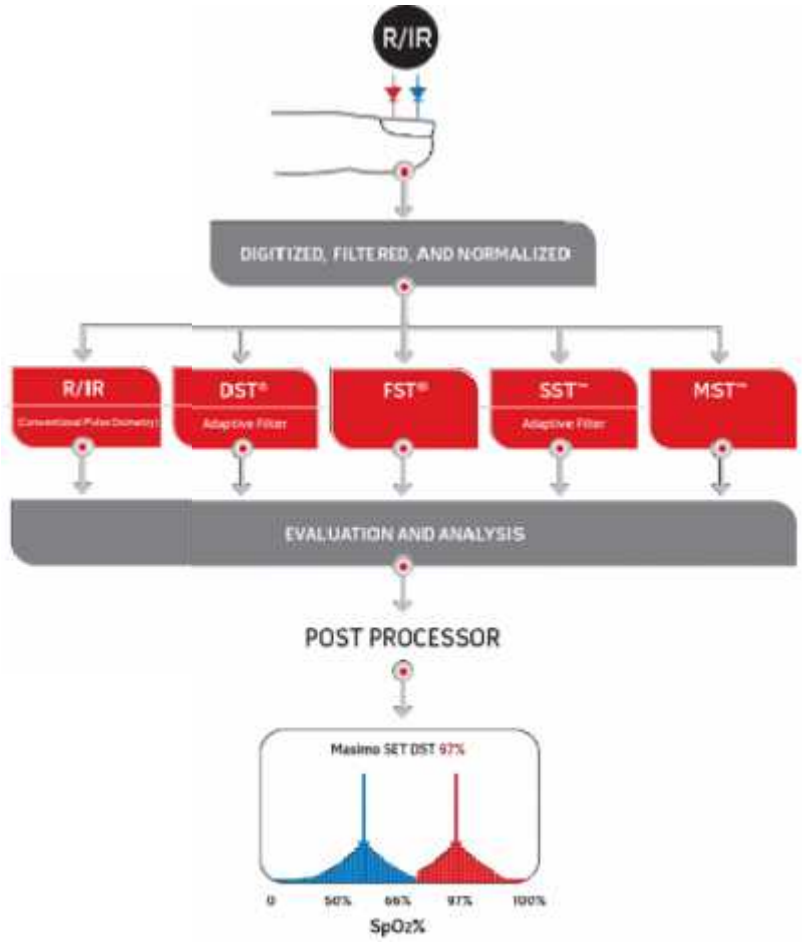
SIGNAL EXTRACTION TECHNOLOGY: WHERE "SOLVING THE UNSOLVABLE" STARTED

OVERCOMING THE LIMITATIONS OF CONVENTIONAL PULSE OXIMETRY

Since its inception, pulse oximetry was plagued by unreliability when it was needed most–during patient motion and low perfusion. The industry had given up and considered the problem "unsolvable." Clinicians were forced to live with the results–excessive false alarms, delayed notification due to long averaging times, inaccurate data, and an inability to obtain data on the most critical patients

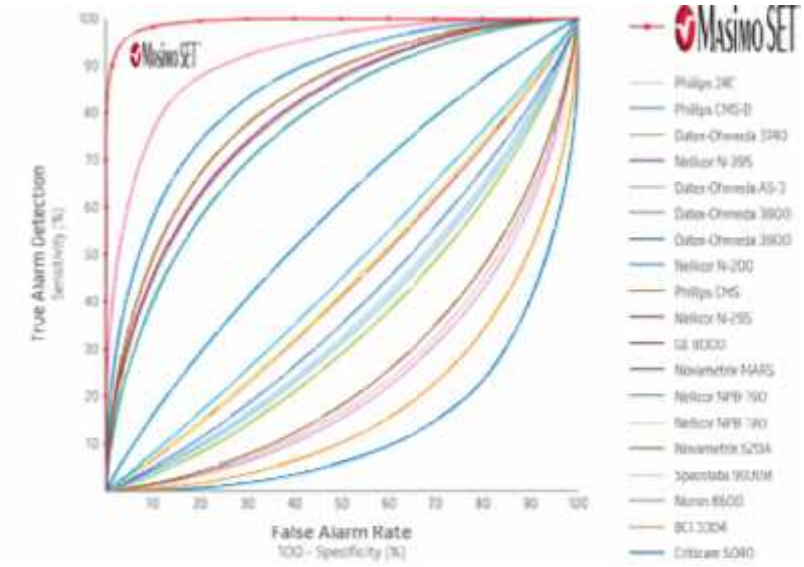
After six years of dedicated and focused research and development, Masimo SET® debuted in 1995 at the Society for Technology in Anesthesia and won the prestigious Excellence in Technology Innovation Award. Thereafter, skeptical clinicians around the world sought actively to compare Masimo SET® to the best pulse oximetry technologies other companies had to offer. But in study after study, the breakthrough signal processing of Masimo SET® consistently resulted in significantly fewer false alarms and far superior true alarm detection.

Signal Extraction Technology, or Masimo SET®, assumes that both the arterial and venous blood can move and uses parallel signal processing engines–DST®, FST®, SST™, and MST™–to separate the arterial signal from sources of noise (including the venous signal) to measure SpO2 and pulse rate accurately, even during motion.



Conventional pulse oximetry uses the standard red over infrared algorithm to provide SpO2, while Masimo SET® uses that conventional algorithm but has added four other algorithms that all run in parallel. These algorithms allow the distinction between arterial and venous signal during motion and low perfusion by identifying and isolating the non-arterial and venous noise SpO2 (left peak shown in blue) from the true arterial SpO2 components (right peak shown in red) in the signal. The plot peak on the right is then chosen as the SpO2 value, since the physiologically higher SpO2 value within the measuring site will be arterial signal.

Performance During Motion and Low Perfusion



A total of 70 volunteers were tested with motorized hand motions. Each motion was studied during both room air breathing and hypoxemia. Pulse oximeters on the stationary hand were used to provide control measurements for comparison. Sensitivity was defined as ability to detect a true SpO2<90%. Specificity was defined as the ability to detect a true SpO2 >90%.

Masimo rainbow® Pulse CO-Oximetry™

Masimo rainbow® is a noninvasive monitoring platform enabling the assessment of multiple blood constituents and physiologic parameters that previously required invasive or complicated procedures, in addition to providing Masimo SET® Measure through Motion and Low Perfusion™ pulse oximetry.

Masimo rainbow® Measurements:

- Total Hemoglobin (SpHb®)
- Oxygen Content (SpOC™)
- Carboxyhemoglobin (SpCO®)
- Methemoglobin (SpMet®)
- Plus: Masimo SET measurements of Oxygen Saturation (SpO_2), Pulse Rate (PR), Perfusion Index (PI), and Pleth Variability Index (PVI®)