

## Advanced Acquisition Modes for the Xevo MRT P10 Mass Spectrometer

Expand your analytical depth and workflow flexibility with advanced acquisition modes

### INTRODUCTION

The Waters Xevo™ MRT P10 Mass Spectrometer deepens analytical capabilities with class-leading MS/MS sensitivity and advanced acquisition modes, including the new SONAR™ Pulse Acquisition Mode and mixed hybrid acquisition mode. These capabilities provide greater analytical flexibility and deeper biological insight from every sample. In this product solution, we take a closer look at how these innovative acquisition approaches expand analytical depth and enable more flexible discovery-driven and targeted workflows across modern omics applications.



Figure 1. The Waters Xevo MRT P10 Mass Spectrometer.

### XEVO MRT P10 MASS SPECTROMETER

- Unmatched sensitivity for deeper discovery with a 20x MS/MS sensitivity boost\*
- Including wideband enhanced duty cycle (WB EDC) for unmatched performance
- Ultrafast acquisition for maximum information
  - 100 Hz MS data acquisition
  - 200 Hz MS/MS data acquisition (MS/MS and DDA)
- Expanded analytical depth and workflow flexibility across multiomics
  - Improved decision making DDA
  - SONAR Pulse Acquisition Mode for enhanced depth of coverage
  - Mixed mode integrating ToF MRM for flexible quantitative workflows

### Sensitivity Revolution



20x MS/MS sensitivity boost ( $m/z$  50–1200)



Improved MS sensitivity for better detection



Wideband enhanced duty cycle (WB EDC) for unmatched performance

### Enhanced Speed



100 Hz MS data acquisition

### Acquisition Modes



**Advanced DDA algorithm**  
New, intelligently, optimized DDA acquisition



**SONAR Pulse Acquisition Mode**  
For enhanced depth of coverage



**Hybrid acquisition mode**  
Integrating ToF MRM with MS<sup>E</sup> for flexible qualitative and quantitative workflows



200 Hz MS/MS acquisition (MS/MS and DDA)

\*compared to the Xevo MRT MS

## WHAT IS IT AND WHY IS IT IMPORTANT?

### SONAR Pulse Acquisition Mode

1. Identifies and quantifies analytes with a high degree of precision, combining both sensitivity and selectivity within a single mode of acquisition
2. Increases depth of analysis, capturing highly specific MS/MS data on critical lower-level analytes
3. A wide range of third-party informatics tools are compatible with sequential mass window DIA methods assisting with adoption and transfer of methodologies.

### Mixed mode data acquisition

1. Simultaneous acquisition of multiple scan types within a single experiment, enabling both quantitative and qualitative experiments. This approach combines both a targeted and untargeted analysis in one acquisition
2. Comprehensive and seamless workflow for precise quantification using the waters\_connect Software MS Quan Application alongside nontargeted screening within the UNIFI™ Application to deliver a fully integrated solution
3. Achieve full characterization on one MS platform to maximize information and save time all from a single injection
4. The fast-scanning speed and exceptional sensitivity of the Xevo MRT P10 Mass Spectrometer enables the collection of multiple target transitions without compromise to the DIA functions or Tof MRM (time-of flight multiple reaction monitoring) performance, making it ideal for high-sensitivity quantification and in-depth discovery experiments.

## WHAT IS SONAR PULSE AND HOW DOES IT WORK?

SONAR Pulse is a DIA mode that identifies and quantifies analytes with a high degree of precision, combining both sensitivity and selectivity within a single mode of acquisition.

- To improve MS/MS selectivity compared to conventional DIA experiments, the SONAR Pulse Acquisition Mode rapidly steps a specified quadrupole isolation window over a defined mass range.
- SONAR Pulse Acquisition Mode reduces the risk of missing critical lower-level analytes that might otherwise be missed from typical DDA experiments, while retaining highly specific MS/MS fragmentation information.
- The Xevo MRT P10 Mass Spectrometer employs WB EDC for increased sensitivity across a broad MS/MS range at high acquisition speeds of up to 200 Hz.

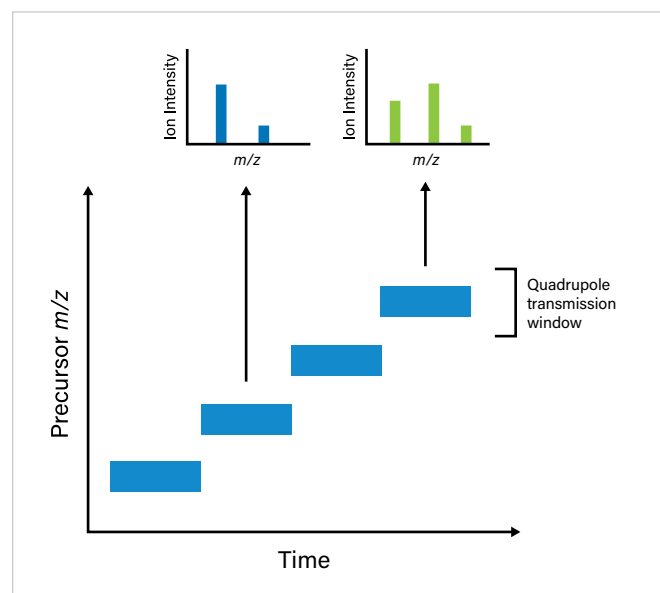


Figure 2. The precursor  $m/z$  range of interest is profiled using a resolving quadrupole further increasing the selectivity for coeluting components. Fragment ions from different precursor  $m/z$  ranges can then be recorded separately and aligned with increased confidence.

SONAR Pulse Acquisition Mode is scalable and flexible. It offers the following options:

- $m/z$  range: Precursor and product ion scan up to  $m/z$  2000
- Quadrupole windows: 2, 5, 10, and 25 Da
- MS/MS speed: 20, 50, 100, 150, and 200 Hz
- Compatible with WB EDC

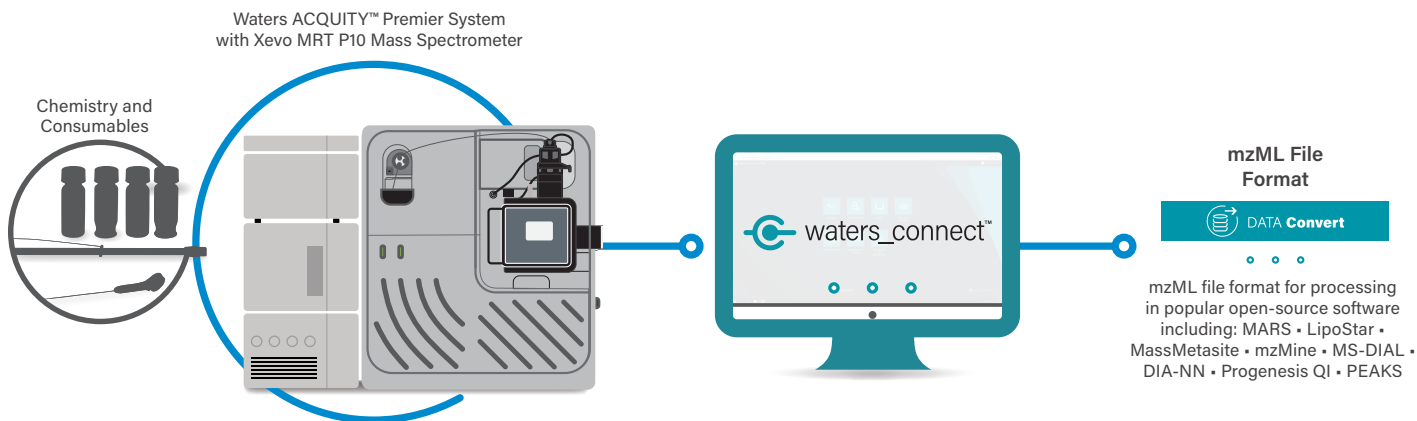


Figure 3. Multiomics Workflow with SONAR Pulse Acquisition Mode.

### WHAT IS MIXED MODE AND HOW DOES IT WORK?

Mixed mode is a hybrid workflow that combines targeted and untargeted strategies within one injection.

- The fast-scanning speed and exceptional sensitivity of the Xevo MRT P10 Mass Spectrometer enables the collection of multiple ToF MRM transitions without compromising the performance of simultaneous DIA (MS<sup>F</sup>), making it ideal for in-depth quantification with discovery or screening experiments.
- High-end tandem quadrupole instrument technology allows fast MS1 selection for targeted workflows.
- Mixed mode gives you a flexible approach with the ability to quantify results in the waters\_connect Software MS Quan Application.
- It enables the export of discovery, full-scan DIA data to industry-standard workflows.
- ToF MRM combines with Enhanced Duty Cycle (EDC) functionality, maximizing sensitivity for specific *m/z* ranges.

### How do you set up Mixed mode acquisition set-up?

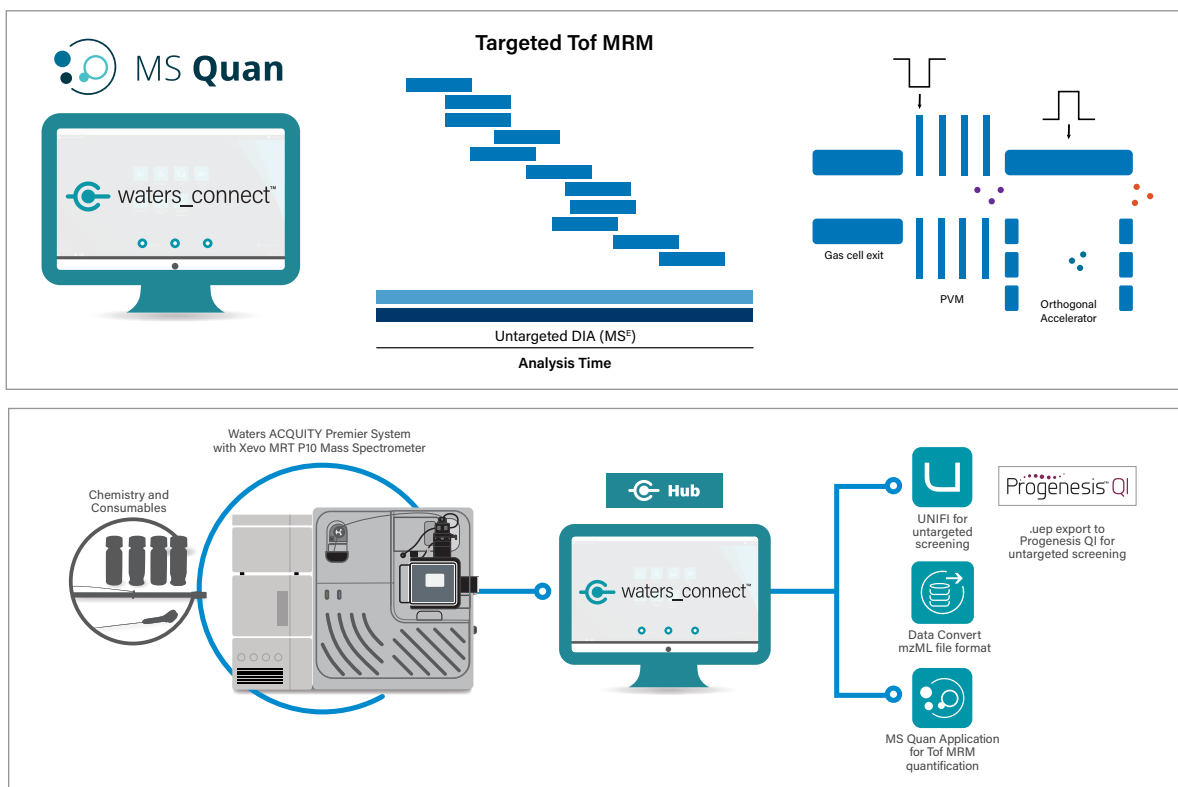


Figure 4. Mixed mode data acquisition and workflow.

## BENEFITS OF SONAR PULSE DATA ACQUISITION



### Time to result

High-coverage and high-quality MS/MS spectra, without method development



### Single injection insights

Quantitation and identifications in a single injection



### High quality MS/MS data

The quadrupole steps over a selected mass range increasing the selectivity



### Ease of data interpretation

Reduced spectral complexity vs. conventional DIA



### Flexible informatics

Data export to mzML for flexible data processing across multiomics applications

## BENEFITS OF MIXED MODE DATA ACQUISITION



### Integrated Quan-Qual

Unified quantification (ToF MRM) and discovery ( $MS^E$ ) on a single MS platform



### TQ-level performance

Exceptional sensitivity and linearity using ToF MRM with EDC



### Single injection insight

High-speed ToF MRM enables multiple quantification channels from a single injection without compromising DIA performance



### All-in-one analysis

Comprehensive screening and discovery of unknowns



### Ease of integration

Seamless data processing aligned with TQ workflows (waters\_connect Software MS Quan Application)

## CONCLUSION

These advanced acquisition strategies broaden analytical capabilities and enable greater flexibility across a wide range of applications by supporting both discovery-driven and targeted omics workflows. The SONAR Pulse Acquisition Mode delivers high-coverage, high-sensitivity MS/MS data, enabling deep molecular coverage from complex samples through enhanced selectivity and confident identification of low-abundance components. In contrast, Mixed mode enables quantitative-qualitative (Quan-Qual) workflows by combining high-sensitivity targeted quantification with simultaneous untargeted screening in a single injection. Together, these modes leverage exceptional MS/MS sensitivity and ultrafast acquisition speed to support integrated multiomic strategies, from deep discovery through high-confidence, targeted measurement.

### Reference Links:

- [DIA-NN](#)
- [PEAKS](#)
- [Mzmine](#)
- [MS-Dial](#)
- [MARS, Lipostar2 and MMS](#)

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