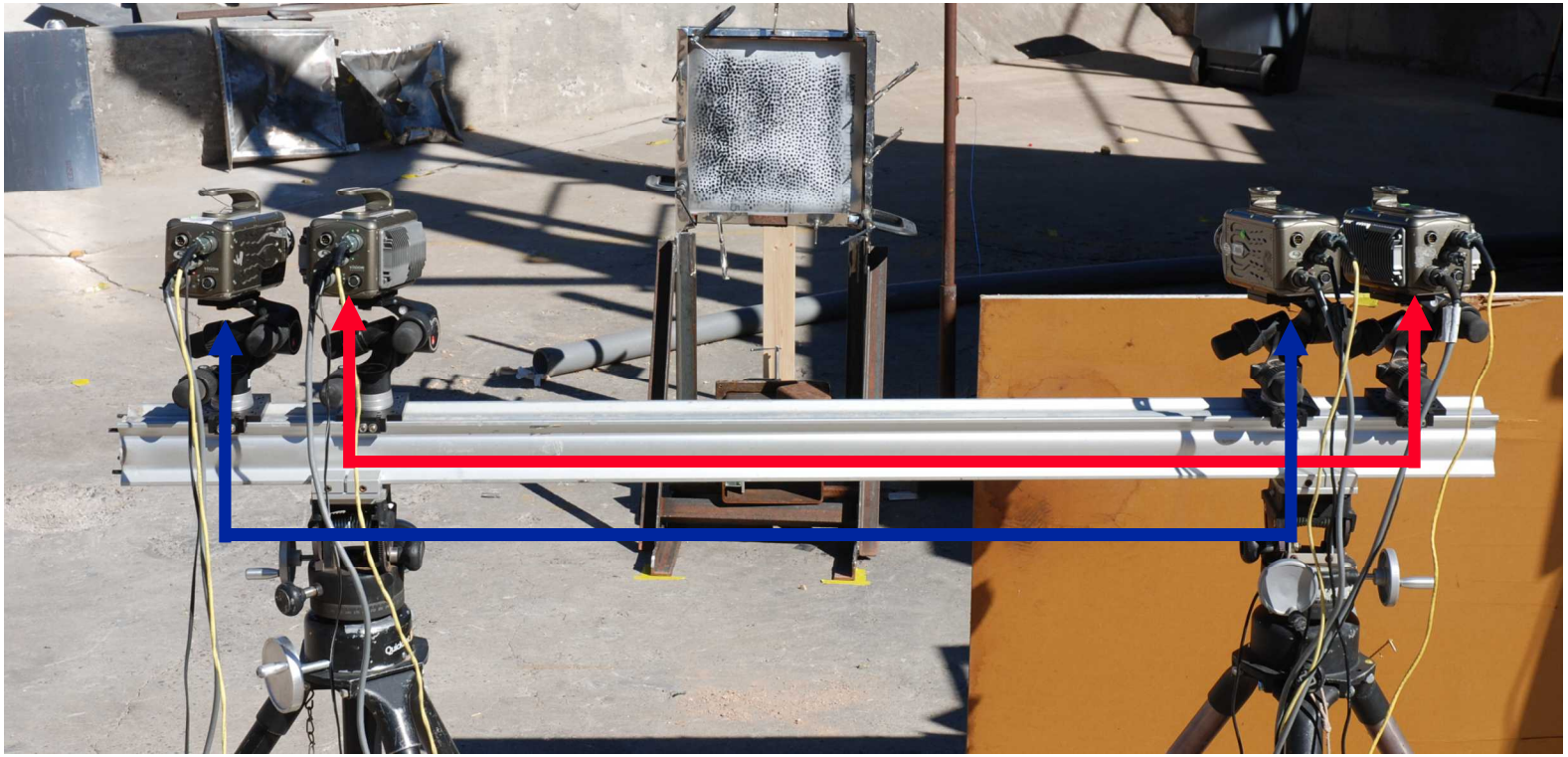
Interlacing of high speed cameras to double the effective frame rate for DIC

SAND2008-4201C



Photomechanics 2008

July 6-9, Loughborough, UK

Phillip L. Reu

Senior Member Technical Staff

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000.

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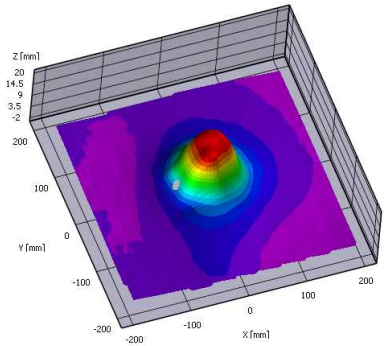
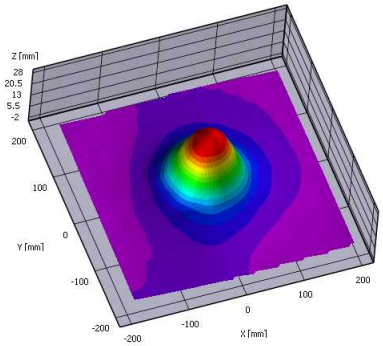
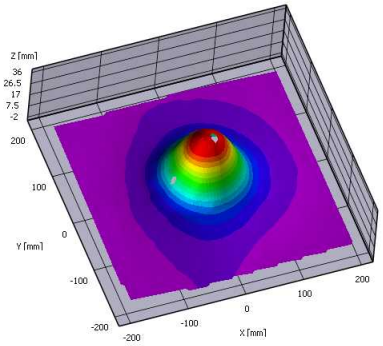
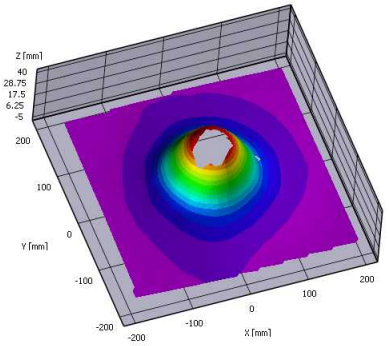
How do you interlace two 3D DIC camera pairs?

Motivation & Experimental Setup









Experimental results

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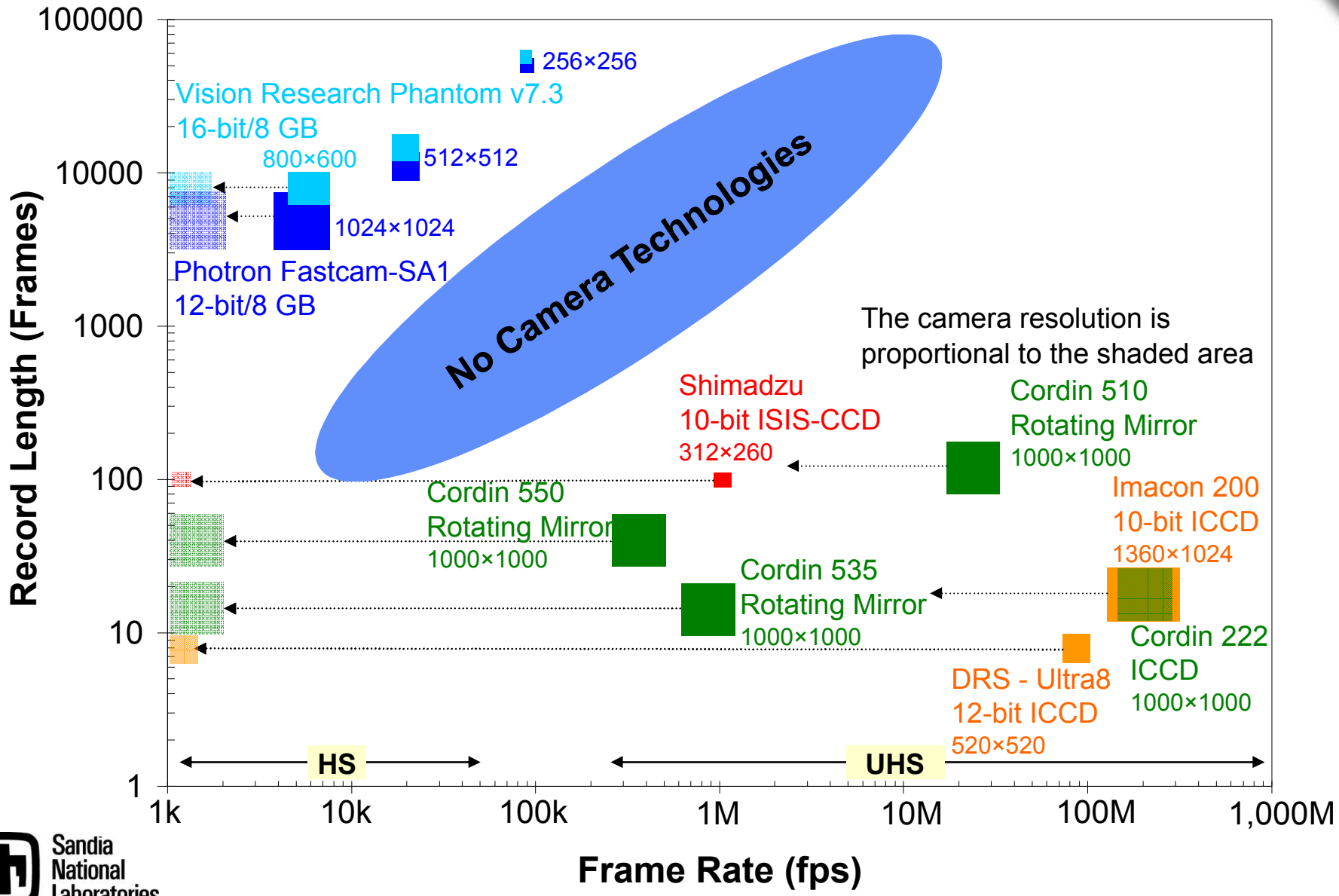
Interlacing can fill an important frame rate gap in digital imaging



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Phantom cameras have timing idiosyncrasies and limitations

1. Variable camera delays
2. Shutter lag
3. Minimum time resolution of 2 μs

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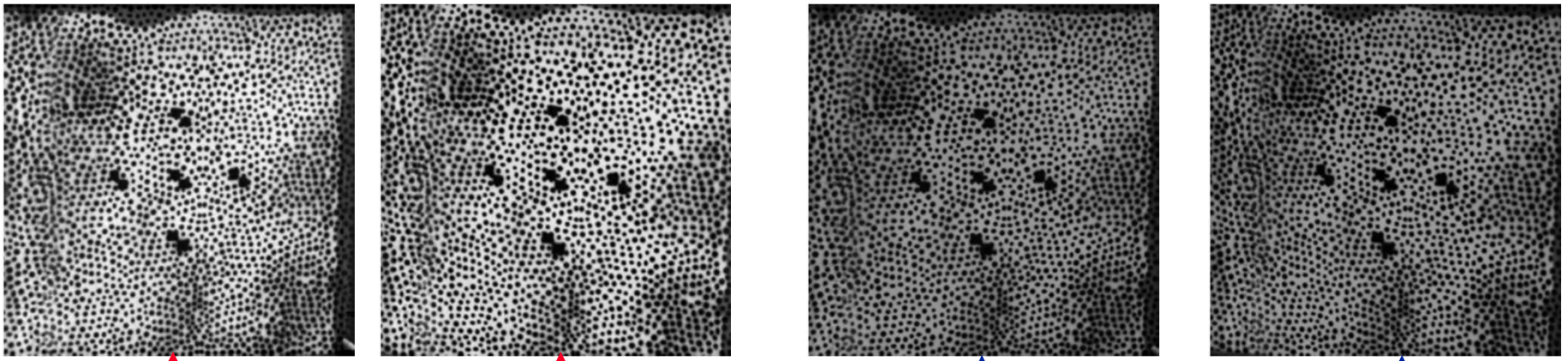
A special method was used to correlate camera set A to camera set B



Camera Set A

Camera Set B

Calculate Coordinate Transformation

Correlate Set A

Correlate Set B

Transform Data to Same System

Analyze The Unified Data

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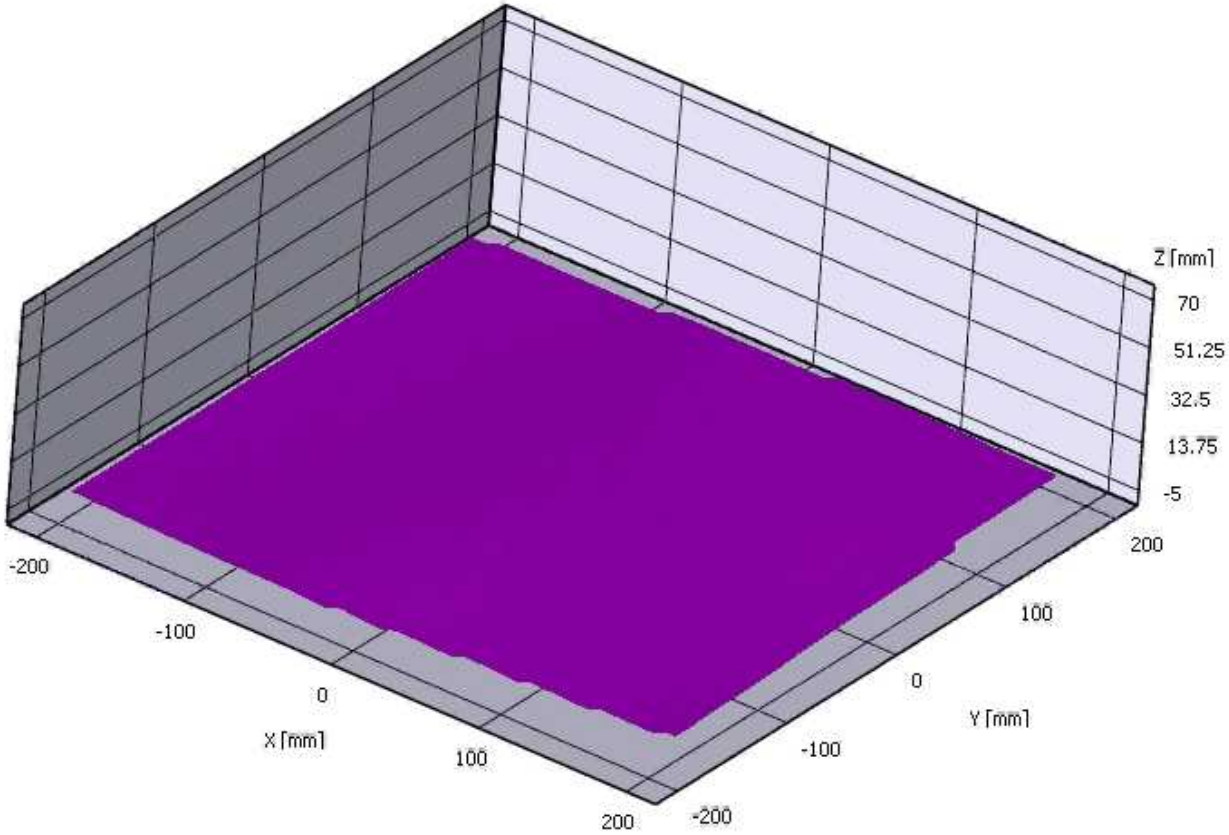

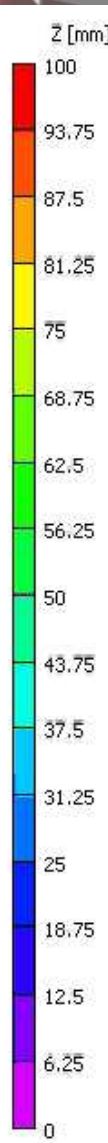

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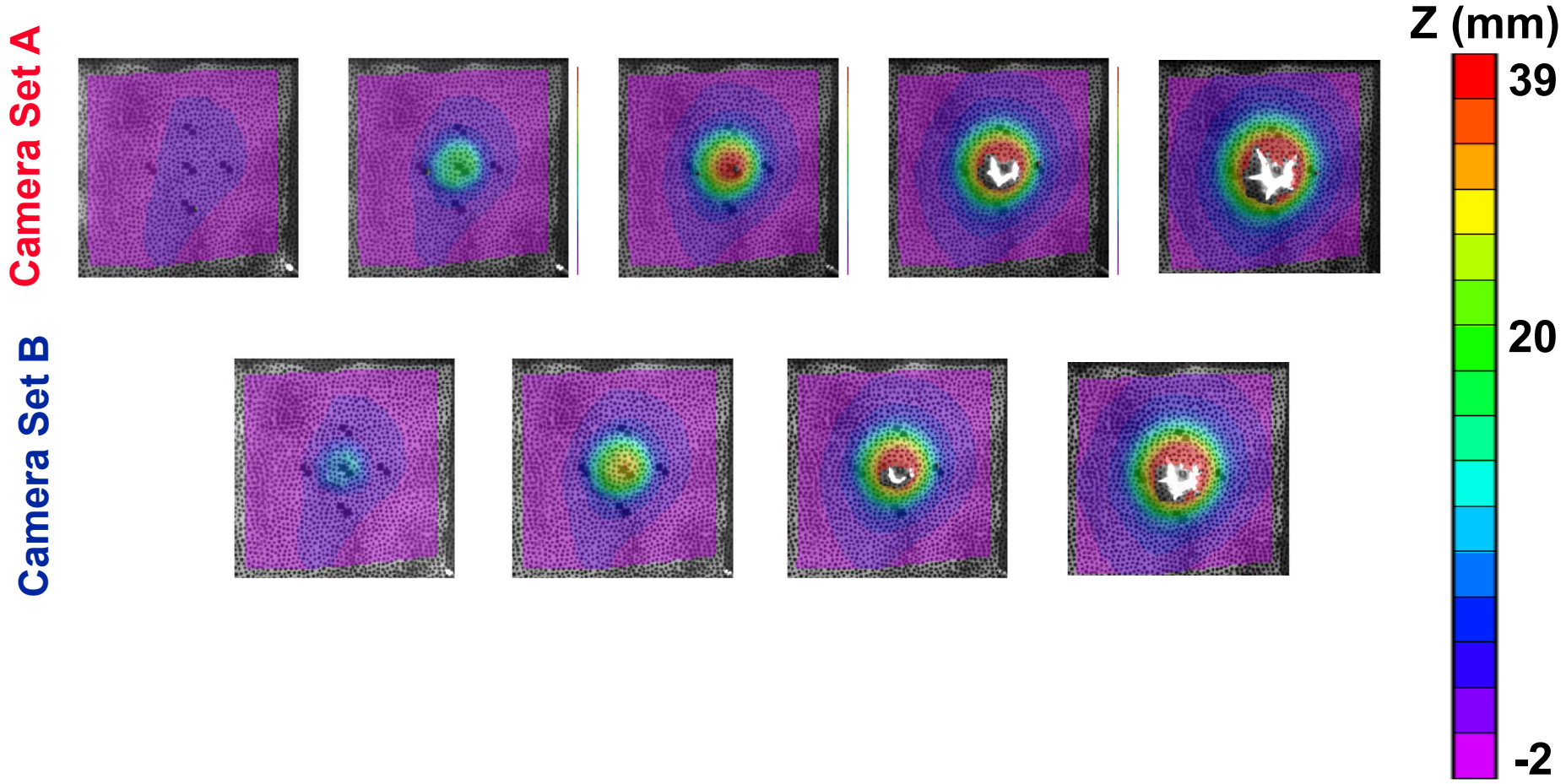
Twice as many frames are available for analysis during the event.



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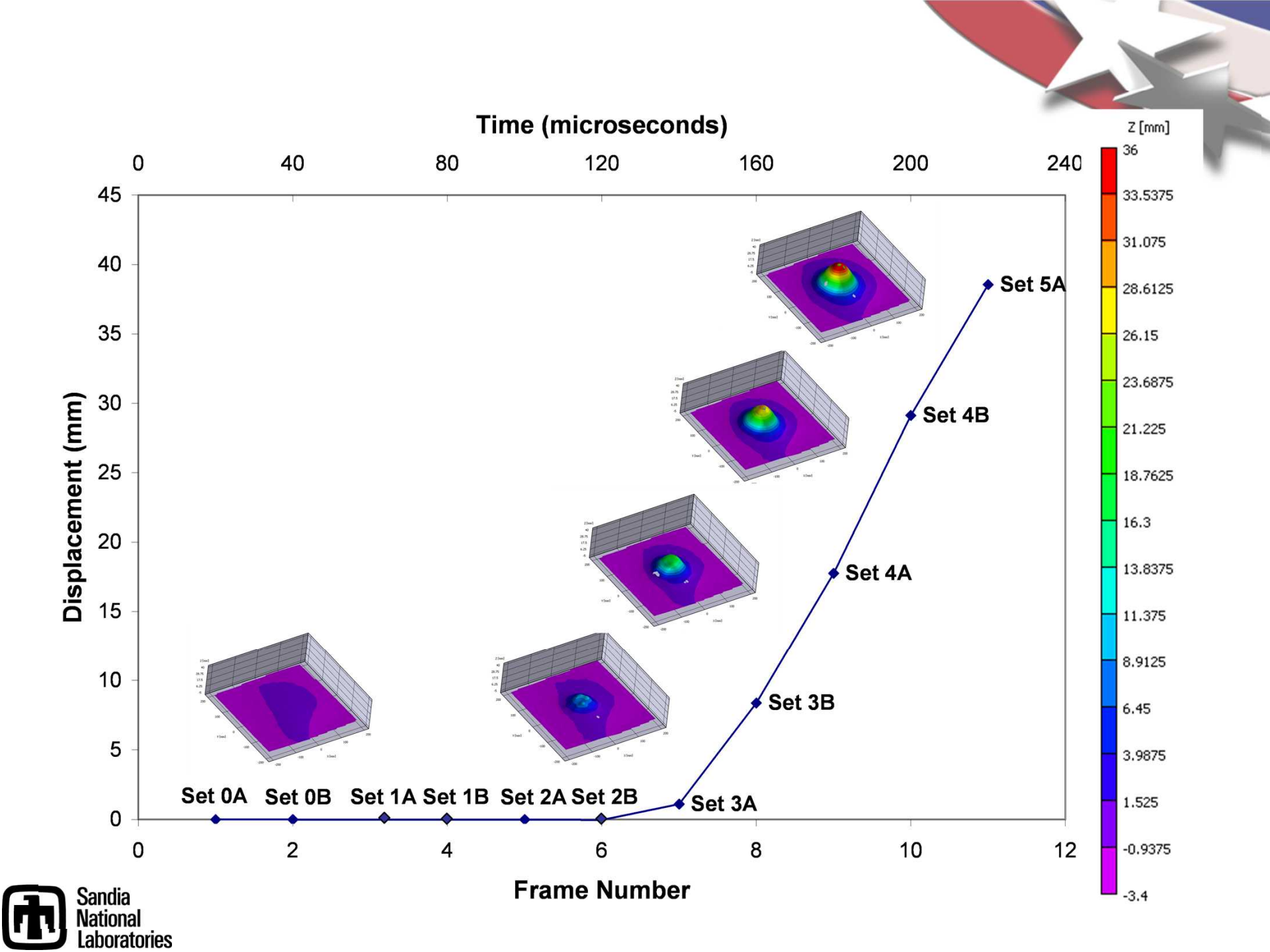

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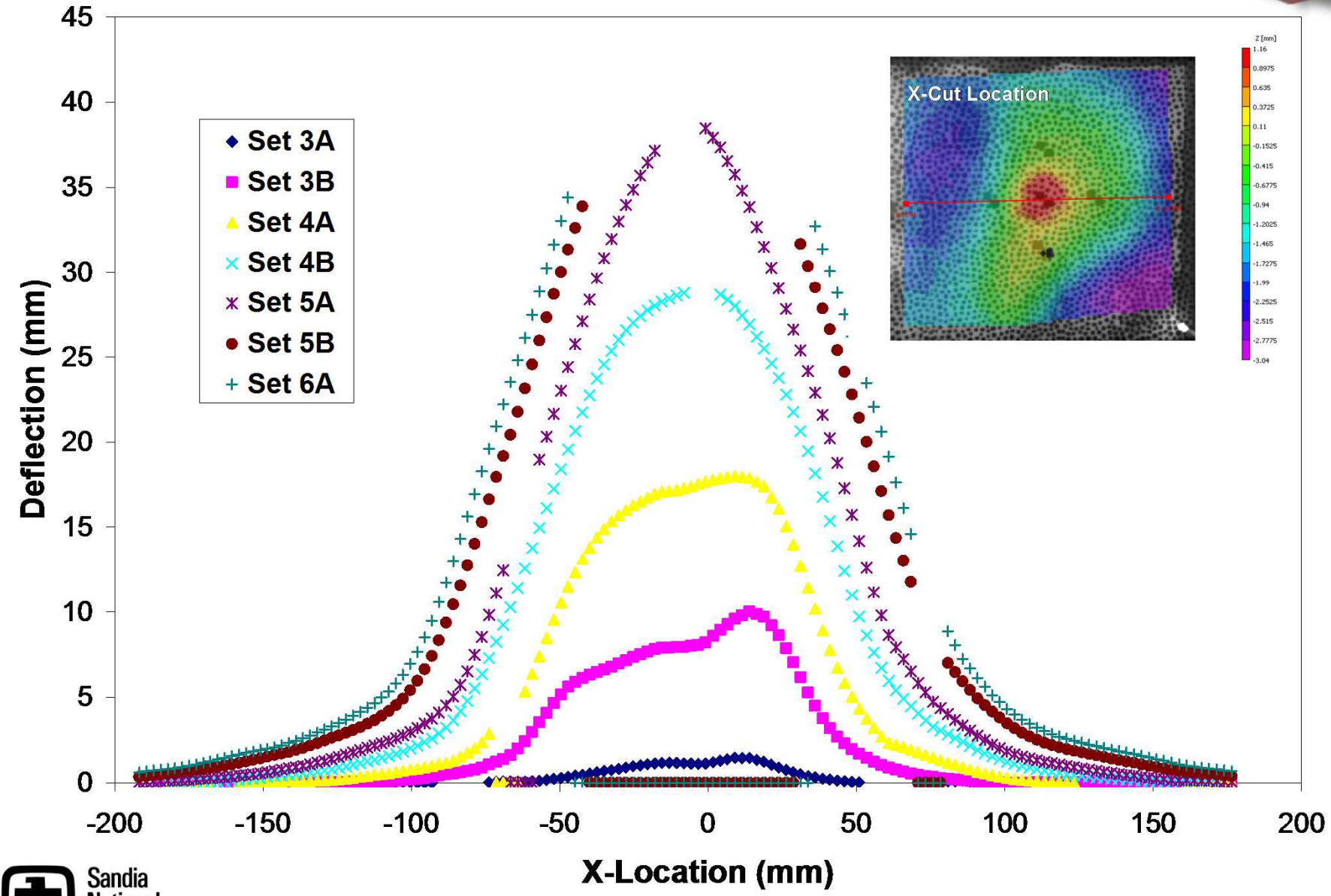

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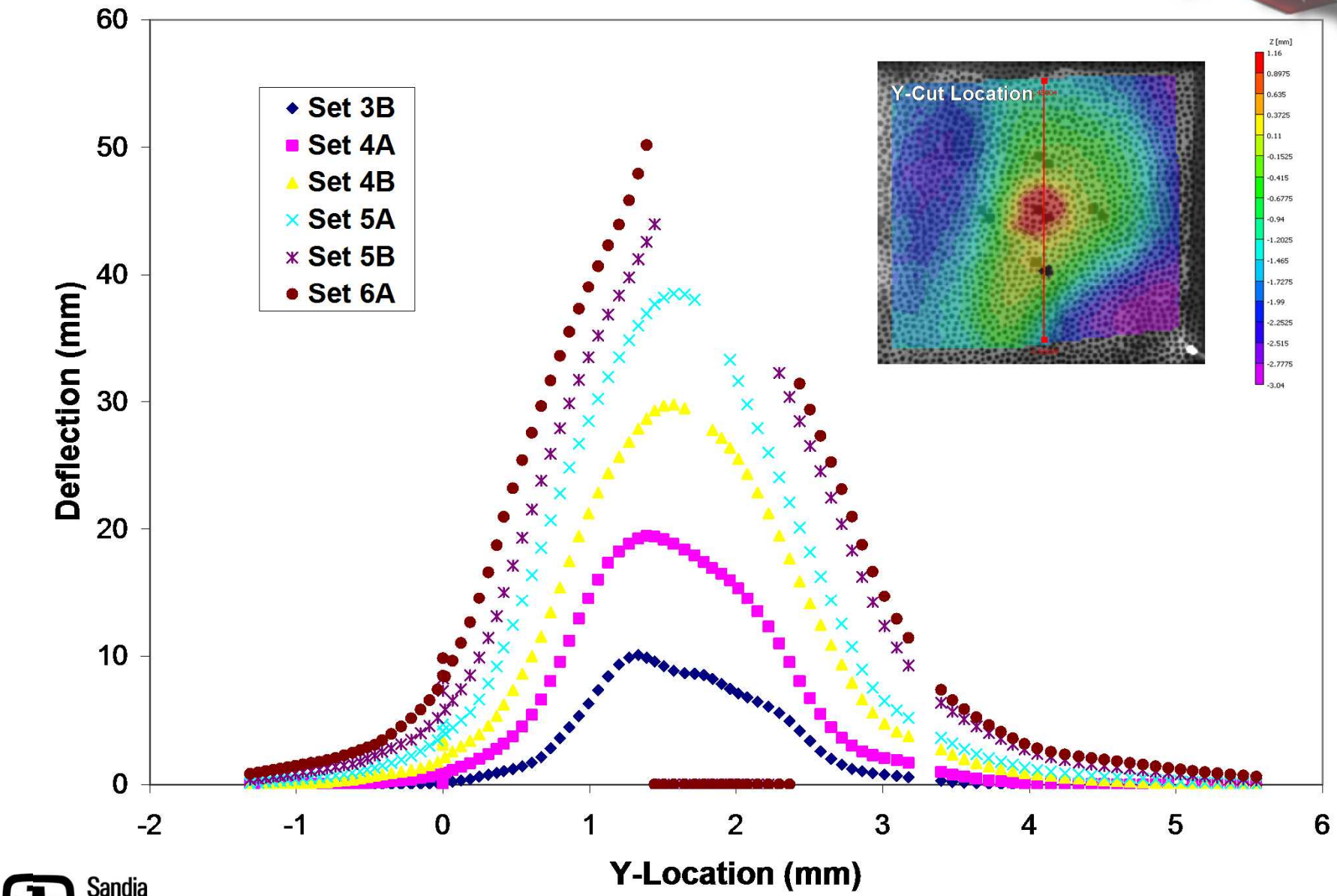

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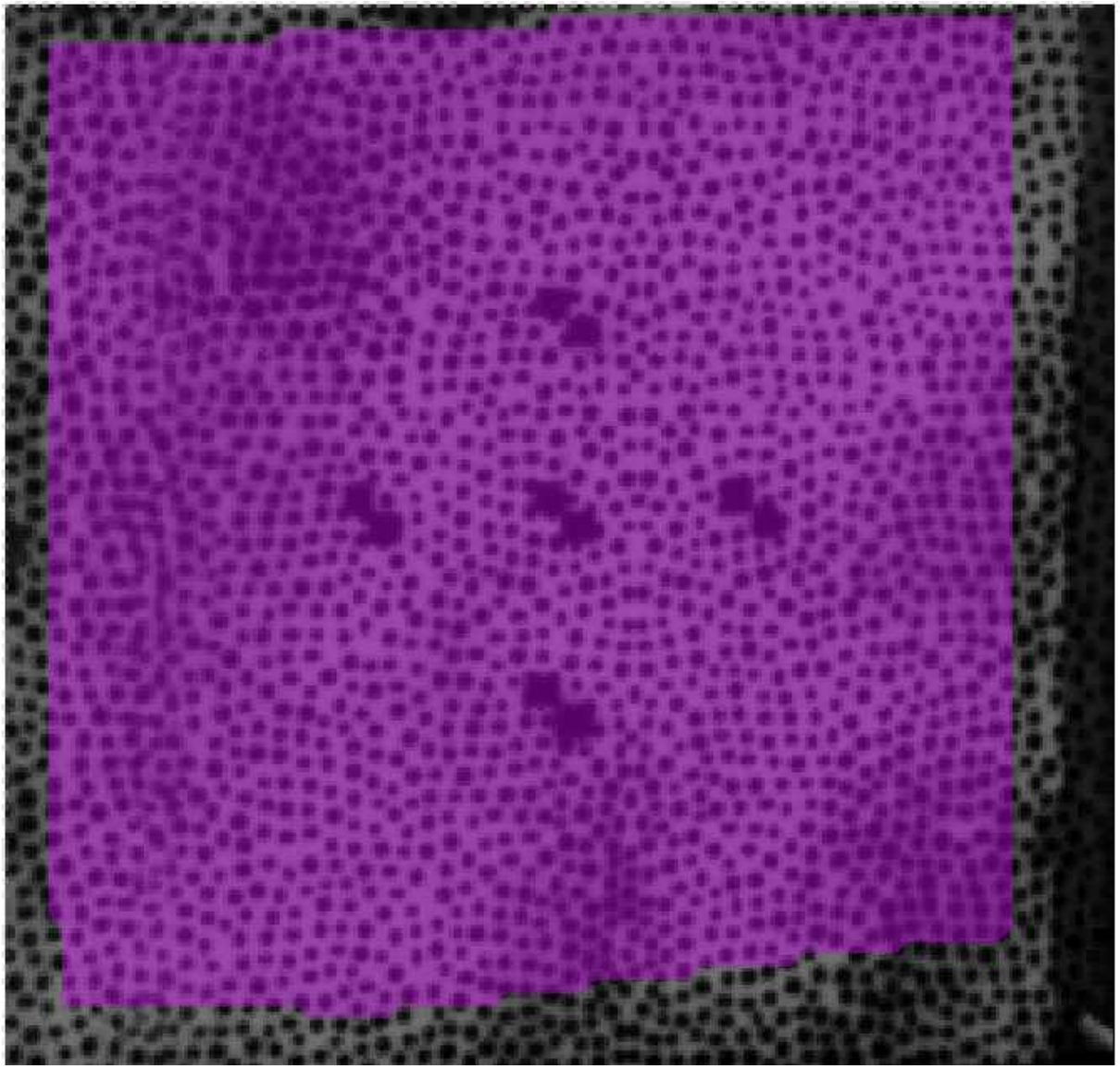
Velocity results



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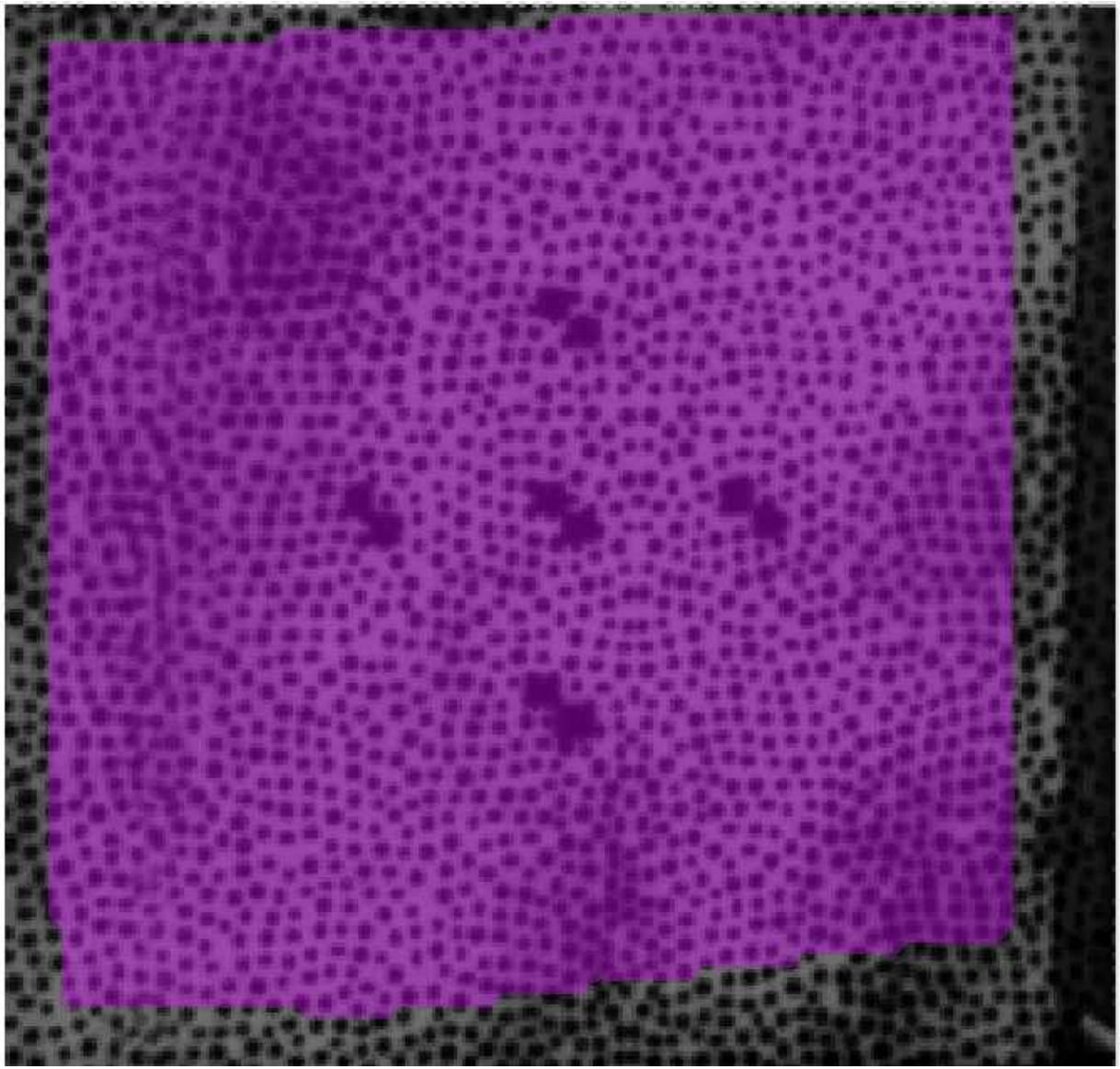
Strain results



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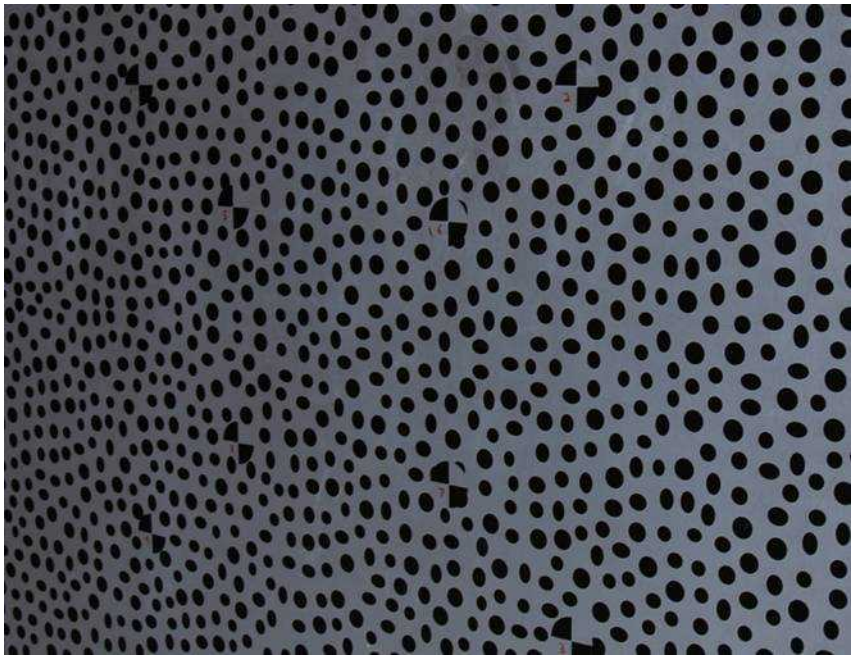
Paint loss is always a potential problem with explosively driven events



Anodizing aluminum

Interlacing is a possibility for increasing frame rates with existing equipment

Useful for:

- **Modal analysis**
- **High Rate Events**

Aknowledgements:
Mark Nissen, Mike Bejarano and Ed Bystrom for photo support.
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Questions?

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