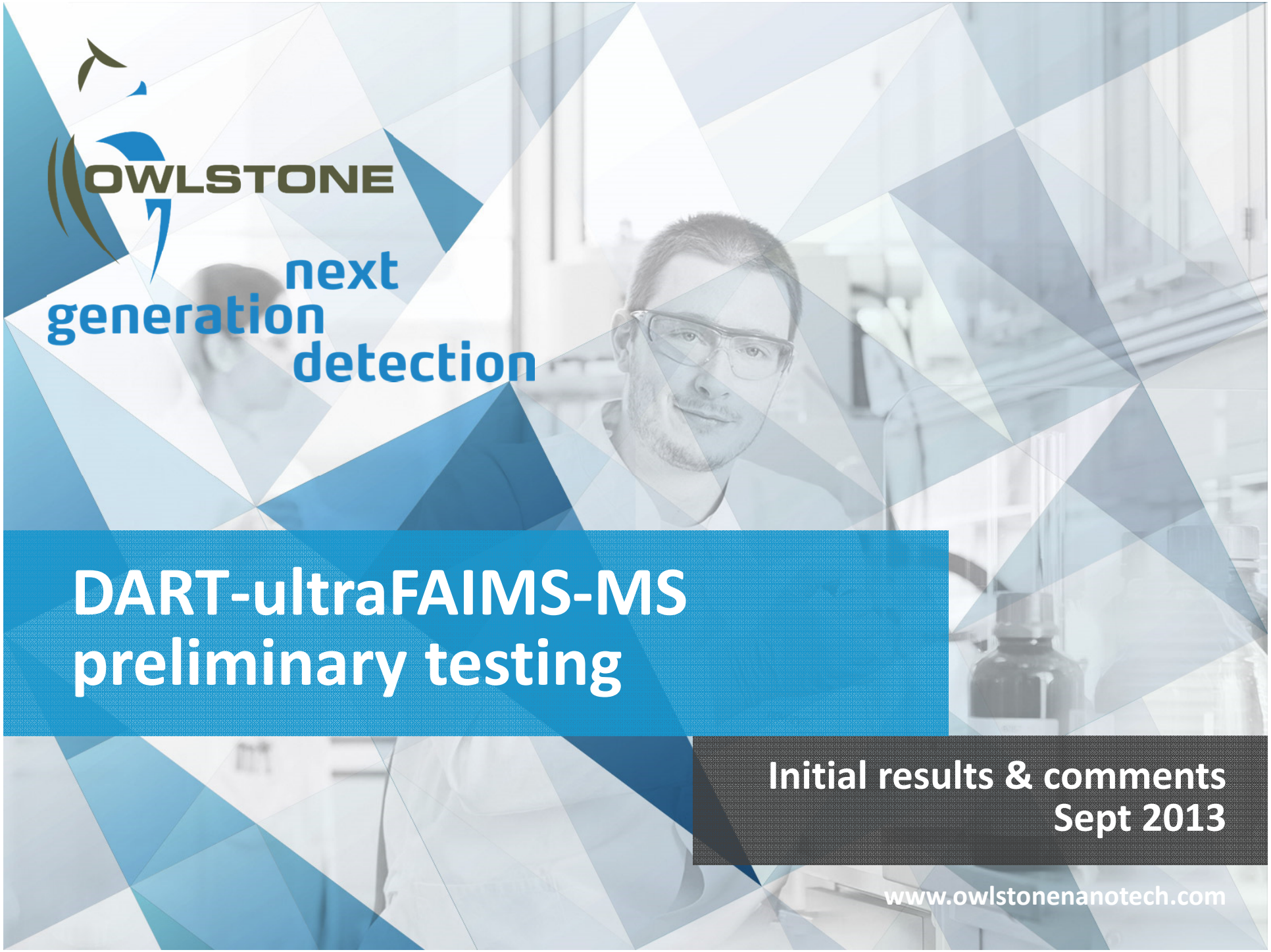


DART-ultraFAIMS-MS preliminary testing

Initial results & comments
Sept 2013

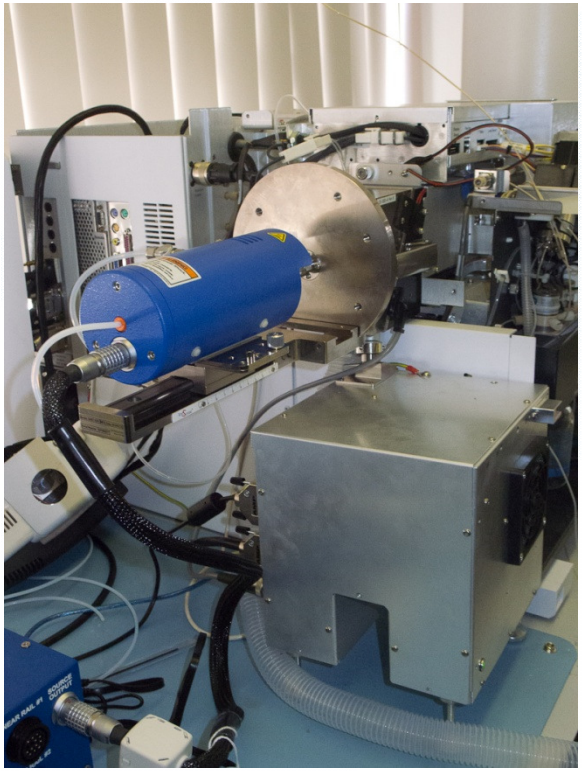
www.owlstonenanotech.com

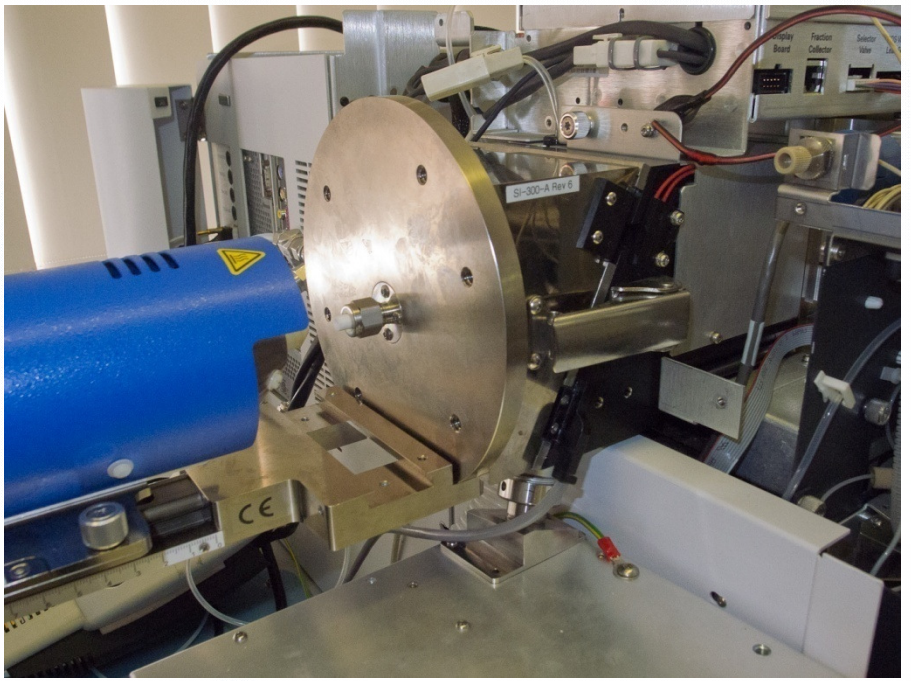
UltraFAIMS with DART

- Many mass spec users have highlighted the potential for using FAIMS pre-separation with direct ionisation sources as a gas-phase analog to the LC pre-separation used with electrospray sources
- The ultraFAIMS pre-separation should reduce general chemical noise, and may also allow selective transmission of isomers and isobars
- We recently coupled our ultraFAIMS-A1 system with the IonSense DART source for proof-of-principle testing, on an Agilent 6230 TOF
- This confirmed that the two systems can be coupled without the need for modifications to either instrument
- Photos of the set-up and results from initial test samples are shown on the following slides.

UltraFAIMS with DART

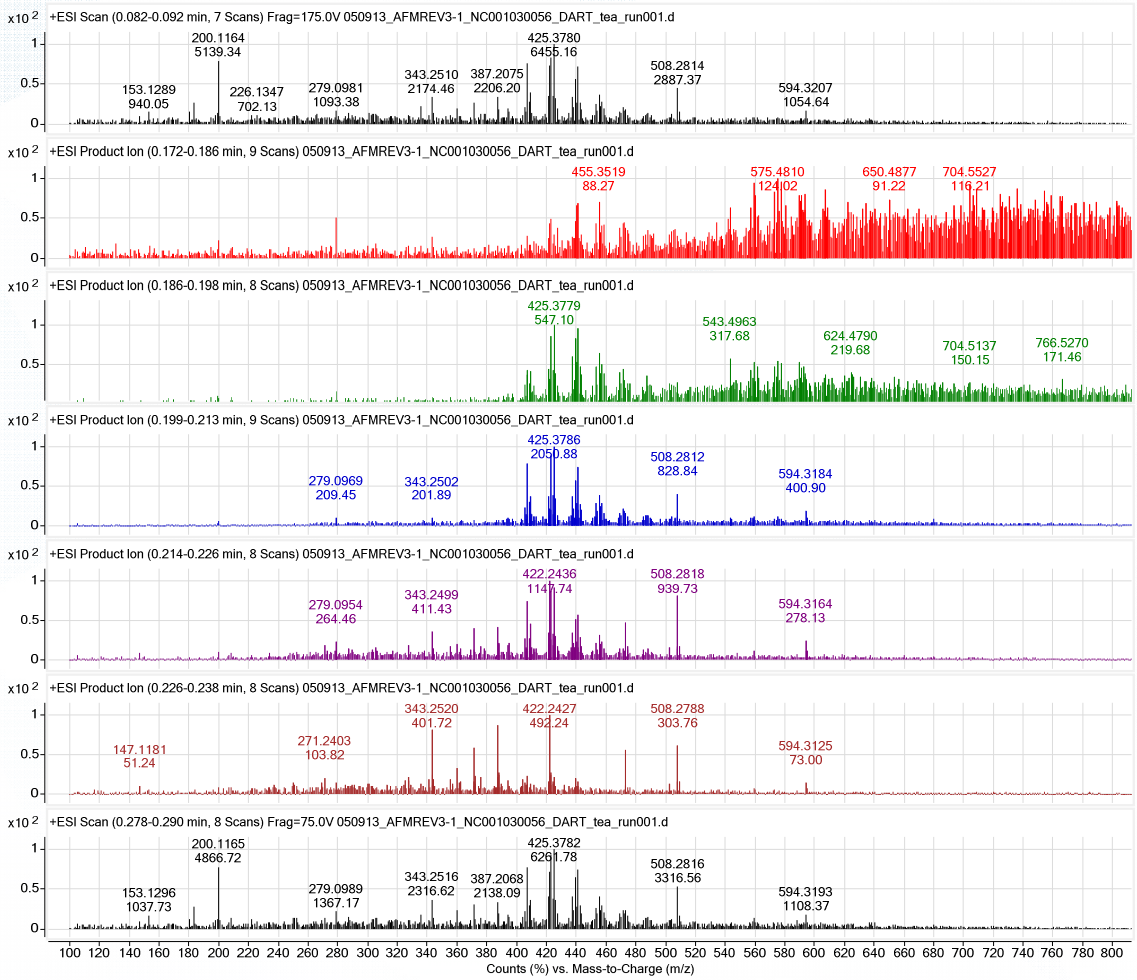
- UltraFAIMS interfaces are designed to avoid the need for modifications to the ionisation source – this means that any source that fits the standard mounting (on Agilent or Thermo mass spectrometers) can be coupled with the UltraFAIMS system – setting up here took a matter of minutes





Example results 1: Green tea in methanol

The black plots show spectrum before and after FAIMS sweep, the coloured plots show (average) spectrum with FAIMS active at 260Td DF, at a sequence of different CF settings. At each setpoint, different subsets of ions are transmitted. The duration of the sweep was 10 secs.



Immediately before start of sweep

CF 1.0-1.4Td

CF 1.4-1.8Td

CF 1.8-2.2Td

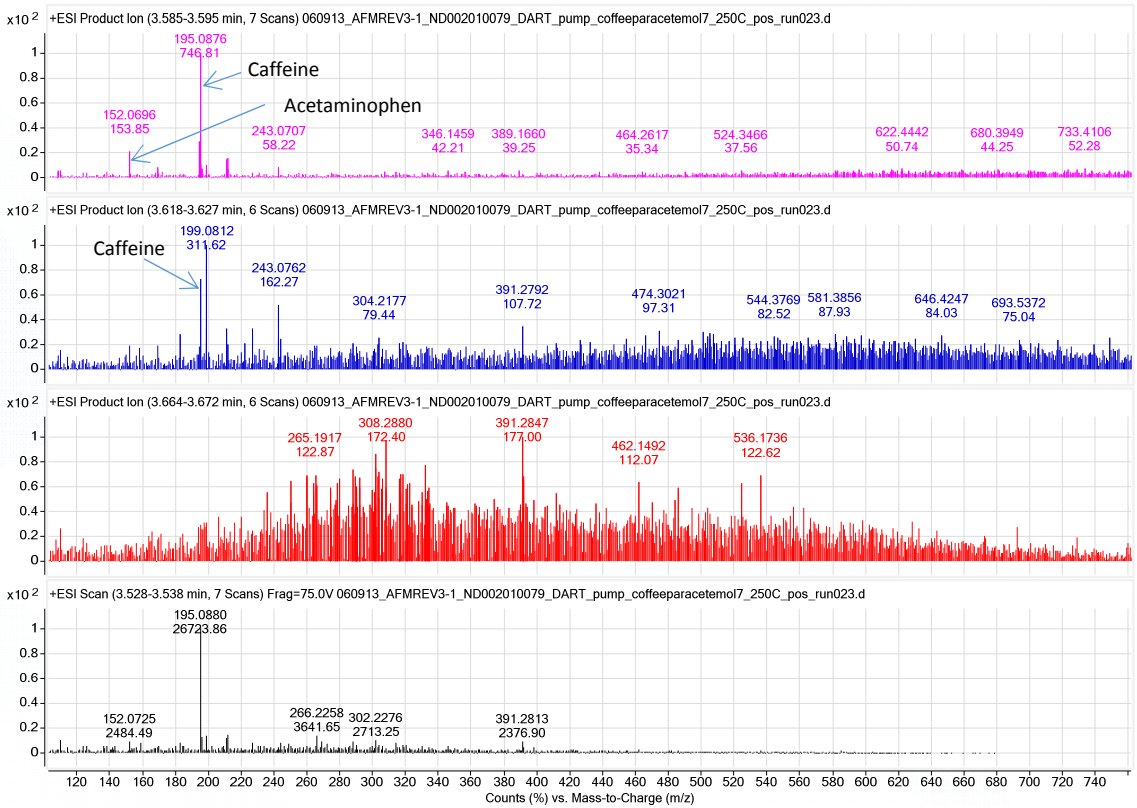
CF 2.2-2.6Td

CF 2.6-3.0Td

Immediately following end of FAIMS sweep

Example results 2: Coffee/acetaminophen mix

The black plot shows the spectrum just before the FAIMS sweep, the coloured plots show (average) spectrum with FAIMS active at 260Td DF, at a sequence of different CF settings. At each setpoint, different subsets of ions are transmitted. The duration of the sweep was 10 secs.



CF 1.3-1.4Td

CF 1.6-1.7Td

CF 2.0-2.1Td

Immediately before FAIMS sweep

Summary

- Test results are very preliminary – we only had 1 day for testing, and on this occasion, could only run the DART source with nitrogen rather than helium, which made the spectra harder to interpret
- Coupling the two systems together is straightforward, where both DART and ultraFAIMS interfaces are available for a given mass spectrometer
- UltraFAIMS scan speed is fast enough to provide separation on DART timescales
- The approach shows potential to enable detection of more low abundance analytes through improvements in signal to noise, though more work is needed to quantify the improvement
- Further testing would be needed to develop methods to separate specific problematic isomeric interferences – this is better done initially with standards
- Owlstone is keen to support users interested in exploring DART-ultraFAIMS-MS applications further – please contact us to discuss

THANK YOU

FOR YOUR ATTENTION!

FEEL FREE TO CONTACT US:

Danielle Toutoungi
danielle.toutoungi@owlstone.co.uk

Billy Boyle
billy.boyle@owlstone.co.uk

www.ultrafaims.com