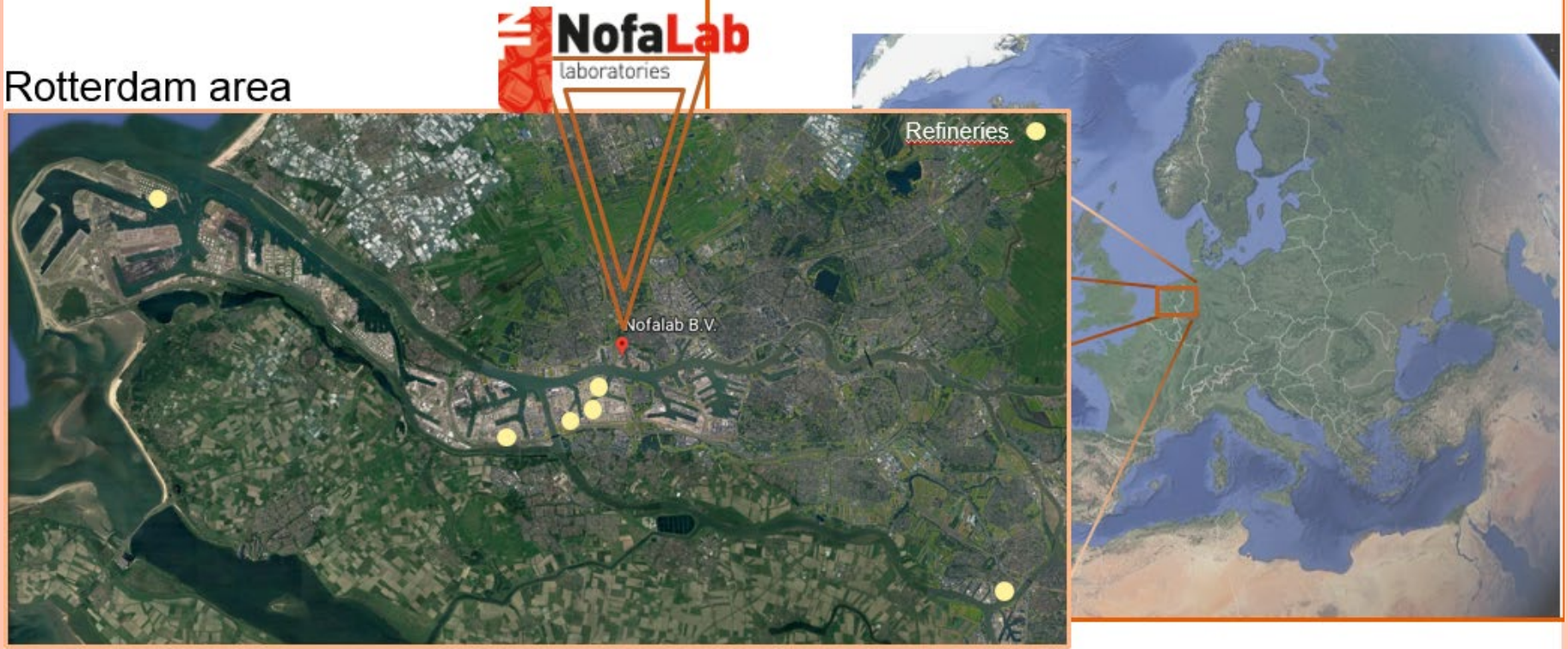
Are you being served?

The Benefits of Dual Data Acquisition in a routine Dioxin Lab

In cooperation with

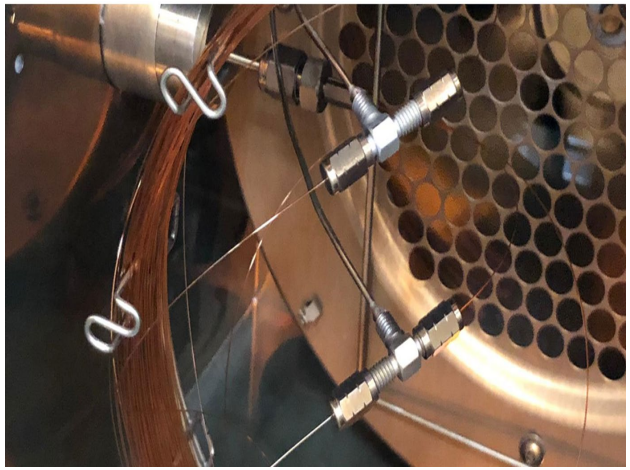
NofaLab

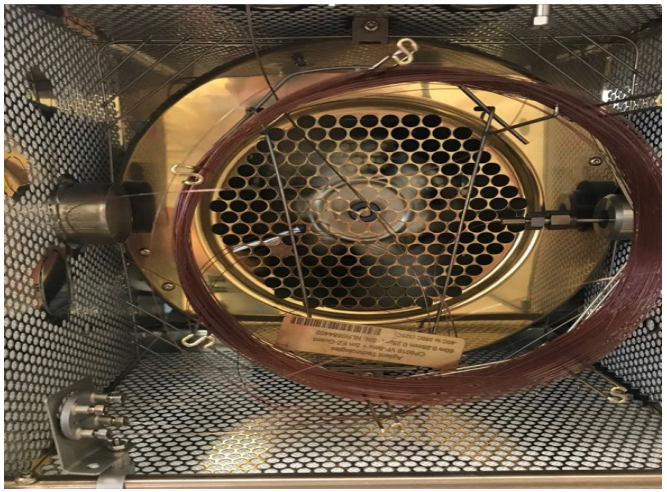
- Strategically positioned in the harbour
- In the vicinity of some of the largest plant oil refineries in Europe

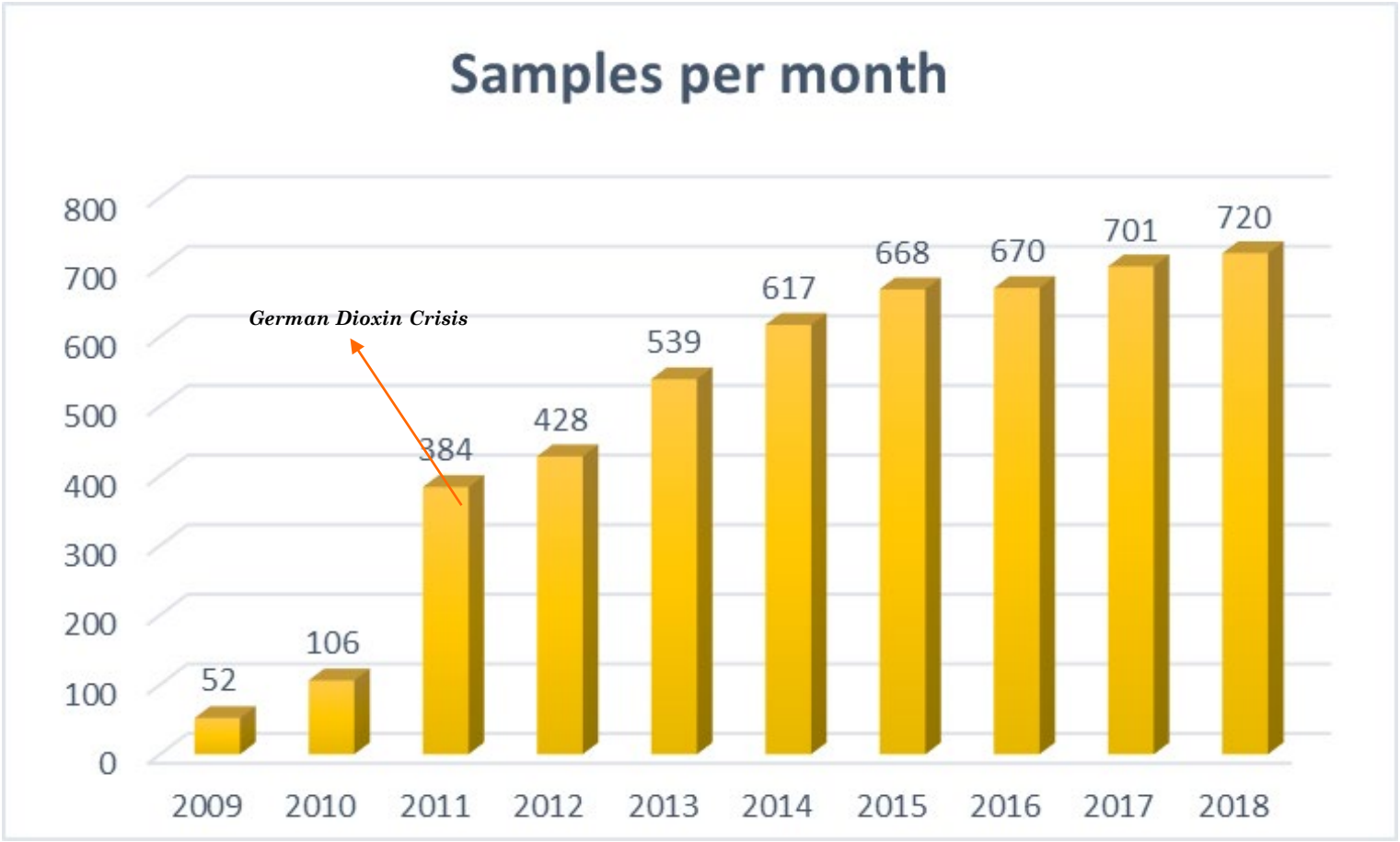


Start of Dioxins at Nofalab

- 2008 1st DFS and 1st generation cleanup system (FMS)
- 2010 2nd DFS and two 1st generation cleanup system
- 2013 both DFS systems eqquiped with Dual Data Acquisition (D.D.A.) (1st generation)
- 2015 3rd DFS installed with 2nd generation D.D.A. and 2 (2nd generation) Cleanup systems







Kind of samples:

1. Vegetable/Animal Oils, fats and Fatty Acids
2. Human food (eg. Milk, eggs, fish, meat, seeds)
3. Animal feed (eg. compound feed, trace materials)
4. Ect.

How do we do it?

Concentrate

Extraction

Measurement

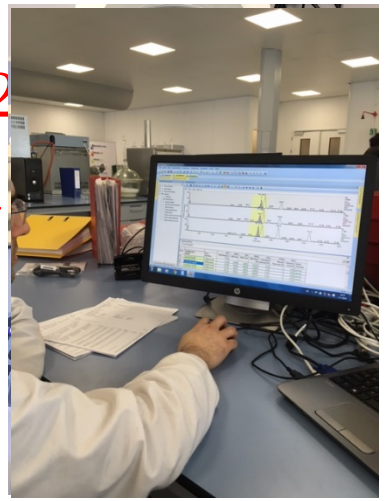
Clean-up

How do we do it

This is how we did it: From 72 hours reporting time to 24 and 8 hours

- 2008-2013 without DDA
  - 72 hours standard reporting time
  - 10 samples a day 24 hours reporting time
- 2013-20xx with DDA:
  - 75% of the samples within 24hours
- 2014-20xx with DDA and GO-HT
  - 8 samples within 8 hours Dioxins and PCBs

8HOUR SERVICE (ONLY FOR OIL TYPE SAMPLES)



- Weight in sample (±1,5 g of fat) 2
- Spike with ^{13}C labeled std. 1 min
- Load sample onto the column 5 min
- Attach all columns 2 min
- Load column set to the system 1 min
- Start program 73 min
- Concentrate 40 min
- Inject in GC-HRMS (D.D.A.) 51 min*
- Evaluating and reporting 5 min

Total: 180 min

* After the first injection all other samples take 26 minutes.

STRATEGY FOR 40 SAMPLES A DAY (POSSIBLE)?

- Preparing the first batch/run most time consuming.
- When first batch will be processed by cleanup system, the 2nd batch can already be prepared.
  You have 73 minutes time to finish.
- Working time 7am till 5 pm
- 10 hours / 1,52 hours = 6,58 sequences a day.
- Everyday a blanc system and recovery (1 for oil type samples and 1 for solid type samples) is done

- Staff: 3/4 men working on the extraction/clean-up
  2 men do the evaluating/reporting of the data

How to manage

- Average weekly number of samples 160
- On top at least 15 QA samples + 15 Proc… …nks
- Often 5 samples re-analysis (confirm…

- Total number of samples i… …400 fractions
- On top at least 15 dic… …ndards + 15 DL and NDL- PCB standards

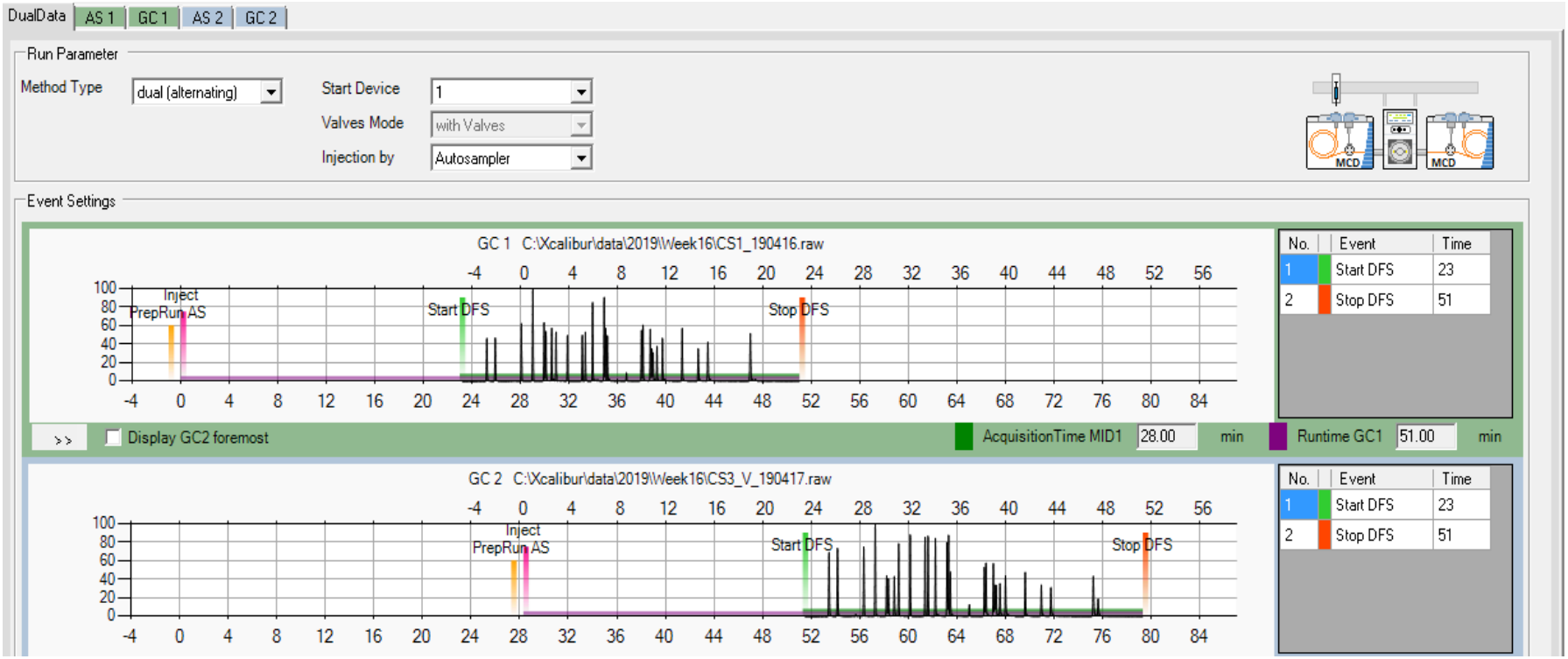
- Total n… …injections is 430
- 60… …onpolar column ⇨ run-time for each fraction 55 …es
- … case of two single GC-HRMS instruments 197,08 hrs required per instrument

Lack of > 29,8 hrs per week

Solution

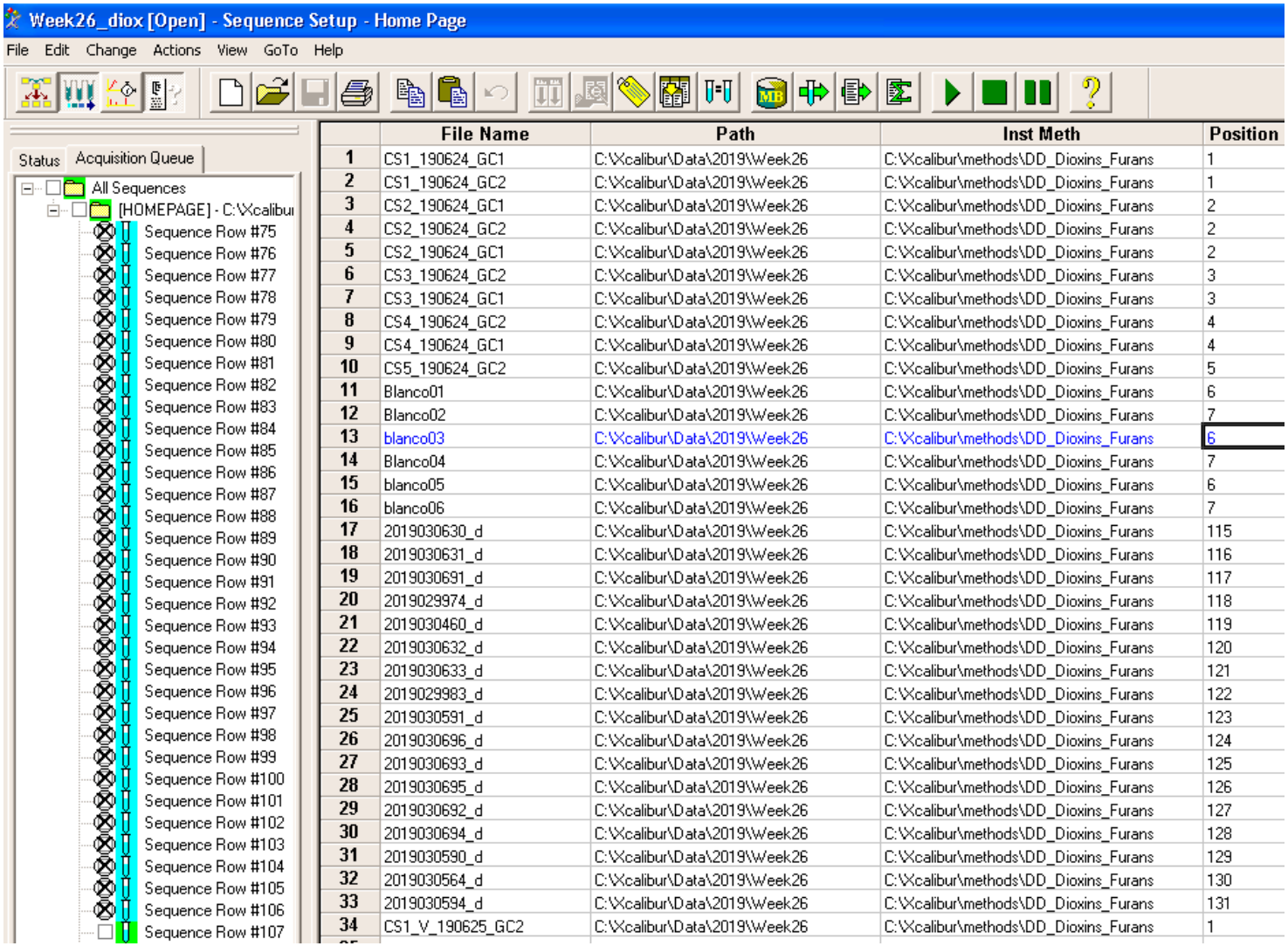
…ion Module

How do we manage GC-HRMS Dual Acquisition

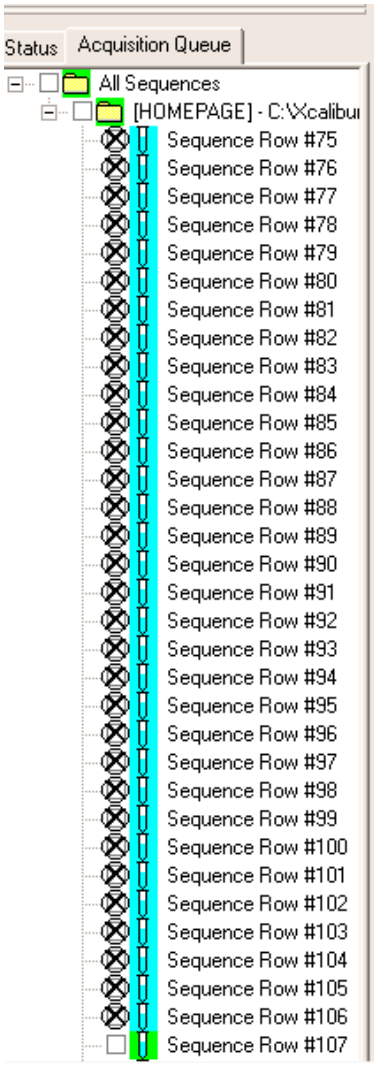


Dual acquisition = 1,8x improvement of efficiency
Every 60 minutes 2 samples are measured

Typical Sequence Nofalab BV



	File Name	Path	Inst Meth	Position
1	CS1_190624_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	1
2	CS1_190624_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	1
3	CS2_190624_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	2
4	CS2_190624_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	2
5	CS2_190624_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	2
6	CS3_190624_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	3
7	CS3_190624_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	3
8	CS4_190624_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	4
9	CS4_190624_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	4
10	CS5_190624_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	5
11	Blanco01	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	6
12	Blanco02	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	7
13	blanco03	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	6
14	Blanco04	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	7
15	blanco05	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	6
16	blanco06	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	7
17	2019030630_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	115
18	2019030631_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	116
19	2019030691_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	117
20	2019029974_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	118
21	2019030460_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	119
22	2019030632_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	120
23	2019030633_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	121
24	2019029983_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	122
25	2019030591_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	123
26	2019030696_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	124
27	2019030693_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	125
28	2019030695_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	126
29	2019030692_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	127
30	2019030694_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	128
31	2019030590_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	129
32	2019030564_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	130
33	2019030594_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	131
34	CS1_V_190625_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	1



	File Name	Path	Inst Meth	Position
34	CS1_V_190625_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	1
35	CS1_V_190625_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	1
36	RecSer_190624	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	137
37	Rec190624	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	140
38	BlancoSys_SER_190624	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	138
39	BlancoSys_190624	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	139
40	2019030589_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	132
41	2019030254_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	139
42	2019030608_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	139
43	2019030595_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	139
44	2019030893_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	141
45	2019030372_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	142
46	2019030364_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	143
47	2019030757_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	144
48	2019030572_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	136
49	2019030848_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	145
50	2019030662_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	146
51	2019030661_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	147
52	2019031127_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	148
53	2019030981_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	149
54	2019030955_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	150
55	CS2_V_190625_GC1	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	2
56	CS2_V_190625_GC2	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	2
57	Blanco07	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	7
58	Blanco08	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	7
59	2019030933_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	8
60	2019030742_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	9
61	2019030745_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	10
62	2019030965_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	11
63	2019030749_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	12
64	2019028426_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	13
65	2019030565_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	14
66	2019030759_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	15
67	2019031069_d	C:\Xcalibur\Data\2019\Week26	C:\Xcalibur\methods\DD_Dioxins_Furans	16

Additional benefits of the Dual Data option

- Source will stay cleaner for a longer time (no solvent and early eluting analytes do enter the source anymore).
- With the DualData XL option the sample throughput of a DFS can be almost doubled”
- Fast column change (no need to break the vacuum in the source).

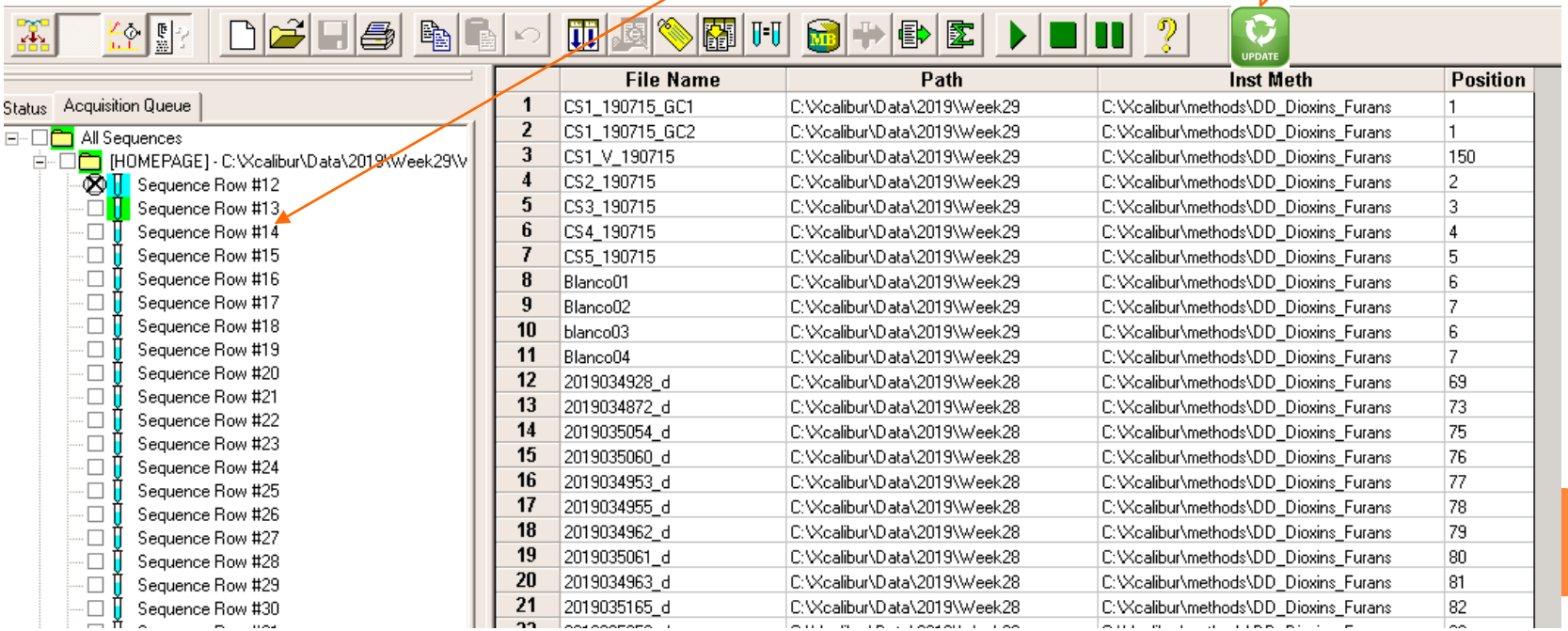
Disadvantages of the Dual Data option

- Once a sequence is started in Dual Data, no changes in sequence order can be made
- No back-up system
  - When you have downtime, you don't have a second system

For the coming future?

- The possibility to include a sample and/or update the sequence queue?!

URGENT Sample



	File Name	Path	Inst Meth	Position
1	CS1_190715_GC1	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	1
2	CS1_190715_GC2	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	1
3	CS1_V_190715	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	150
4	CS2_190715	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	2
5	CS3_190715	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	3
6	CS4_190715	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	4
7	CS5_190715	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	5
8	Blanco01	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	6
9	Blanco02	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	7
10	blanco03	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	6
11	Blanco04	C:\Xcalibur\Data\2019\Week29	C:\Xcalibur\methods\DD_Dioxins_Furans	7
12	2019034928_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	69
13	2019034872_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	73
14	2019035054_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	75
15	2019035060_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	76
16	2019034953_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	77
17	2019034955_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	78
18	2019034962_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	79
19	2019035061_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	80
20	2019034963_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	81
21	2019035165_d	C:\Xcalibur\Data\2019\Week28	C:\Xcalibur\methods\DD_Dioxins_Furans	82

CONCLUSION

- To increase the throughput in your Laboratory and you don't have deep pockets;

DualData XL is the Solution

- Less downtime, because source will stay cleaner for a longer time.

In cooperation with

ThermoFisher SCIENTIFIC

DSP systems The missing link in your laboratory!

MIURA

NofaLab laboratories