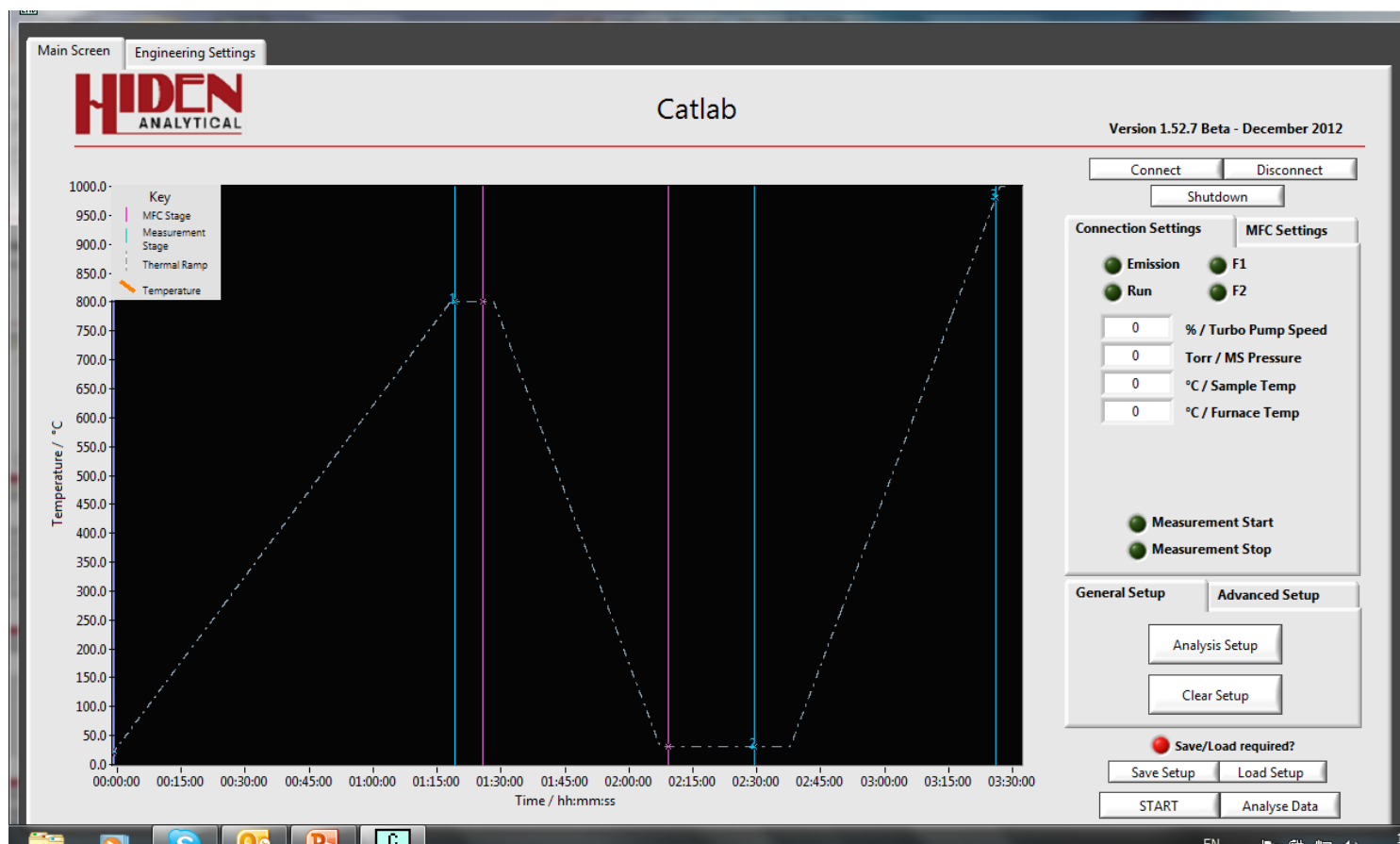


Hidden CATLAB Software

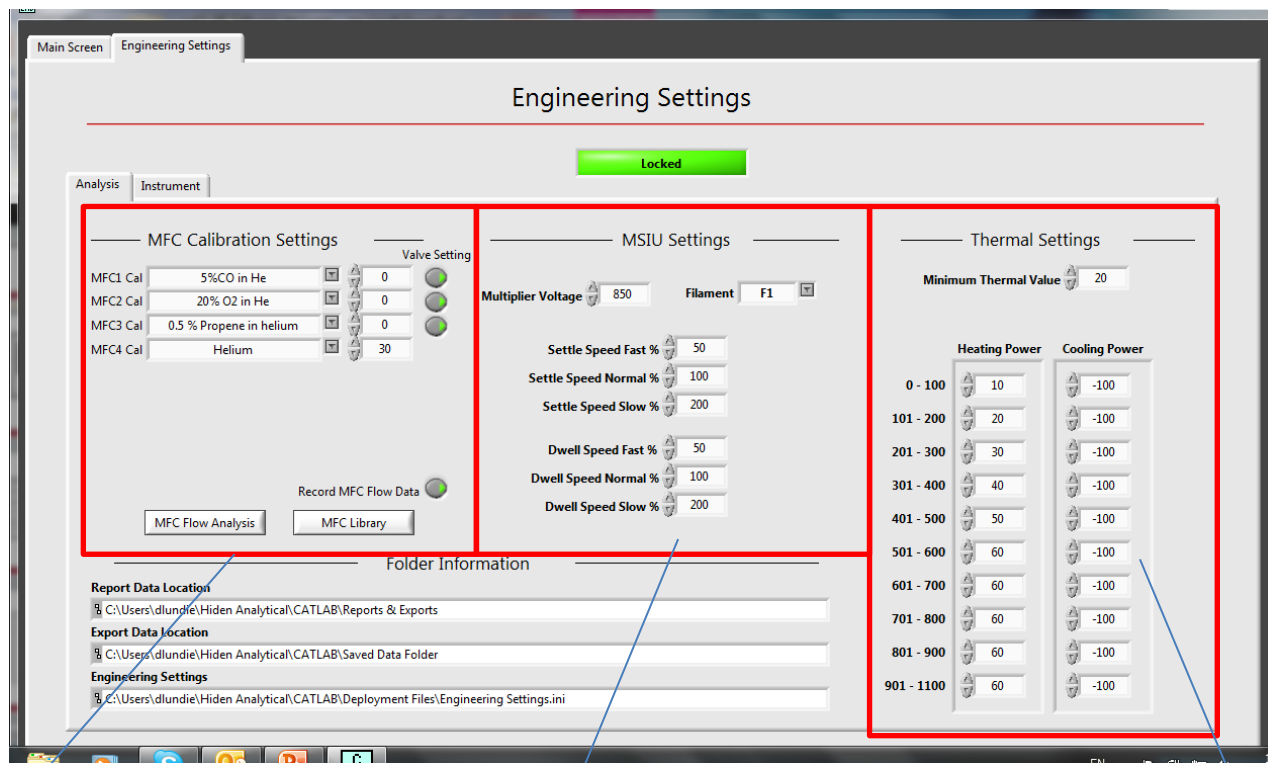
Complete Control of Experimental
Parameters

CATLAB Control Software



- Control of MS/Temperature/Gas Flows in one software package.

Hardware Control Parameters

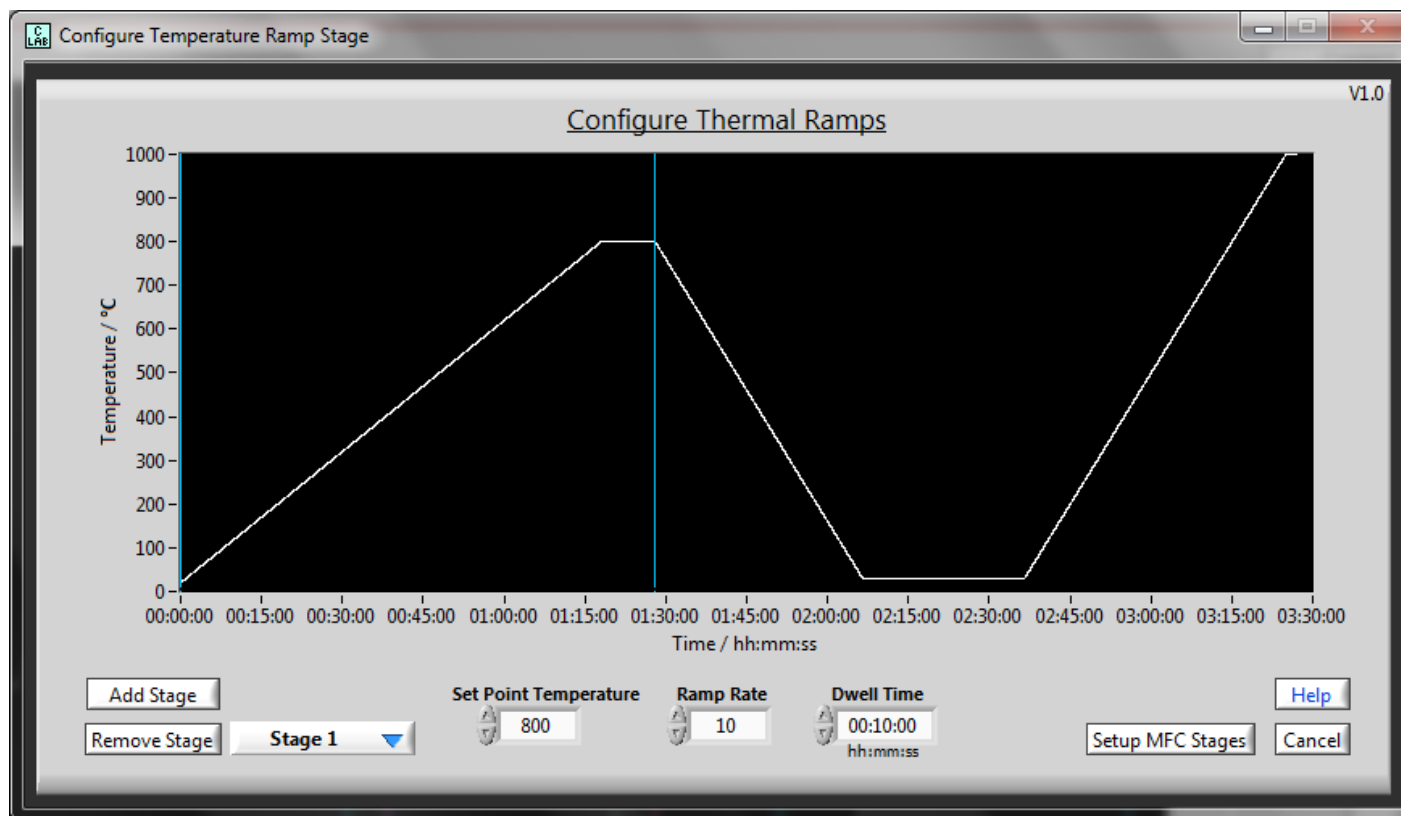


Control and calibration of
MFCs for different gases

Mass Spectrometer Control

Furnace Control

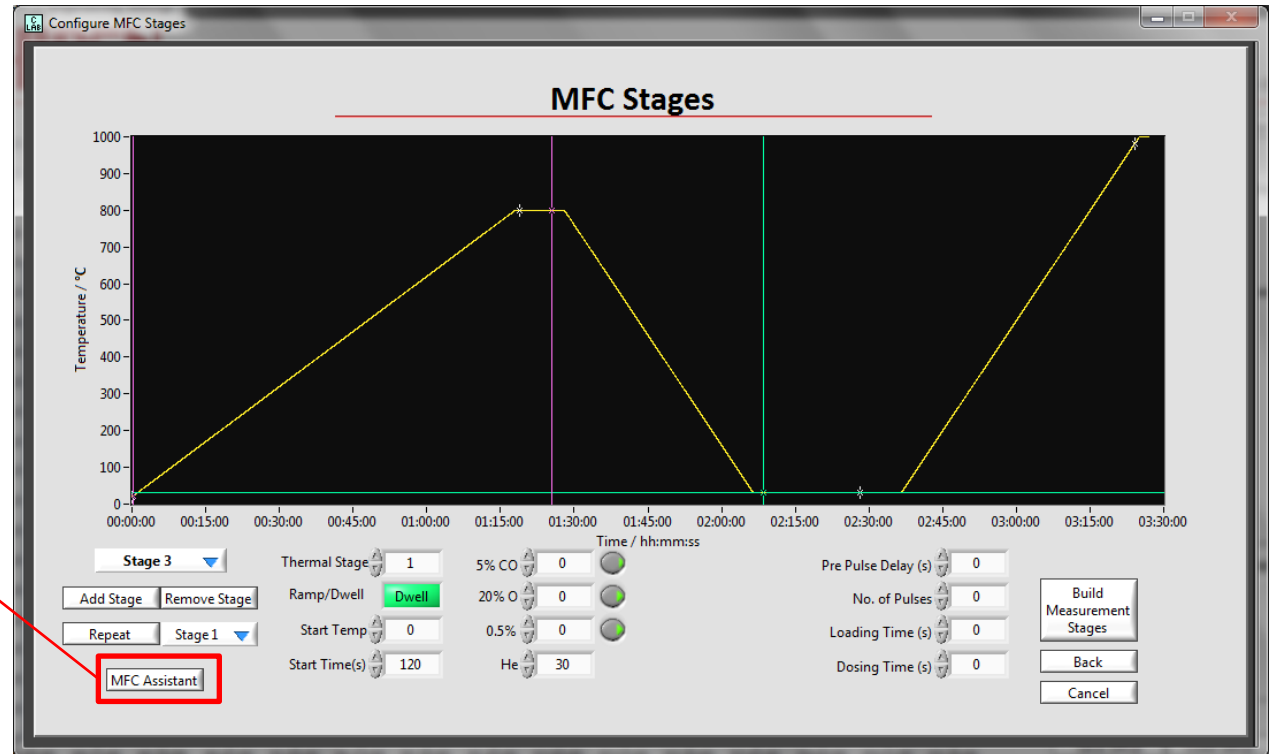
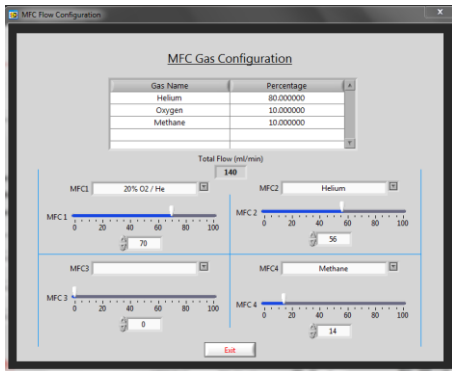
Experimental Setup



- Stage 1: Configure the temperature profile of the experiment
 - set ramp rate, set point and dwell time for each stage.

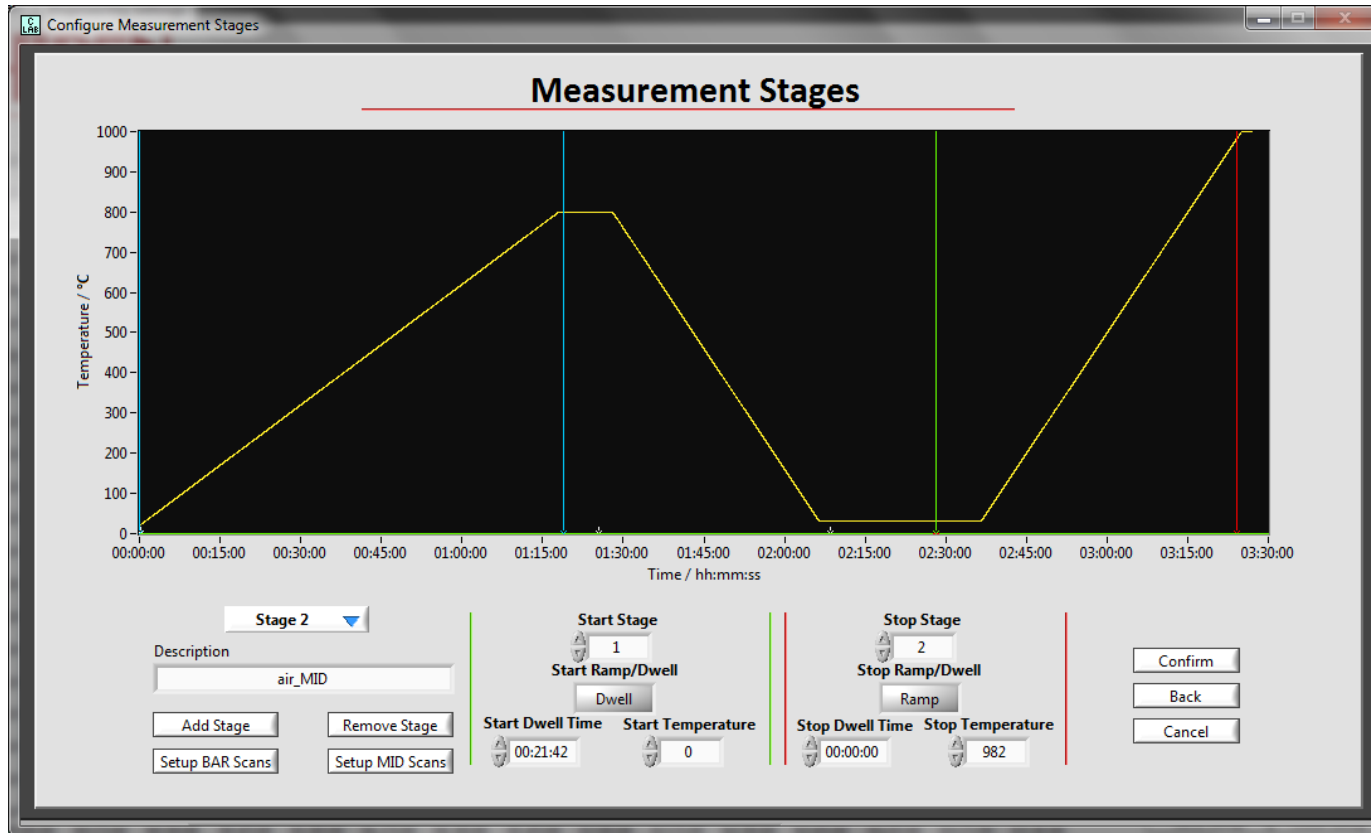
Experimental Setup

MFC Assistant



- Stage 2: Configure gas flows/Pulses for each stage of the experiment
 - MFC Assistant to help calculate percentage composition of each component in gas mixture for the selected flow

Experimental Setup



- Stage 3: Add measurement stages. Stages are triggered by time or temperature depending where on the temperature profile the start/stop is placed.
 - Different MS analysis types can be configured for each stage of the experiment.

MS Control - BAR Mode

The screenshot displays the 'BAR Scan Setup' window, which is used for configuring mass spectrometry scans. The window is titled 'BAR Scan Setup' and contains a section titled 'Bar Scan Settings'. This section is divided into three subscan configurations: 'Bar Subscan 1', 'Bar Subscan 2', and 'Bar Subscan 3'. Each subscan configuration includes a series of controls: a status indicator (green 'Enabled' button), a 'Start Mass' field with a spinner, a 'Stop Mass' field with a spinner, an 'Increment' field with a spinner, a 'Detector' dropdown menu (set to 'SEM'), 'Aurorange High' and 'Aurorange Low' fields with spinners, a 'Start Range' field with a spinner, an 'AutoZero' dropdown menu (set to 'ON'), 'Electron Energy' and 'Emission Current' fields with spinners, a 'Settle Speeds' dropdown menu (set to 'Normal'), and a 'Dwell Time' dropdown menu (set to 'Normal'). At the bottom of the window, there are three buttons: 'Save', 'Load', and 'Exit'.

Subscan	Status	Start Mass	Stop Mass	Increment	Detector	Aurorange High	Aurorange Low	Start Range	AutoZero	Electron Energy	Emission Current	Settle Speeds	Dwell Time
Bar Subscan 1	Enabled	1	30	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal
Bar Subscan 2	Enabled	35	50	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal
Bar Subscan 3	Enabled	100	200	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal

- Multiple Bar scans can be configured in 3 subscan sections for optimised sampling of unknowns.
- Ion source control for each subscan.

MS Control – MID Mode

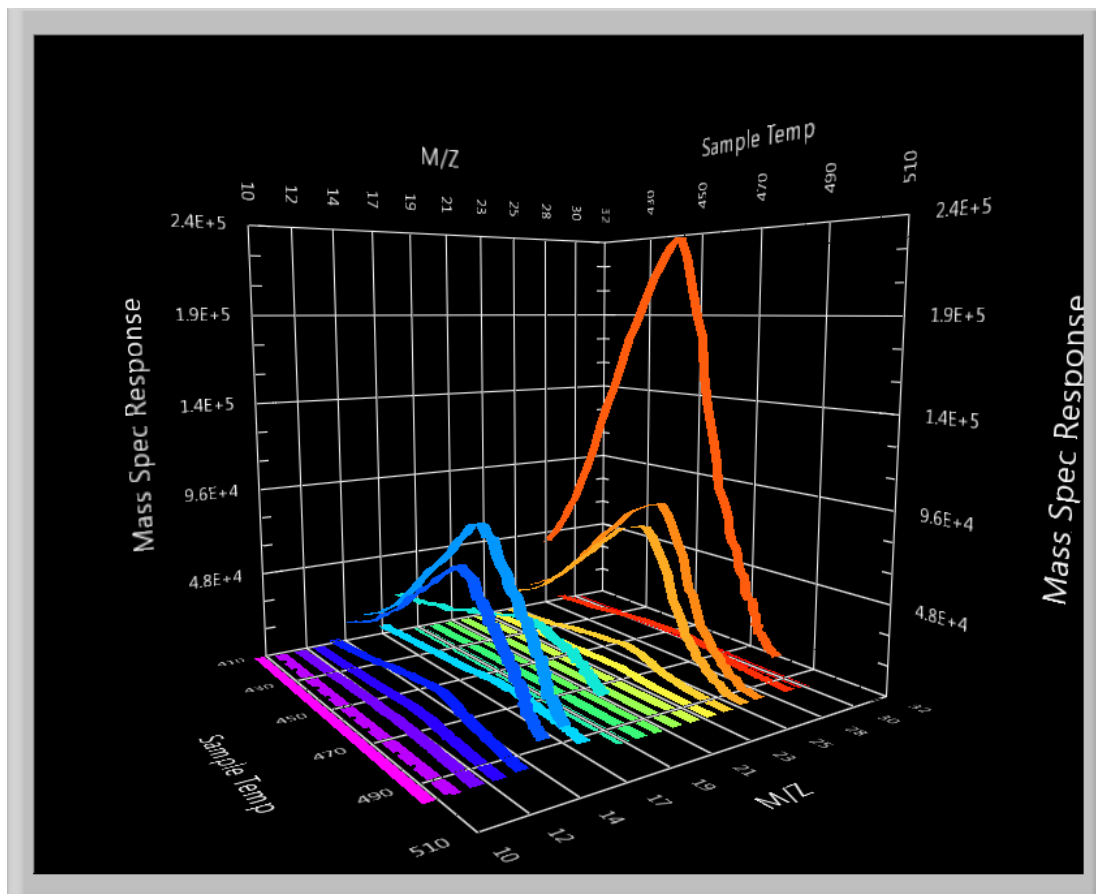
MID Setup

Gas	1	2	3	4	5	6	7	8	9	10
Gas 1 Argon	40 999	20 107	36 3	38 1	0 0	0 0	0 0	0 0	0 0	0 0
Gas 2 Hydrogen	2 999	1 100	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Gas 3 Water	18 999	17 230	16 11	2 7	20 3	19 1	0 0	0 0	0 0	0 0
Gas 4 Oxygen	32 999	16 114	34 4	33 1	0 0	0 0	0 0	0 0	0 0	0 0
Gas 5	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Gas 6	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Gas 7	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Gas 8	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0

Page 2 Save Load Show Advanced Settings Show Limits Exit

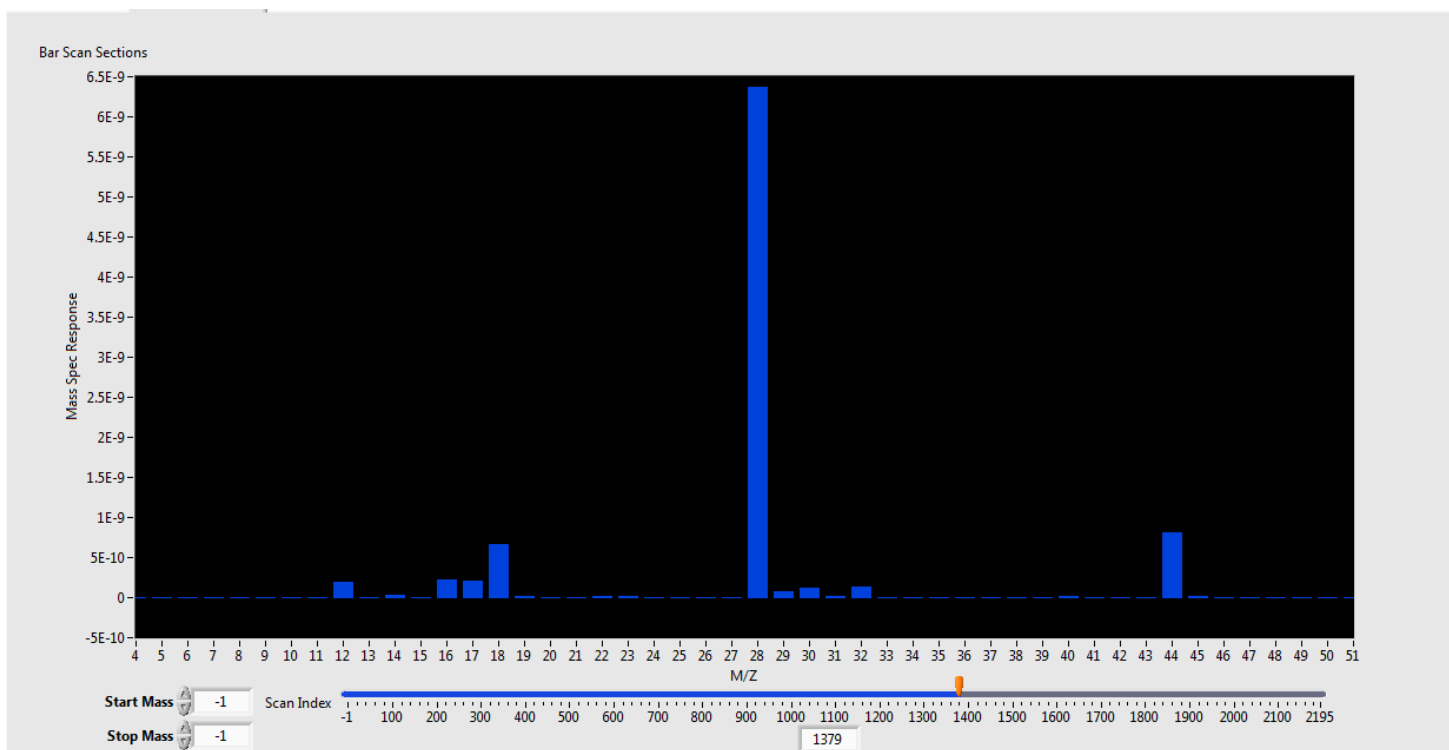
- MID Scan setup for known species.
- Automatic overlap removal.
- Includes library of most common gases.
- Ion source control for each species – preferential ionisation of some overlapping gases.

MS Display – 3D BAR



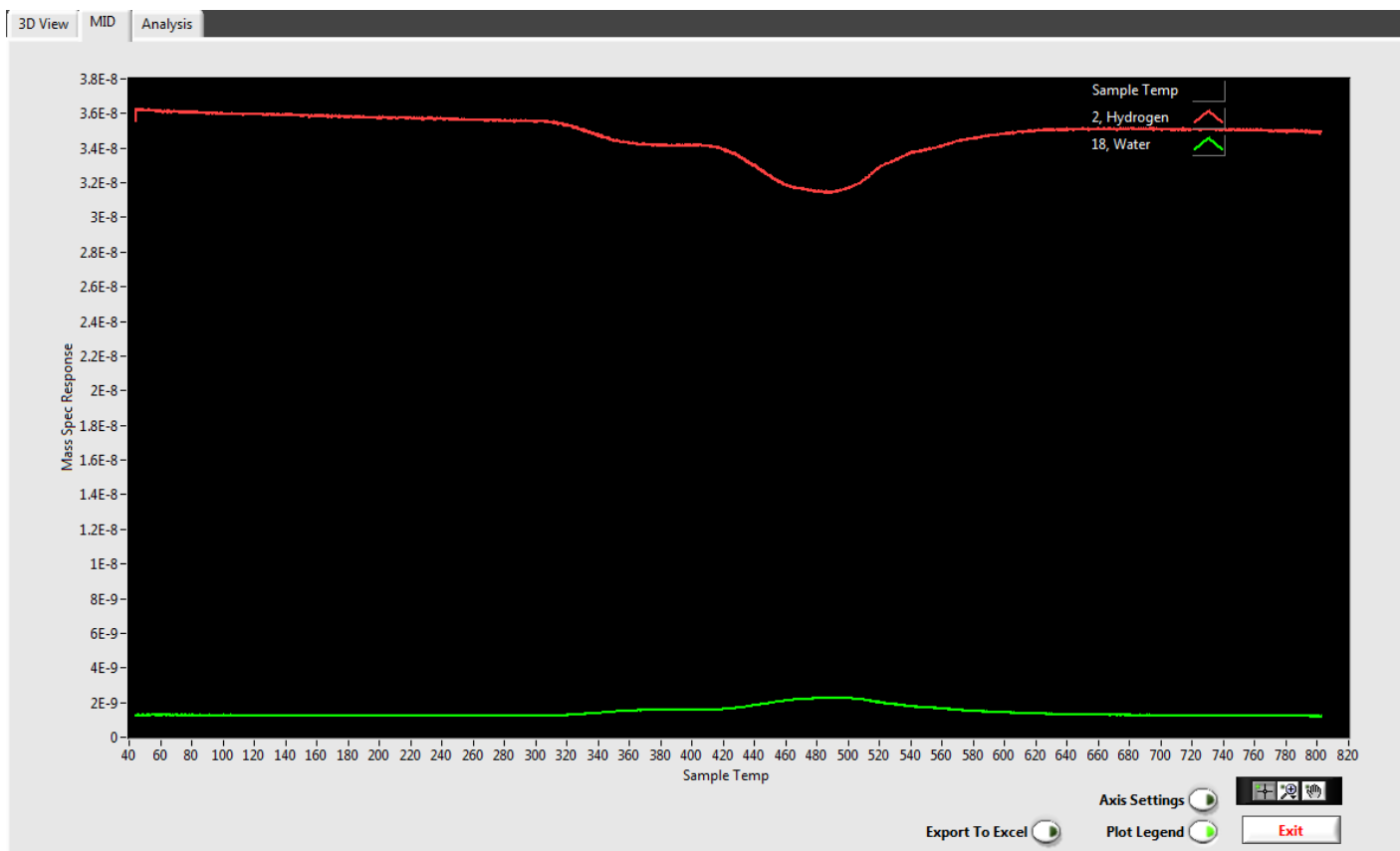
- 3D Bar Graph mode for easy identification of bar mode trends.
- Rotate or zoom in on regions of interest.

MS Display – 2D BAR



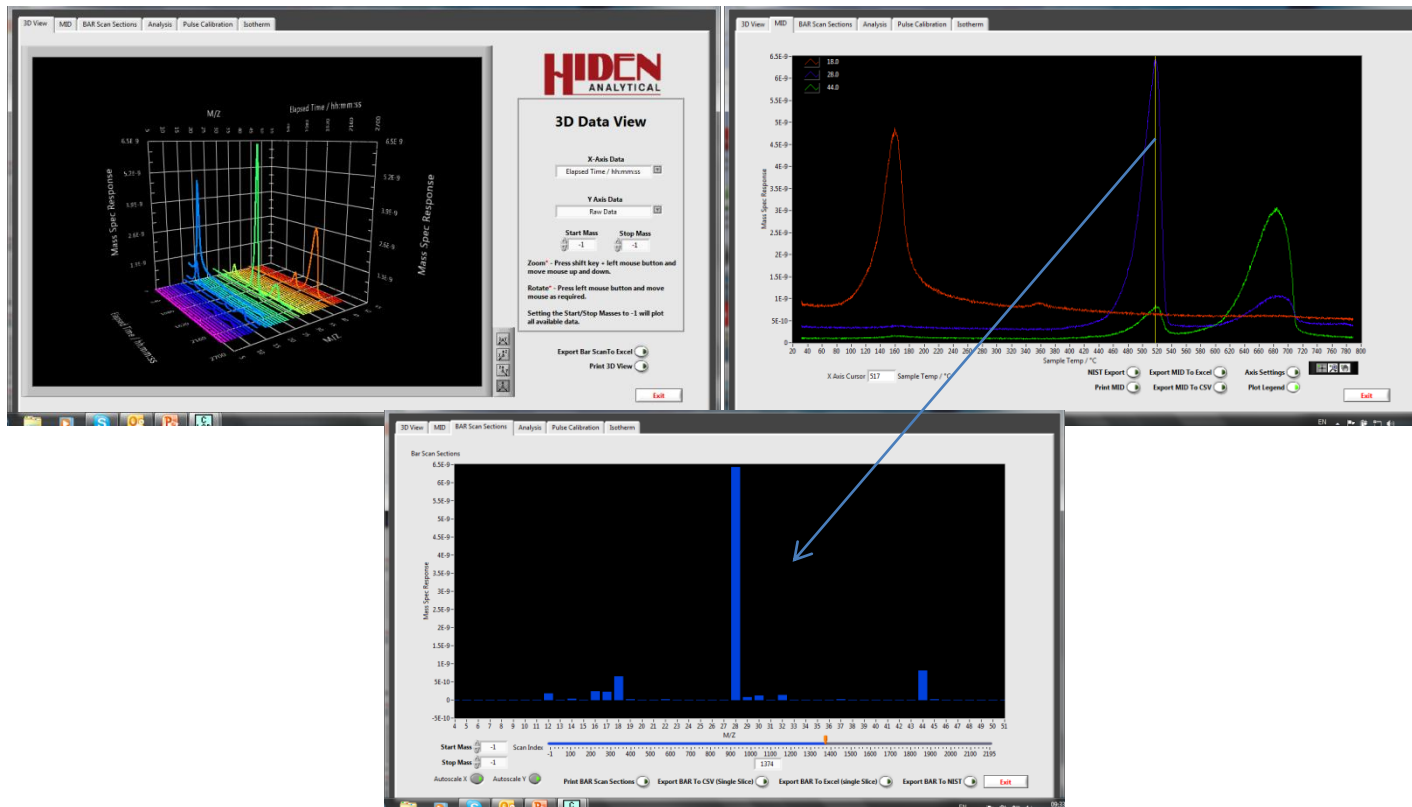
- View single cycle of BAR scan data

MS Display - MID



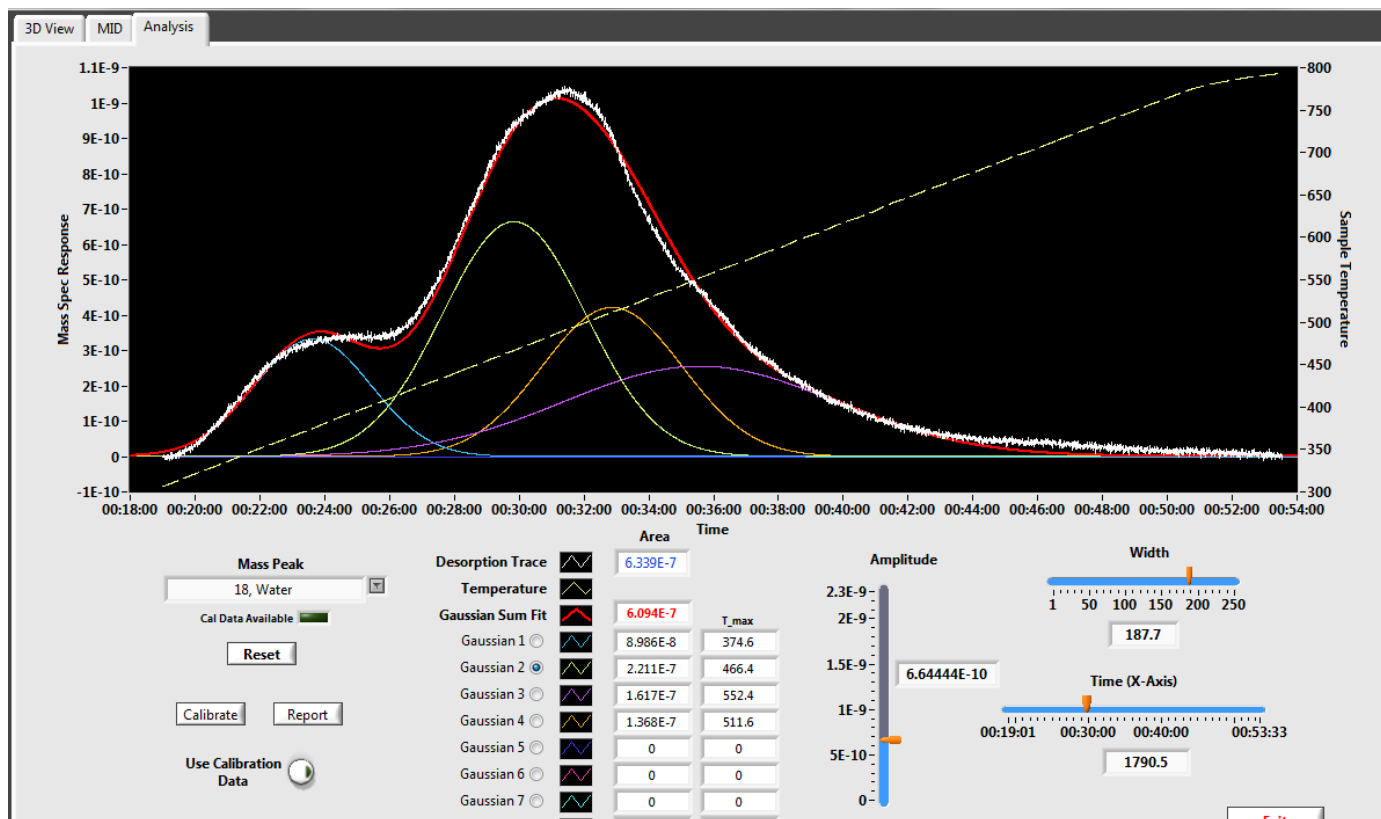
- Data plotted with x-axis as time or temperature.
- Y2 axis for secondary plotting of m/z data, temperature or flow vs. time/temperature.

Data Analysis



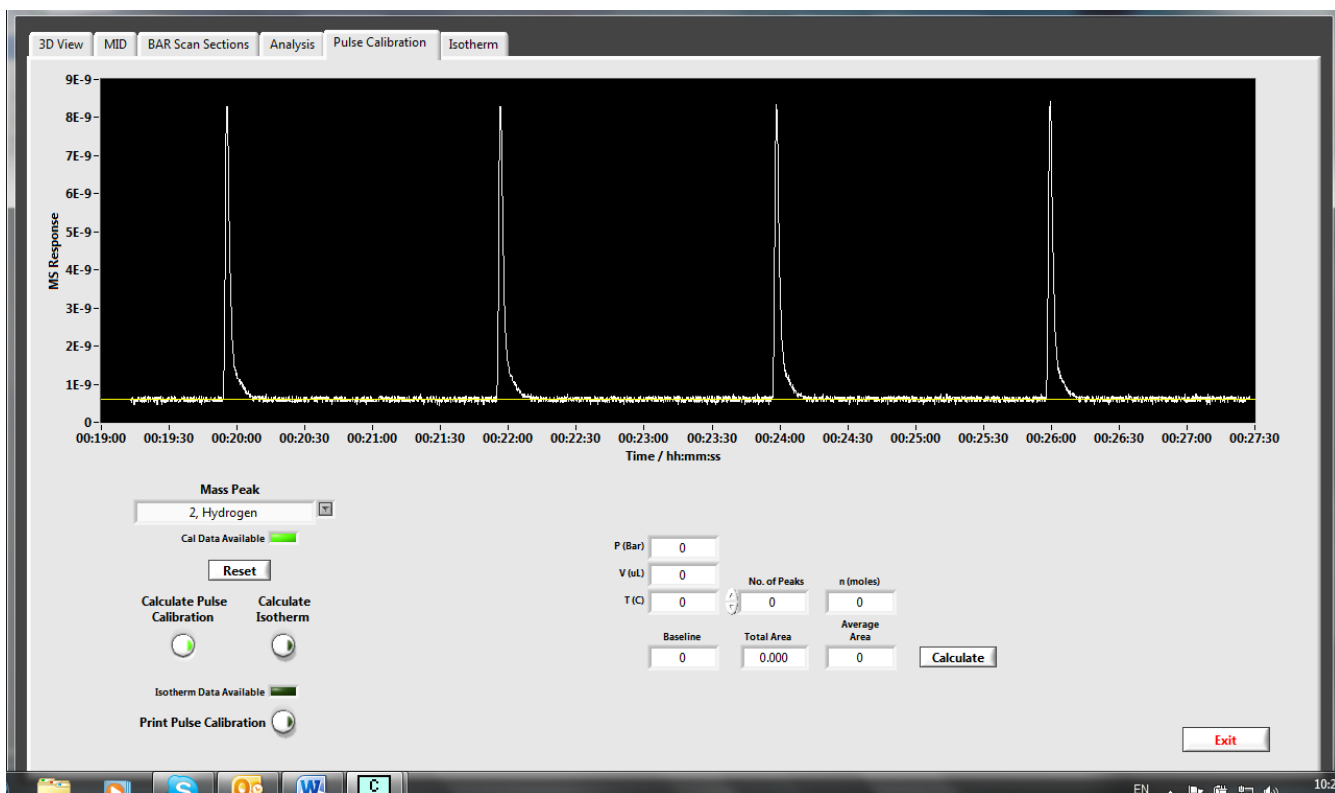
- 3D Bar, 2D Bar and MID modes all available in data analysis mode.
- Multiple export/print options.
- Export selectable masses or whole scan to NIST database for identification of unknowns.
- 2D Bar and MID view linked to enable viewing of Bar scan at any point in the MID trace and vice versa.

Data Analysis



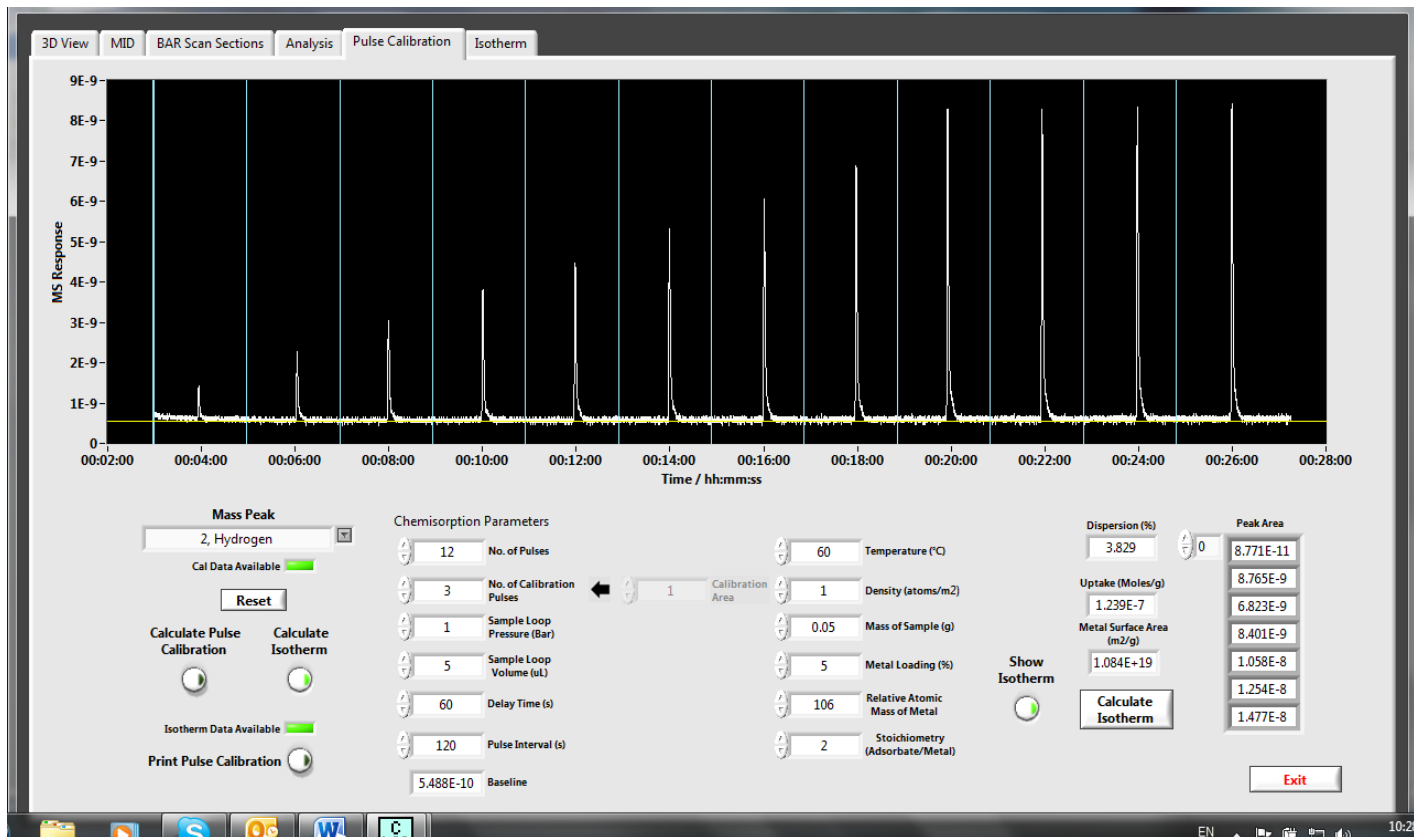
- Peak fitting analysis routines.
- Integrated area.
- Baseline subtraction.

Data Analysis



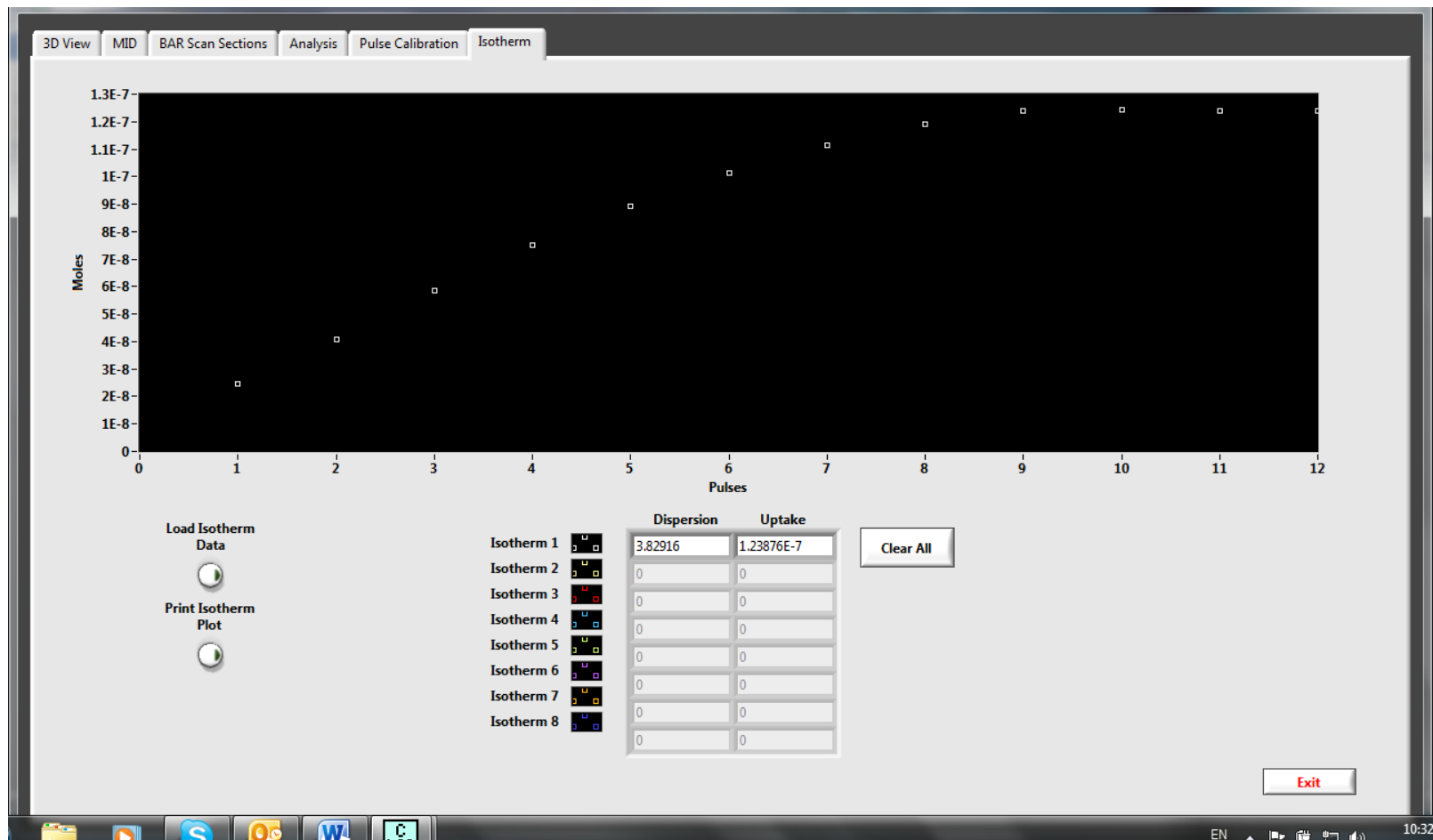
- Calibrate MS response vs injected gas amount for quantification of desorbed gases.

Data Analysis



- Pulse chemisorption algorithms to determine total uptake, metal surface area and dispersion from pulse adsorption experiments.

Data Analysis



- Calculate and plot the pulse adsorption isotherm.