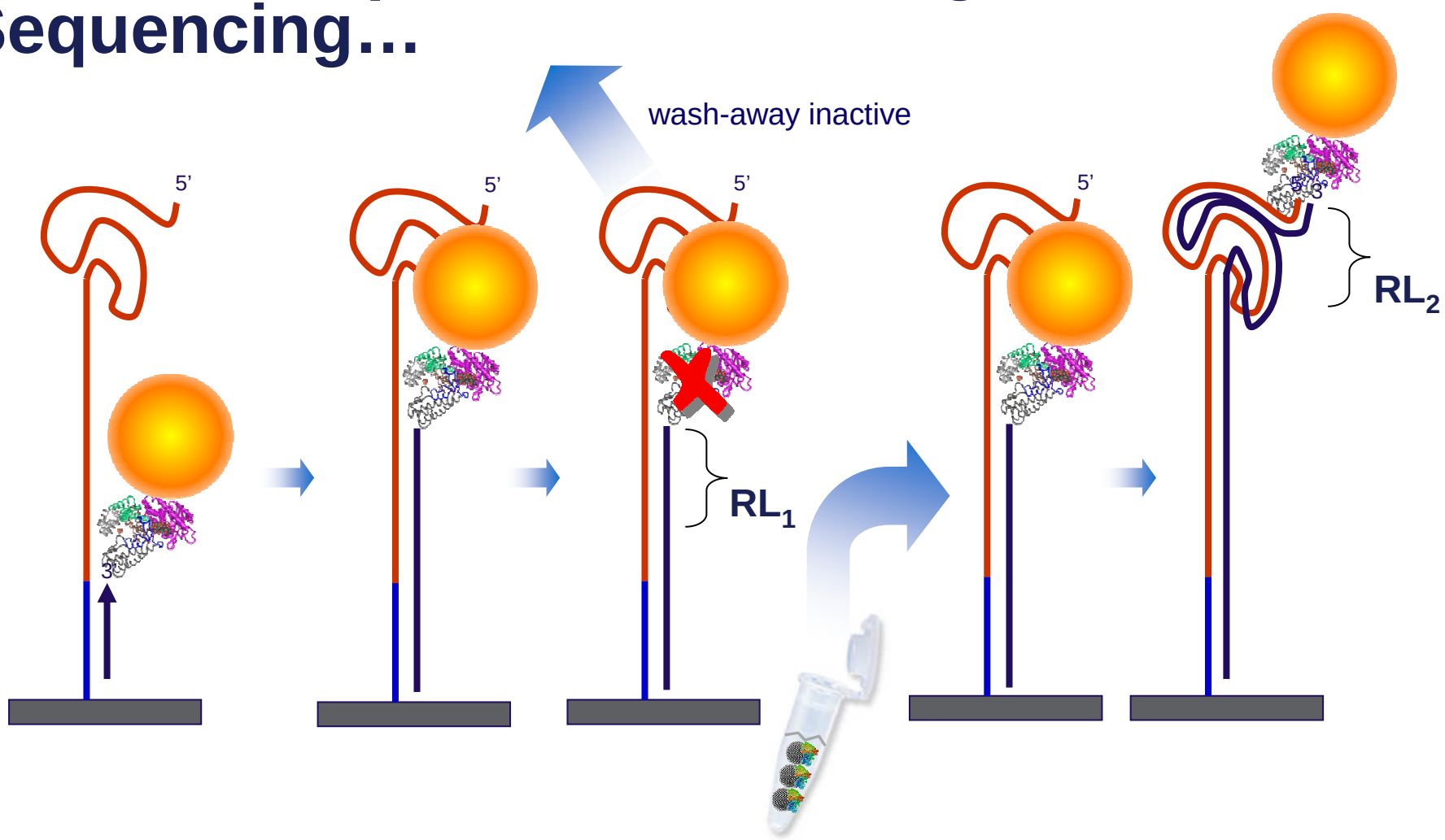
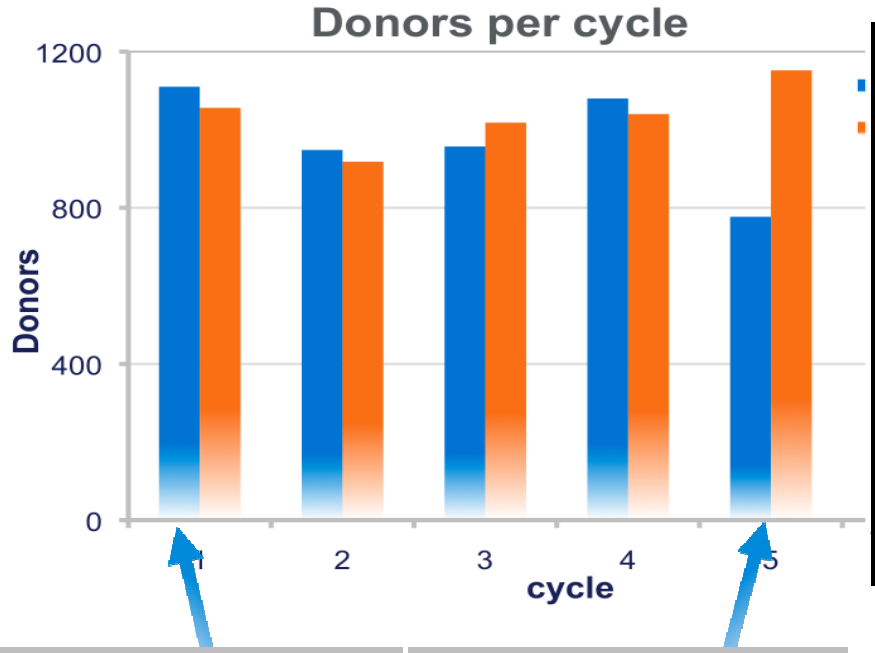
Portable Sequencers: Exchange & Continue Sequencing…

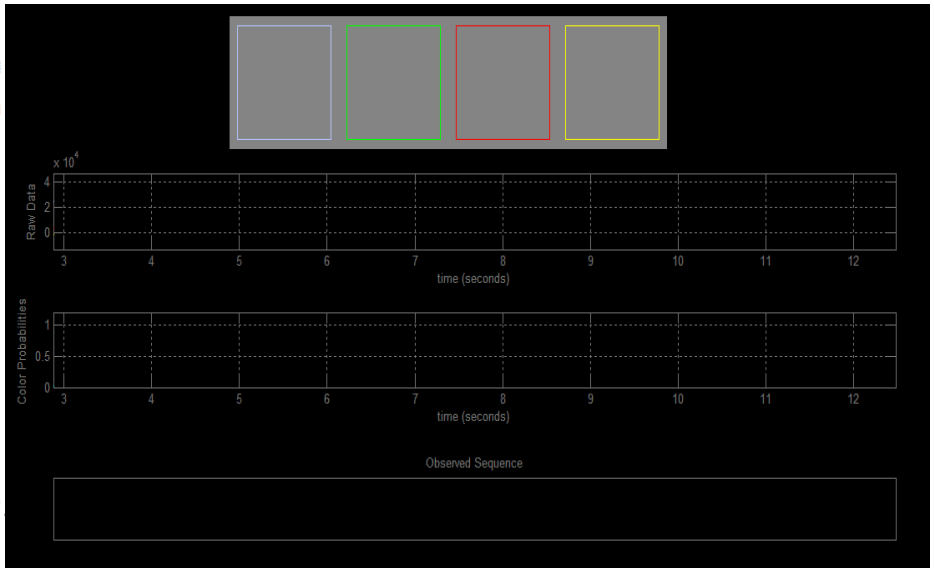


Continuous read-length = # exchanges X fundamental read length

life technologies™

Multiple Rounds of Exchange Allow for Continuous Expansion of Reads



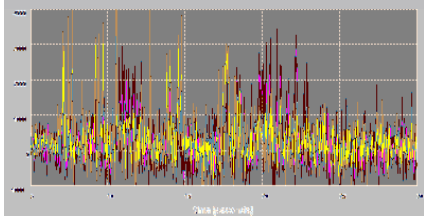


Movie File = Extended_Read_Length_Reagent_Exchange_Movie.avi

Extending: G12A12G12A12



Extending: G12A12G12A12

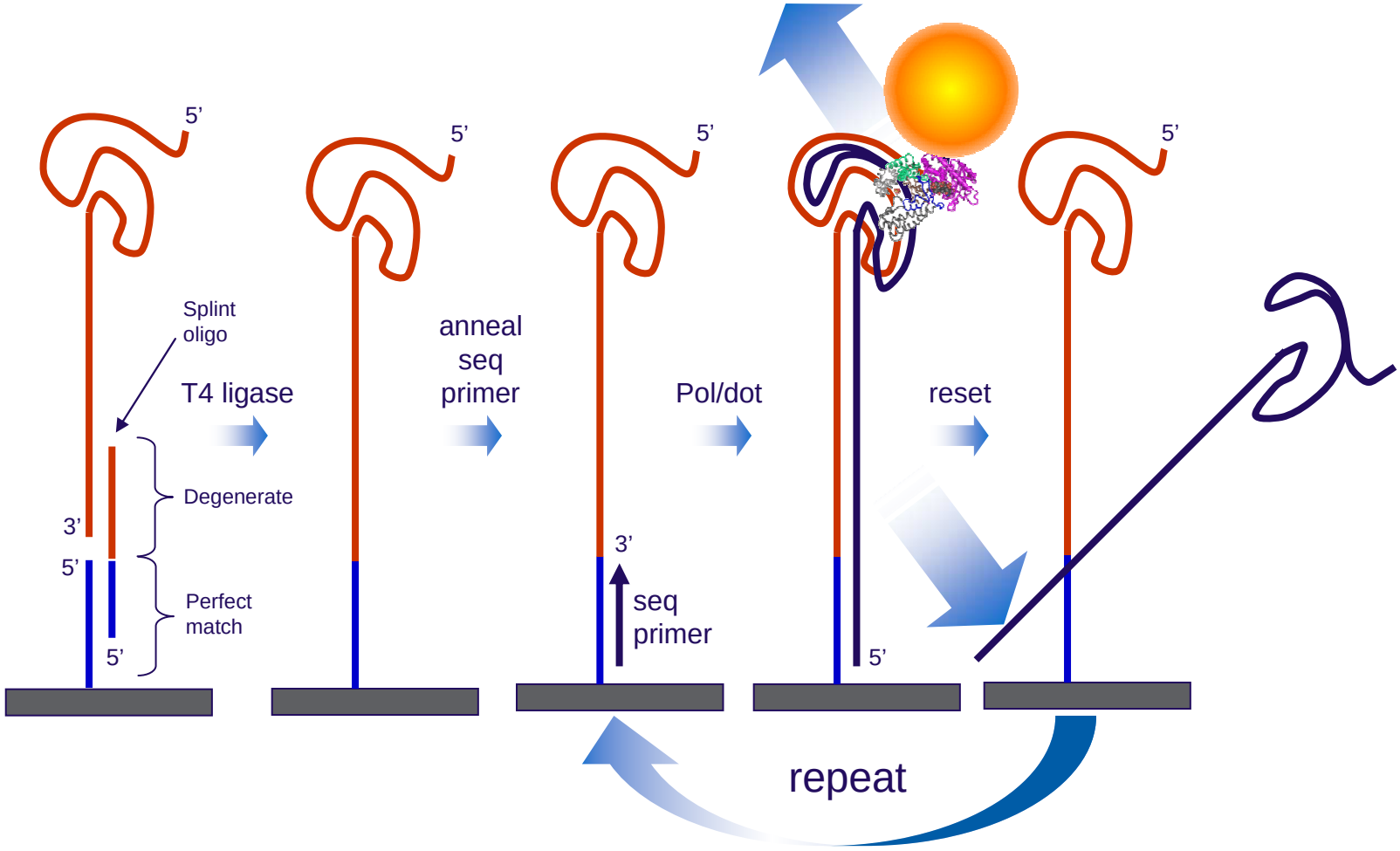


Five cycles, no loss of signal, no gaps in sequence

life technologies™

Recursive Sequencing: Increase in Accuracy While Maintaining Read Length

Reading same unaltered genomic DNA template multiple times

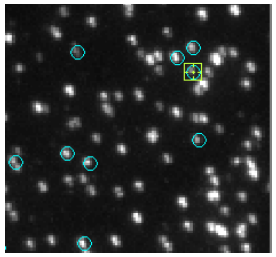


Unmodified genomic template, no circularization needed

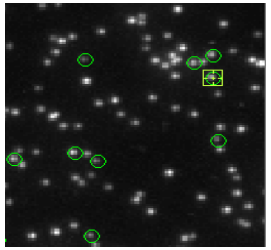
life technologies™

Sequencing Identical Single Template (□), Multiple Times

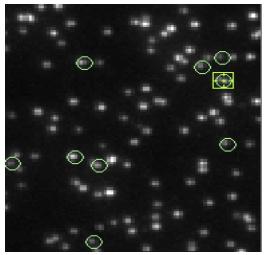
Cycle 1



Cycle 2



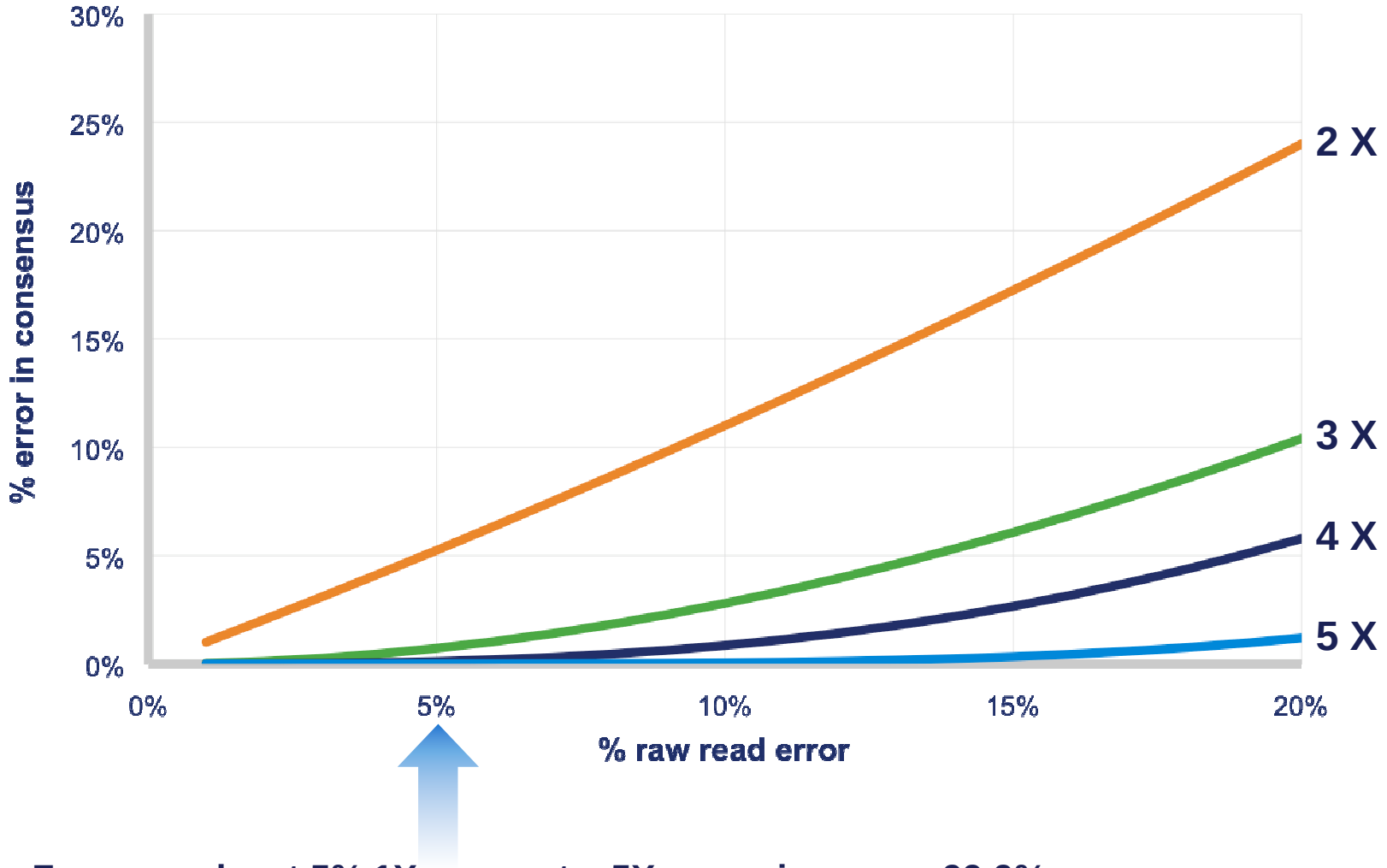
Cycle 4





life technologies™

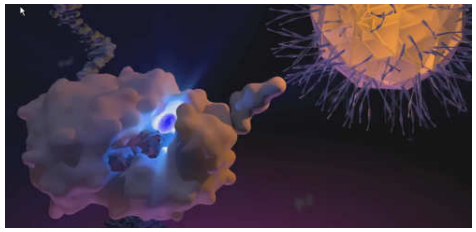
Recursive Sequencing Accuracy Gain (no insertion-deletions modeling)

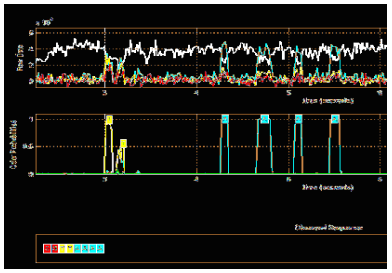


For example, at 5% 1X error rate, 5X recursive seq = 99.9% accuracy

life technologies™

Complementary Applications for Gen-2 and Gen-3 Life Technologies Sequencing











SEQUENCE STRUCTURE

- De novo sequencing
- Haplotype phasing (medical apps)
- RNA structure
- Structural variation
- Gene families & repeat regions

SEQUENCE QUANTITATION

- Gene expression
- Whole human sequencing
- Accurate heterozygote detection
- CHiP with sequencing
- miRNA sequencing

Together

Comprehensive genome sequencing

life technologies™

Life Technologies Single Molecule Sequencing System

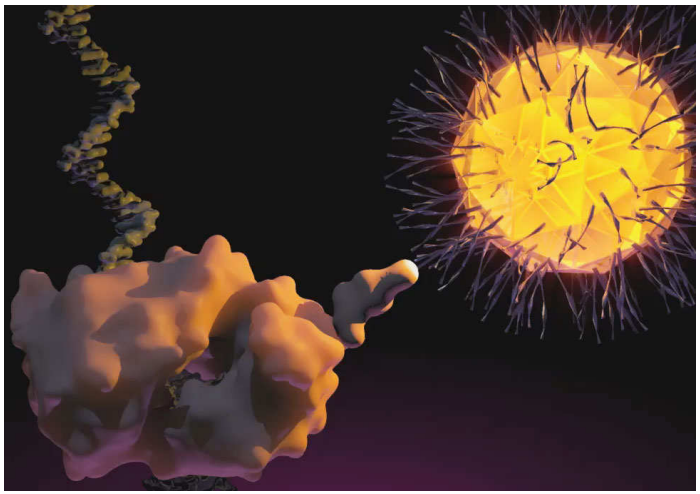
Portable nanometer-sized sequencing engine

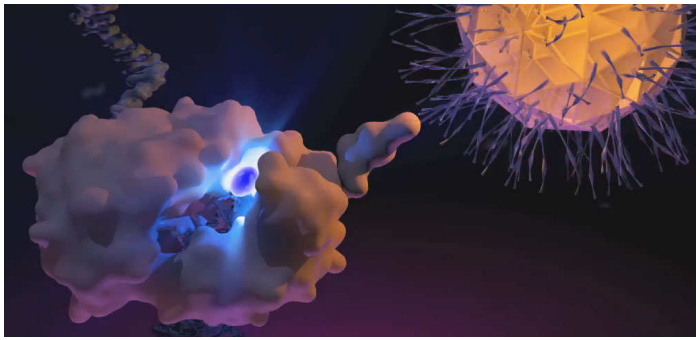
That enables

Continuous long read lengths using active-sequencer exchange

And

"Tunable" high accuracy using recursive sequencing





Early-access Instruments and collaborations starting in Q4 2010
(come to Life Technologies suite Room 1106, for additional information)
Joe.Beechem@lifetech.com

life technologies™

For Research Use Only. Not intended for any animal or human therapeutic or diagnostic use.

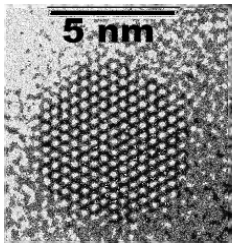
© 2010 Life Technologies Corporation. All rights reserved. The trademarks mentioned herein are the property of Life Technologies Corporation or their respective owners.

life technologies™

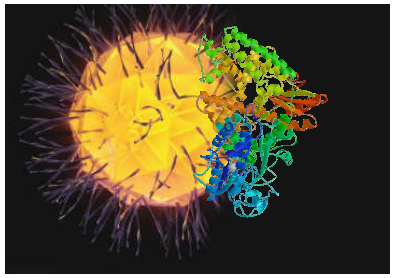
Appendix

life technologies™

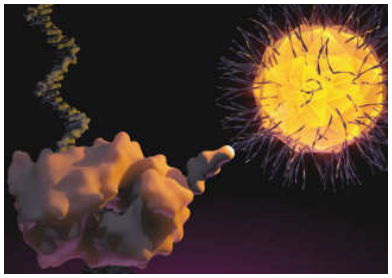
Leveraging Best-in-Class Materials to Build a Nanometer-Sized DNA Sequencing Engine…



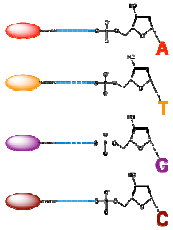
"Next-Generation" quantum-dot nanocrystal, designed exclusively for single molecule sequencing



New proprietary DNA polymerase, with single-point attachment to quantum-dot nanocrystal



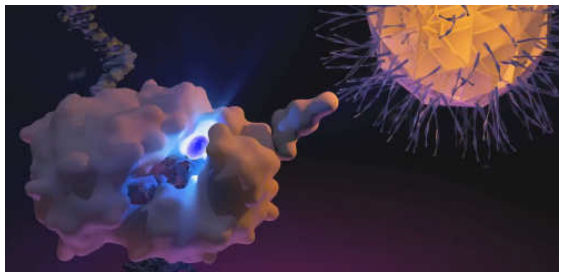
Add primer-template DNA



Complete control over all components allows extremely rapid sequencing system development



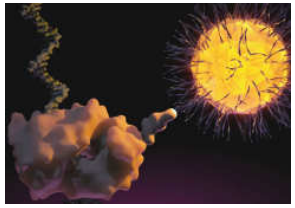
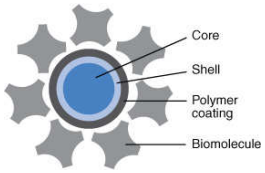
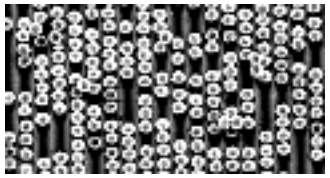
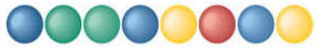
Portable, reagent-based sequencing engines



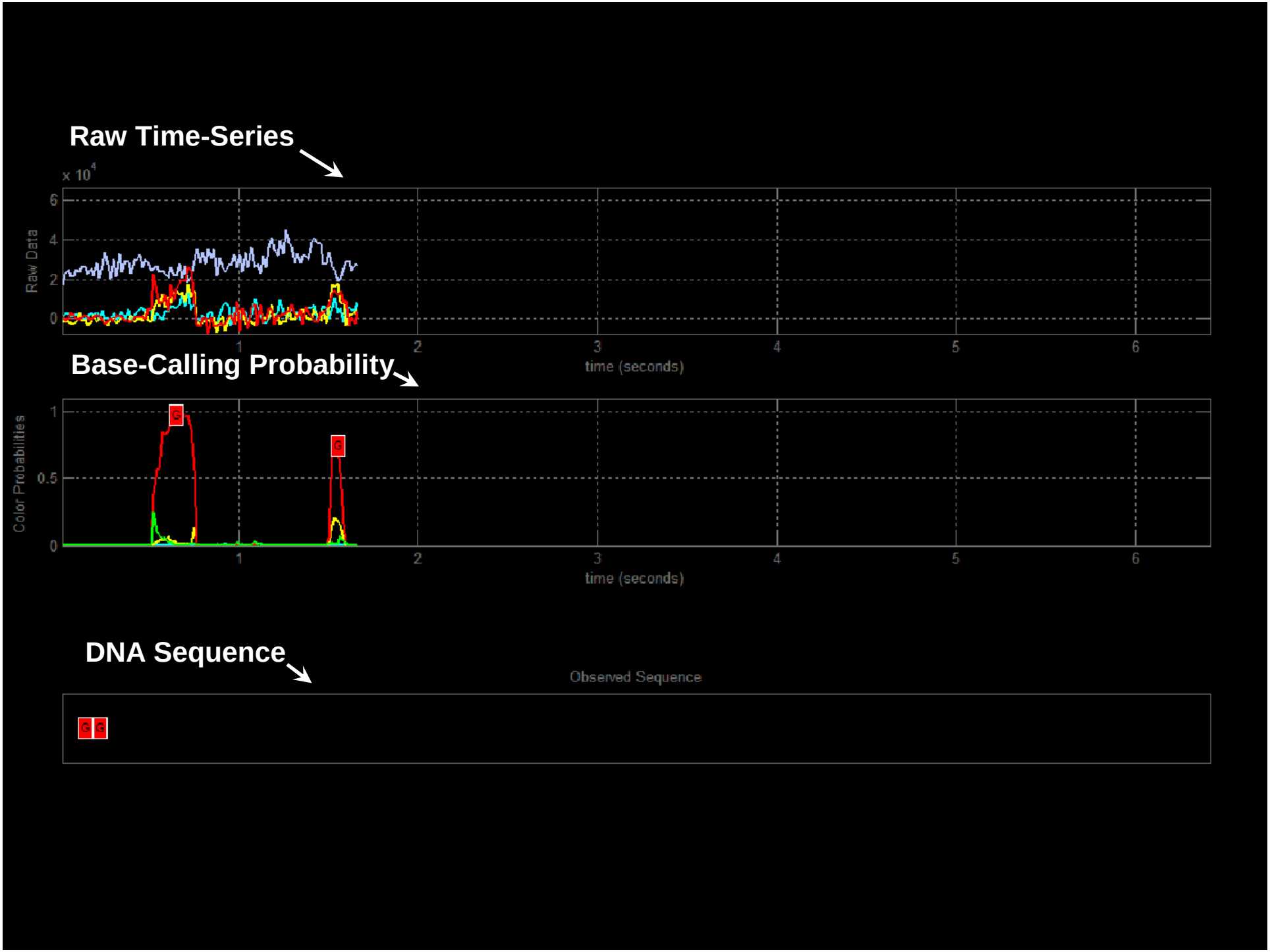
Add Molecular-Probes dyes, plus big-dye linking chemistry to dNTP's, yielding real-time FRET SM sequencing signals

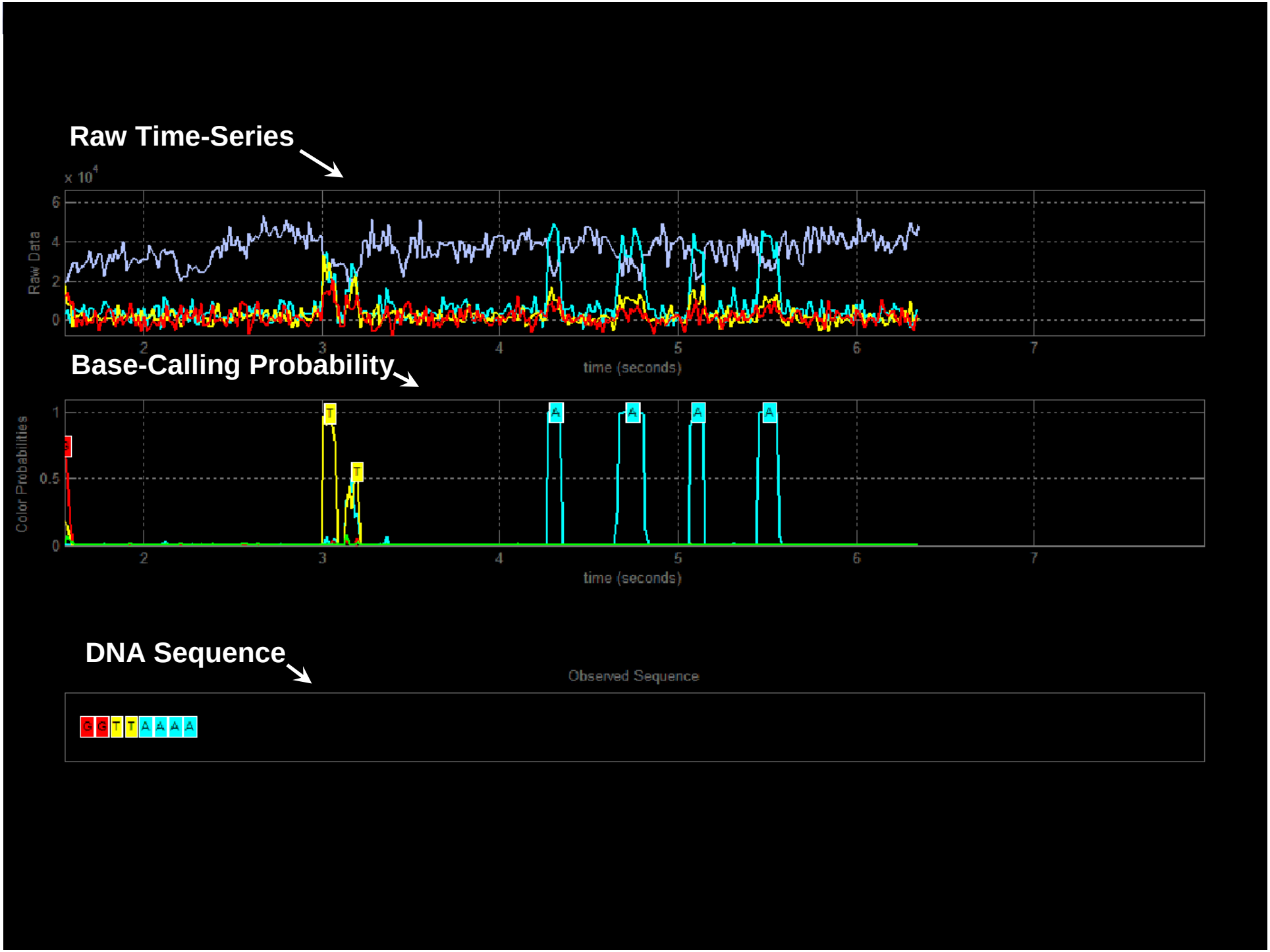
life technologies™

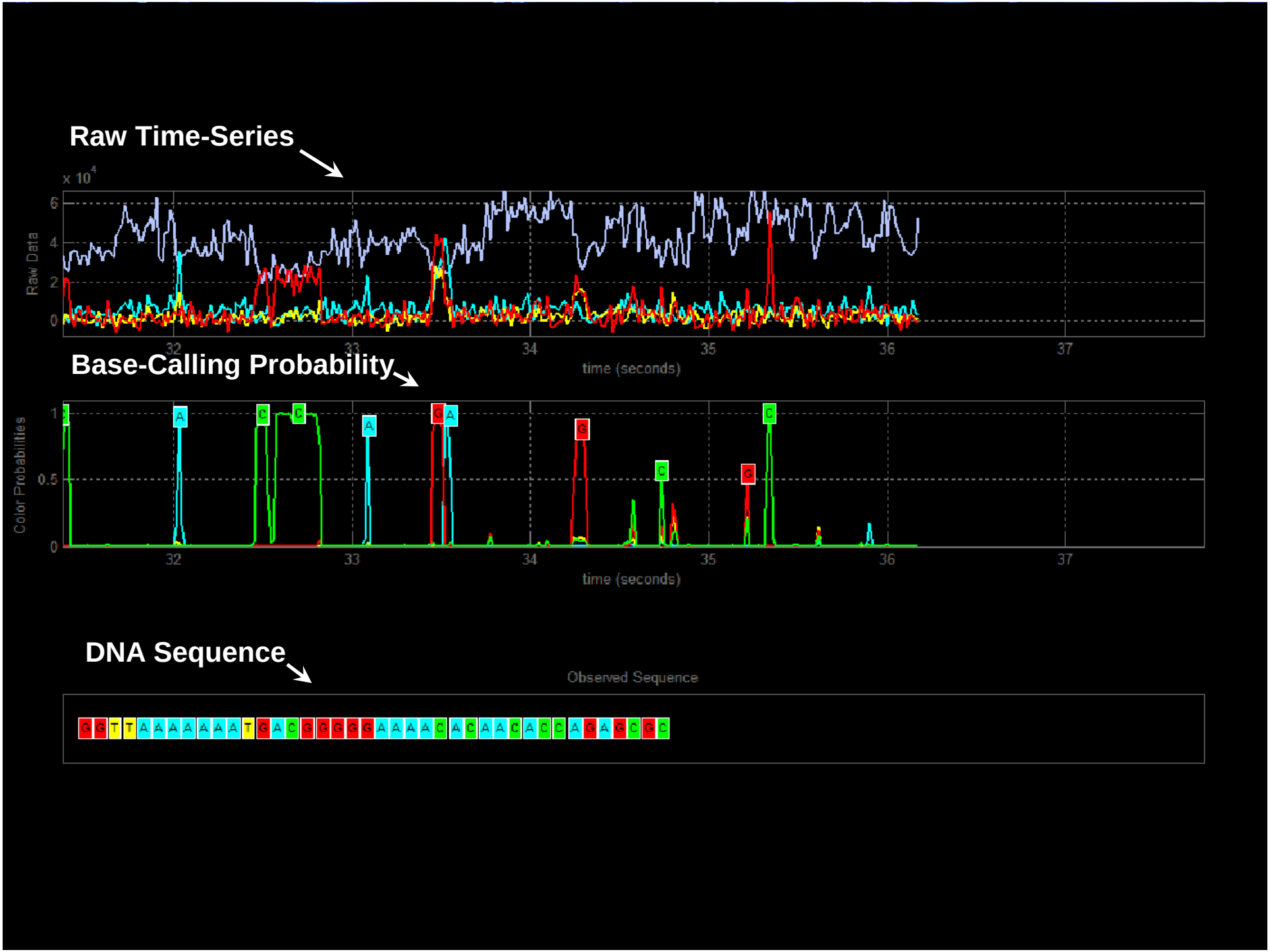
SMS FRET (Gen-3) Sequencing Complements (Not Competes) with SOLiD™ System (Gen-2)

Technology	Attributes	Performance
  Single molecule sequencing	• Real time detection	• Fast TIME TO RESULT • Long READ LENGTH
	• Single molecules	• Easy SAMPLE PREP • Less COVERAGE BIAS
   SOLiD™ System sequencing	• Closely packed beads • Synchronous detection	• High THROUGHPUT
	• 2-base encoding	• High ACCURACY

life technologies™


Raw Time-Series
x 10^4
Raw Data
time (seconds)
Base-Calling Probability
Color Probabilities
G
G
time (seconds)
DNA Sequence
Observed Sequence
C G


Raw Time-Series
x 10^4
Raw Data
time (seconds)
Base-Calling Probability
Color Probabilities
time (seconds)
DNA Sequence
Observed Sequence
G G T T A A A A


Raw Time-Series
x 10^4
Raw Data
time (seconds)
Base-Calling Probability
Color Probabilities
time (seconds)
DNA Sequence
Observed Sequence