00AM to 7:00PM
- Thursday, August 9th – 8:00AM to 2:00PM



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Travel, Lodging, Registration

- Registration is covered for speakers
- If you are planning to stay overnight and haven't booked a room yet, I highly suggest you do so ASAP – Rooms are going quickly
 - Hyatt Regency – Show Hotel 1.408.200.1234
 - aLoft 1.408.263.3900
 - Avator Hotel 1.408.235.8900
 - Hilton Santa Clara 1.408.330.0001
 - The Biltmore Hotel 1.800.255.9925

https://flashmemorysummit.com//English/Lodging_Travel/Lodging_Travel.html



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Data Recovery Session

- **Track:** Data Protection Track
- **Session:** DPRO-101B-1: Data Recovery of SSDs
- **Category:** Data Recovery

- **Date:** Tuesday August 7th – 9:45AM to 10:50AM (65mins)

- **Room:** Ballroom A – Check for the room location when you arrive



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Paper Presenters

- Session Organizer & Chairperson: Troy Hegr
- Will DeLisi, DriveSavers Data Recovery
 - Flash Recovery Engineer: will.delisi@drivesavers.com
 - **Paper:** Data Needed from Drones? Yes, and the data is rich. Recovery of a drone.
- Robin England, Ontrack Data Recovery
 - Hardware Research & Development Team Lead: robin.england@ontrack.com
 - **Paper:** Recovering Data from 3D NAND-Based Devices



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Notes about the FMS template

- You may use 1 of 2 templates:
 - White or Dark Blue background
 - Download preferred template here:
https://flashmemorysummit.com/English/For_Speakers/Presentation_Templates.html
- The first action you should take is to save the presentation
 - You have opened a design template (.pot)
 - Need to save as .ppt



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Preparing your talk

Good information for speakers:

https://flashmemorysummit.com/English/For_Organizers/Paper_Presenter_Instructions.html

- SESSION STRUCTURE
- ORGANIZATION
- VISUAL AIDS
- TIMING
- IMPROVING YOUR MECHANICS
- ANSWERING QUESTIONS



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Rough/Final Draft Presentation

- Please have your rough draft to Troy by Friday 7/27
- We will also be uploading it to the FMS website here:

https://flashmemorysummit.com/English/For_Speakers/Presentations_Uploads_To_Box.html

How to complete the upload

Name your file: `yyyymmdd_sessionid_lastname.ext`

Where:

yyyymmdd is the year, month, day of your presentation at FMS, for example: 20180807

sessionid is the Session Identifier as shown in the FMS Program, ours is: [DPRO-101B-1](#)

lastname is your last/family/surname, for example: Bjoerling

ext is the filename extension, for example: pdf, ppt, or pptx

In this example the complete file name would be: 20180807_FTEC-101A-1_Bjoerling.pdf

Provide a short file description. *(This will appear after you drop the file into the upload box.)*

Your full **name**, **email address** and **title of the presentation** would be helpful.

If you are uploading a new, revised version of your presentation, please tell us here.



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Session Structure Day Of

- Please try to arrive in room 10-15 mins early
- Troy: Session Opening Statement: 5 mins
- Troy: Introduction of speakers: Name, Title, Affiliation, and Description of Duties/Qualifications (BIO): 5 mins
- Preso 1: 15 mins (Will/Josie?)
- Preso 2: 15 mins (Robin)
- Q&A: 15 mins



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Other Logistics Day Of

- Audiovisual Equipment (including projector and microphone) - Provided
- Laptop – Please bring yours if you have one; Troy will also have a laptop
- Presentation – Please email Troy your final copy on day before our session (Monday 8/6 by 5pm PST) – Also bring a copy of your presentation on USB thumb drive as a backup
- Time Limits – Please be respectful of time and try to keep presentation to allotted amount of time – Troy will signal you when you have 2 mins remaining



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Q&A portion of session

- We hope to get audience participation in Q&A
- Please send Troy 1-2 questions of relevance in case we have limited audience participation
- Troy will also have a few questions ready
- We will try to not exceed 2 minutes for each answer



Other Activities going on at FMS

- Check Program at a Glance here for latest:
https://flashmemorysummit.com/English/Conference/Program_at_a_Glance.html#
- Pre-Conference Seminars Monday, August 6th (Paid Registration Only)
- Solid State Storage Reception Monday, August 6th 5:00 – 7:00pm (Room 209/210)
- Continental Breakfasts 8-8:30AM each morning (Tues, Wed, Thurs)
- Lunches included for speakers each day
- Lifetime Achievement Award Tuesday 11:30-11:40AM Mission City Ballroom
- Tuesday Evening Reception 4:00-7:00pm Exhibit Hall
- FMS 2018 Chat with the experts Beer/Pizza 7:00-8:30PM Ballroom A-D -
- All Industry Reception 5:45-6:30PM Exhibit Hall
- Best of Show Awards 6:30-7:00PM FMS Theatre
- Exhibit Hall Open Daily Tues-Thurs
 - Tuesday August 7 – 4 PM - 7 PM
 - Wednesday August 8 – Noon - 7 PM
 - Thursday August 9 – 10 AM - 2:30 PM
- Keynotes 16 Total throughout show



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Other Questions?

- Anything at all? Josie Registration, Dinner, email travel schedule, Mike schedule dinner offsite for Monday evening, Josie send Bio
- Let's have a great 2018 FMS!!
- Thank you for participating!!