Ultra Recording Simulator™

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Overview

- General-purpose micromagnetic read-write simulation and analysis software.
- Software for designing advanced and new-generation recording technologies.
- Microsoft Windows application (*NT, XP™, Vista ™ and Windows 7*).
- Friendly user interface. Extremely short learning curve.
- Comprehensive user documentation; extensive web resources.

Sample Application Areas

- *Longitudinal* and *Perpendicular* recording.
- *Heat-Assisted Magnetic Recording (HAMR).*
- New patterned-media nano-recording systems.
- Multi-track recording simulation.
- Enhanced recording *parametrics* (overwrite, micro-track analysis, spectral analysis etc.).

Mathematical Model

- *Dynamic* and *Static* solvers (*Landau-Lifshitz* and *Landau-Lifshitz-Gilbert*).
- Accurate, robust and efficient three-dimensional (3-D) micromagnetics (Magnetostatic, Exchange, Anisotropy, *Stochastic* Thermal fluctuation etc.).
- Efficient magnetoresistive read-head model (*AMR & GMR).*
- 3-D magnetic shield model.

Simulation *Schemas*

- ***Writing***. Moving energized ***Writer*** records on a storage media.
- ***Reading***. A moving ***Reader***, senses recorded media data.
- ***Media Test****.* A media sample is subjected to externally applied vector fields to evaluate its magnetization behavior.
- ***Writing Field Scan****.* The fringing field produced by a write head is detected by a moving probe.
- ***Media Field scan****.* The fringing field produced by bits of a storage media is detected by a moving probe.
- ***Write and Media Field scan****.* The fringing field produced by a combination of a write head and storage media is detected by a moving probe.

Productivity tools

- Integrated ***New-Design Assistant***. Rapid new-design creation wizard. Popular design templates.
- ***Reader Shield Assistant***. Rapid setup of reader surrounding shield configuration.
- ***Cellider***. Array component patterning tool.
- ***Mag-O-Mat***. Material micro-property editing tool.
- ***MagJob***. Batch job scheduling and monitoring tool.
- ***Recording and playback of simulations***. Create a movie of a simulation for follow-up detailed analysis of solution states.

Writer

- *Write head*. ***Moveable*** generic ***single-pole***, ***gapped*** heads, ***custom*** heads and imported head response functions.
- *Thermal source*. ***Moveable*** source with definable ***media footprint.***
- Thermal source can be used in conjunction with Write head for ***HAMR*** simulations.
- Possible ***skewed*** orientations and motions of sources.
- Write head and Thermal source are both energized by generic ***pulse-train signal*** sources.

Reader

- *Reader*. ***Moveable*** phenomenological (possibly shielded) magnetoresistive heads (***AMR*** & ***GMR***).
- Possible ***skewed*** head orientation and motion.

Media

- Composite anisotropy media – with *storage* and *under layer.*
- Media magnetocrystalline anisotropies
  - Longitudinal
  - Perpendicular
  - Cubic
  - Bi-crystalline
  - Custom user-defined.

Data Outputs

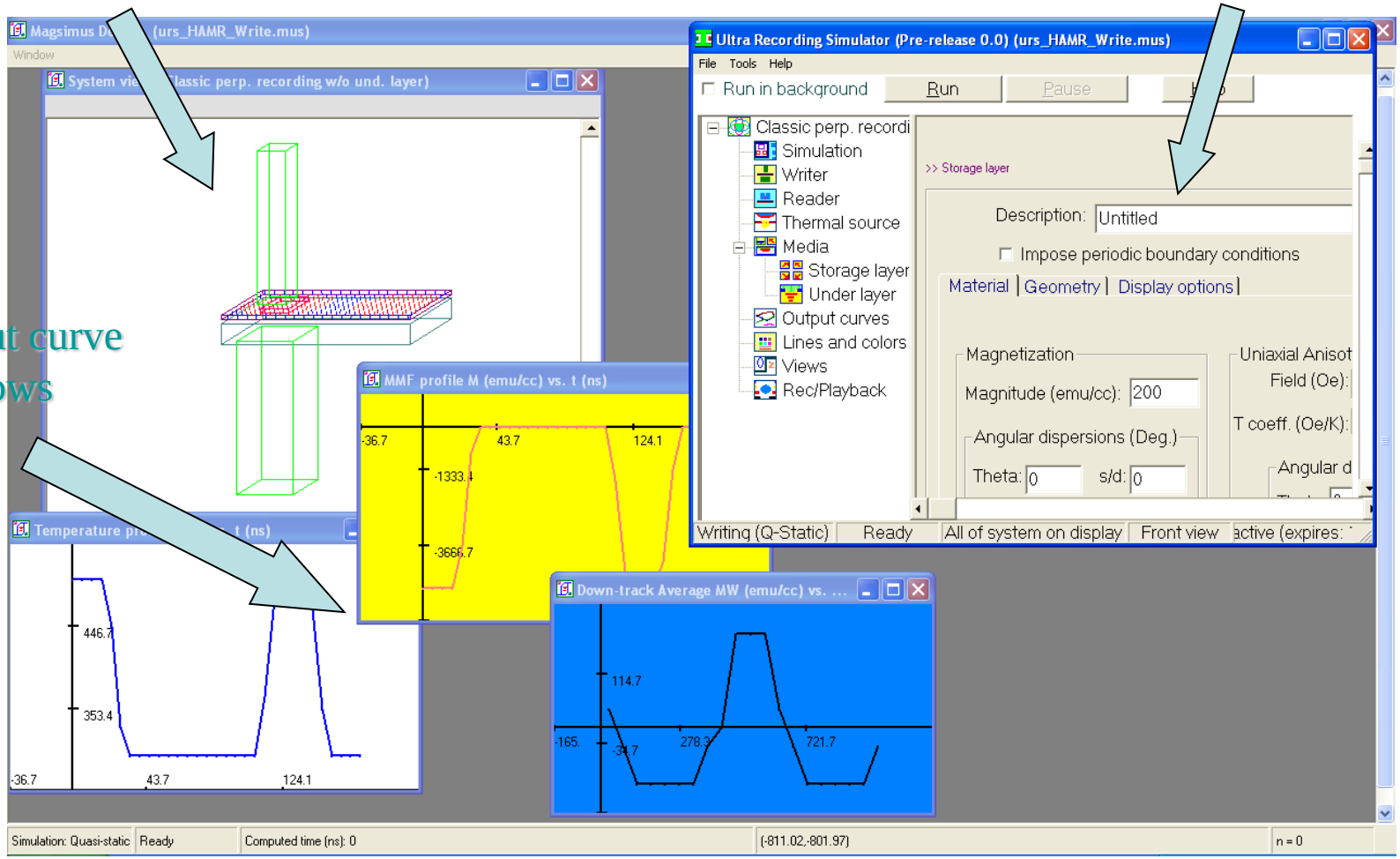
- Comprehensive data output repertoire.
- Vector field viewers (magnetization and interaction field maps; vector field transformations). Easy *field navigation*.
- Data Curves (Spectral analysis, Differentiation, Integration etc.).

HAMR Perpendicular Write Example Screenshot

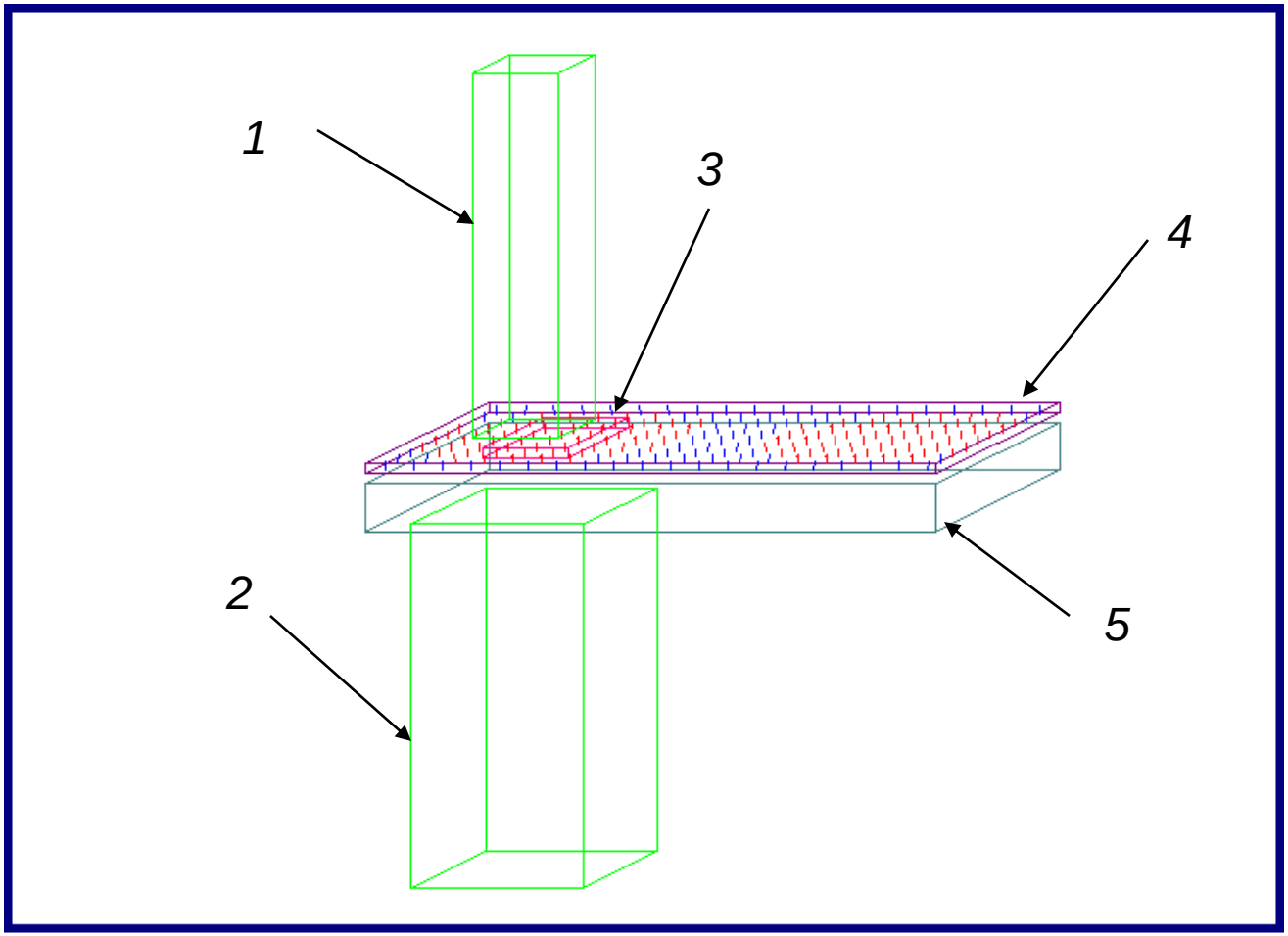
System-View box

URS Control window

Output curve windows



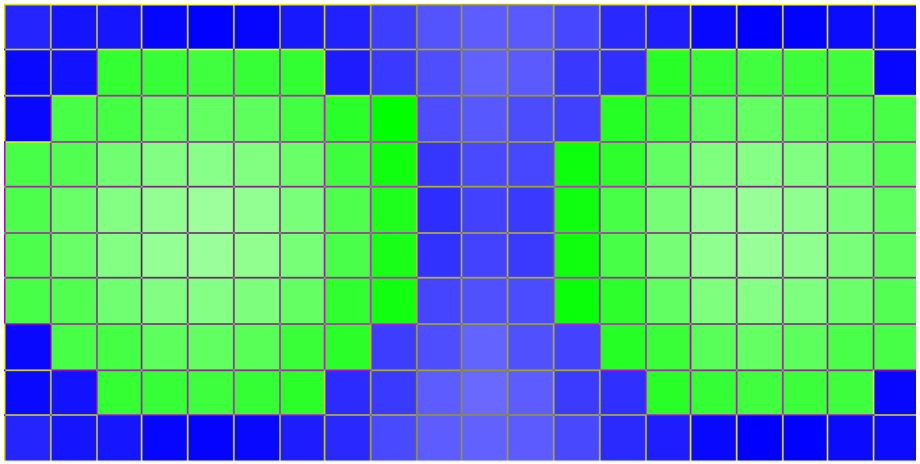
HAMR Perpendicular Write Example *System Details 1*



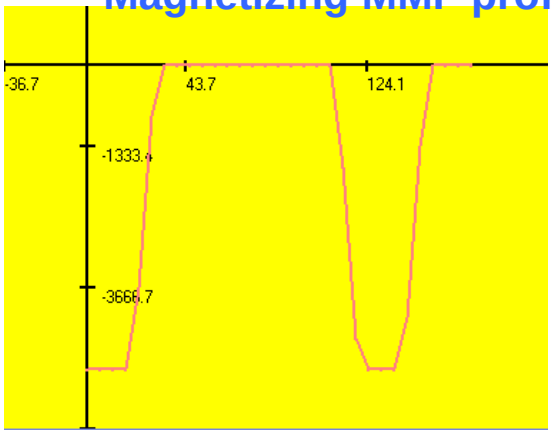
1 – *P1* Pole
2 – *P2* Pole
3 – Thermal *footprint* in media
4 – Media *storage layer*
5 – Media *soft under layer*

HAMR Perpendicular Write Example *System Details 2*

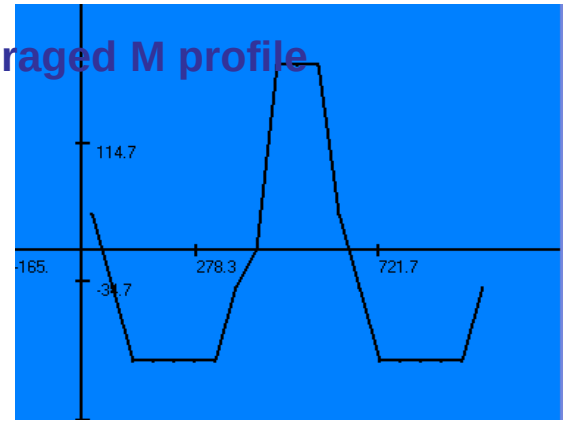
Induced top surface charge of media soft under layer



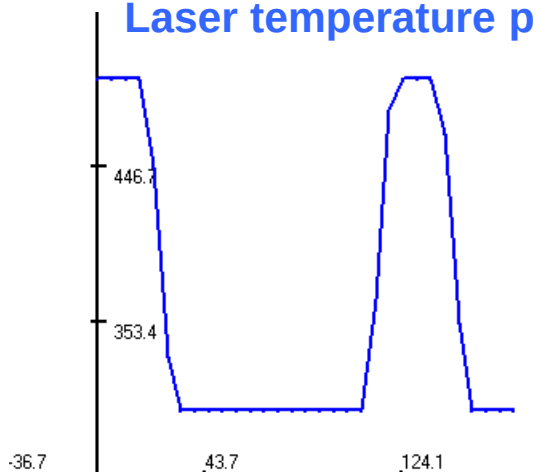
Magnetizing MMF profile



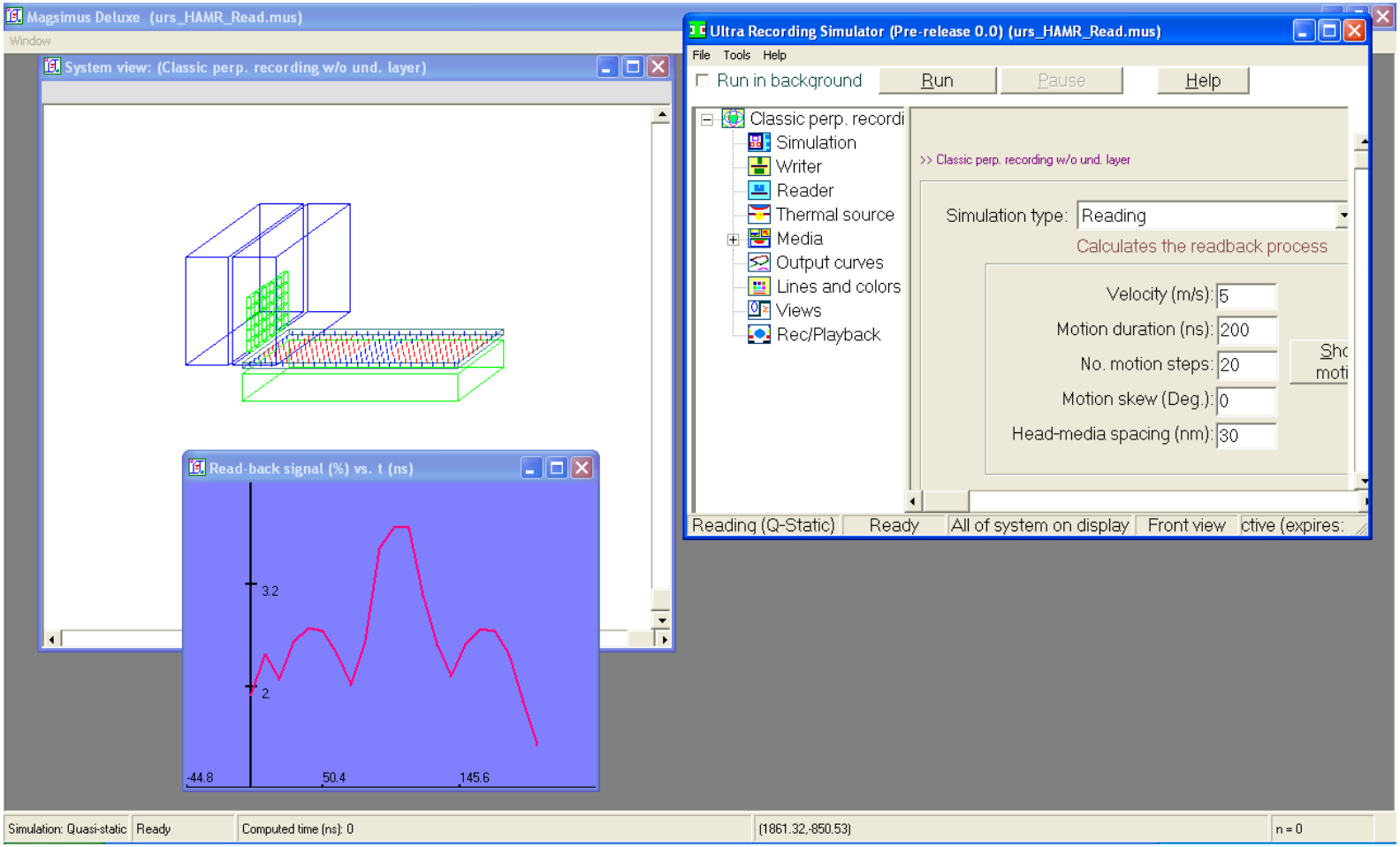
Cross-track averaged M profile



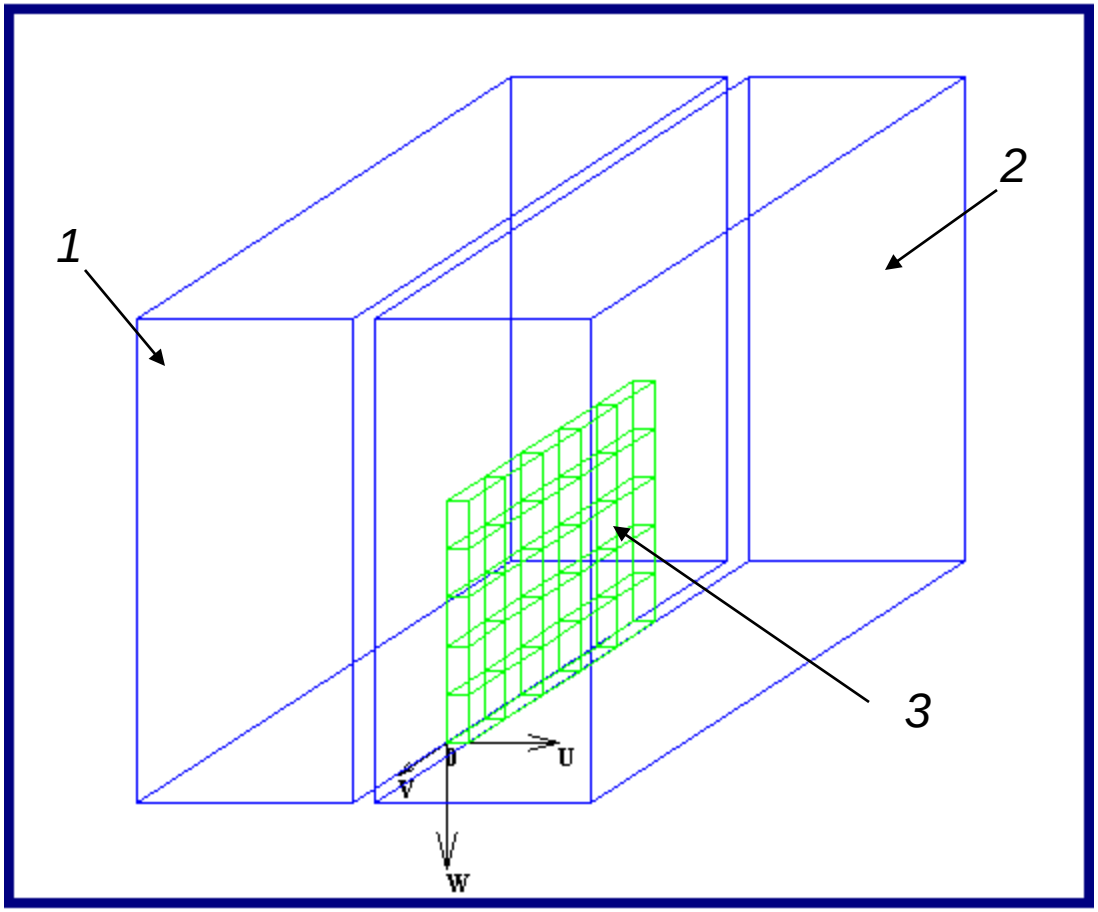
Laser temperature profile



HAMR Read Example Screenshot



HAMR Read Example
Reader Detail



1 – *P1* Pole (shield)
2 – *P2* Pole
3 – MR sensor