

## Central Analytical Laboratories (CAL) - Flask and Calibration Laboratory

### **FCL update**

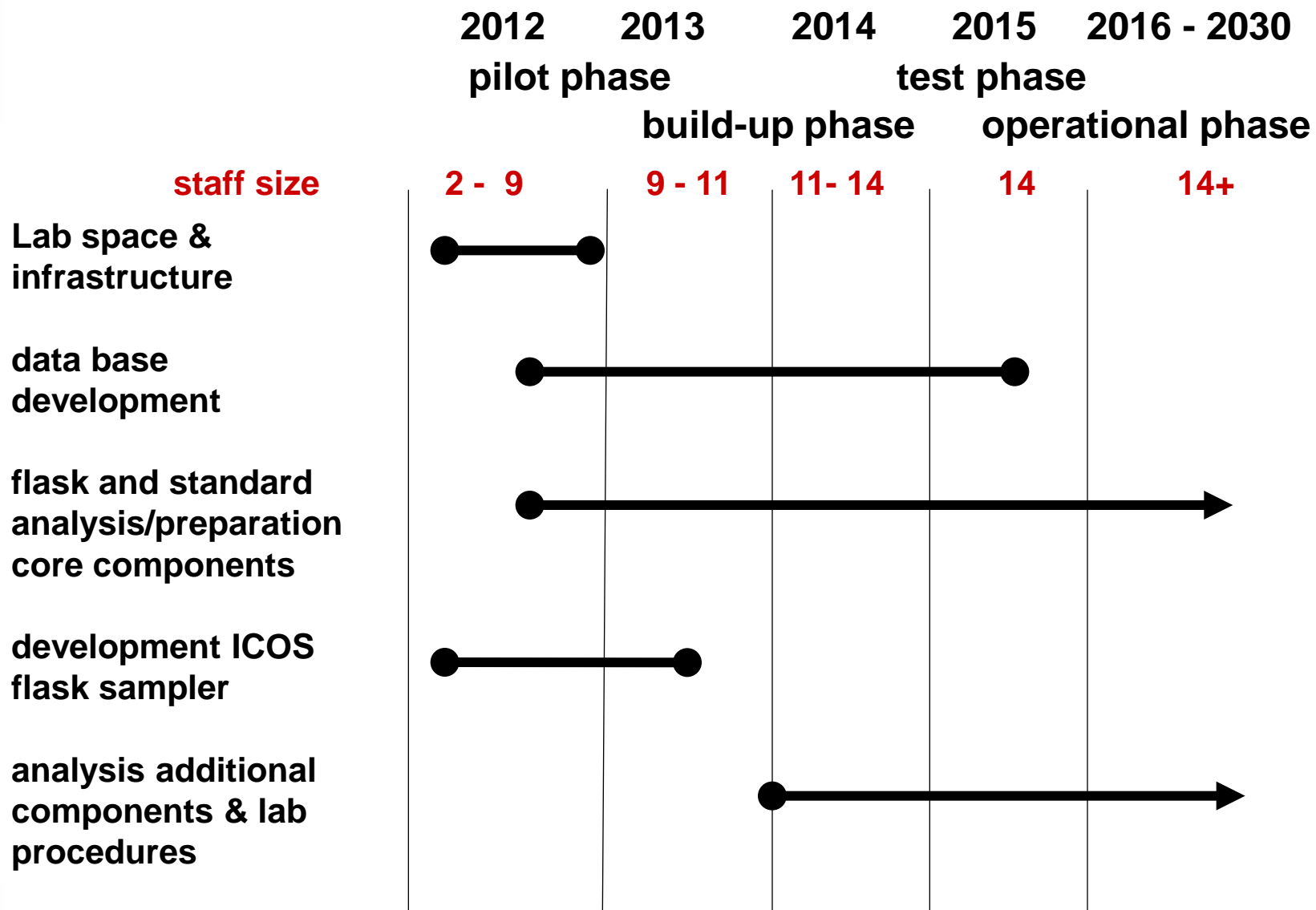
Armin Jordan and Daniel Rzesanke

+ Maria Büttner, Rico Hengst, Michael Hielscher, Frank  
Lanitz, Christian Lütz, Bert Steinberg

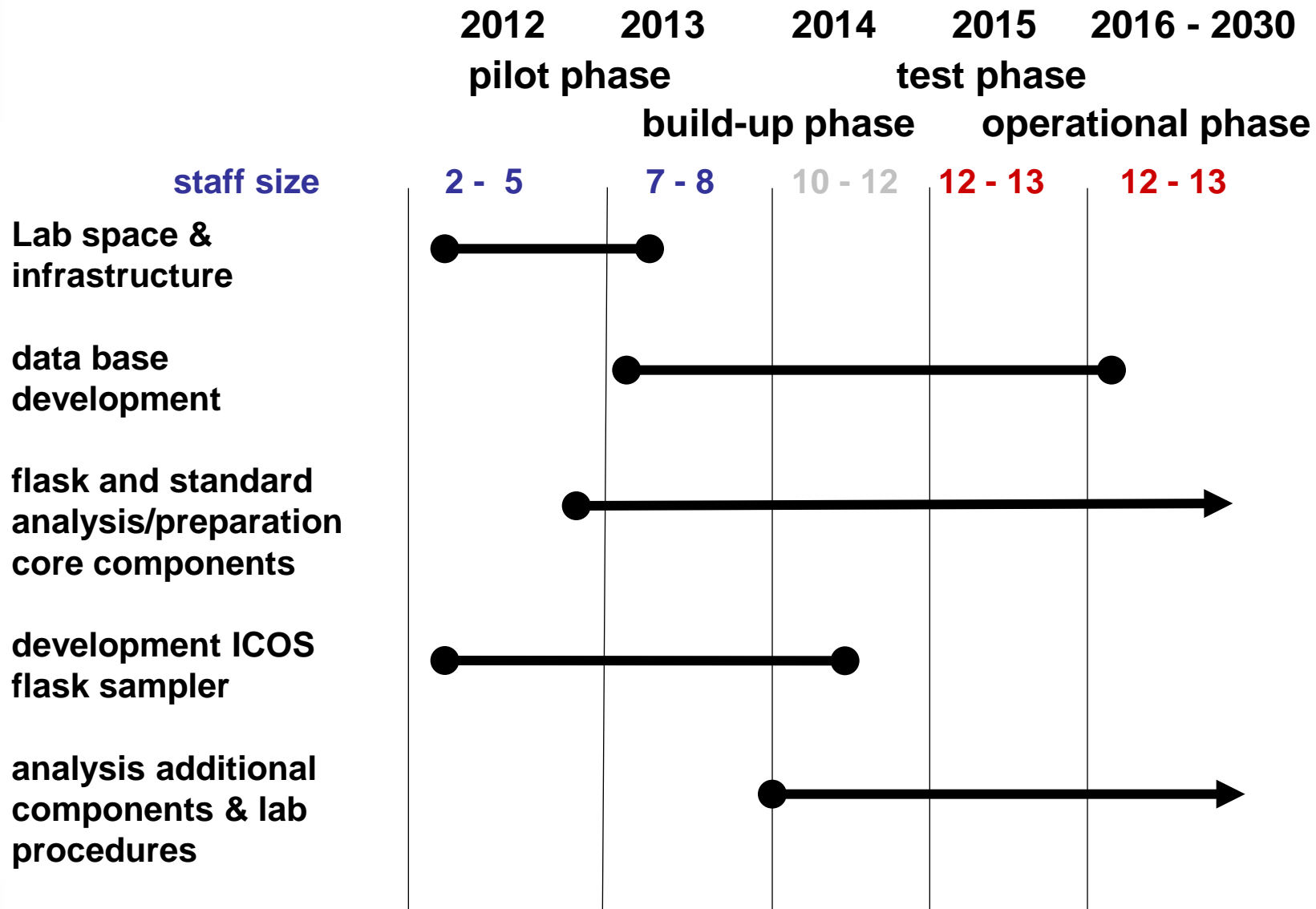
*Max-Planck-Institute for Biogeochemistry, Jena*

ICOS Atmosphere Monitoring Station Assembly (MSA)  
Paris, 13.11.2013

# FCL implementation plan



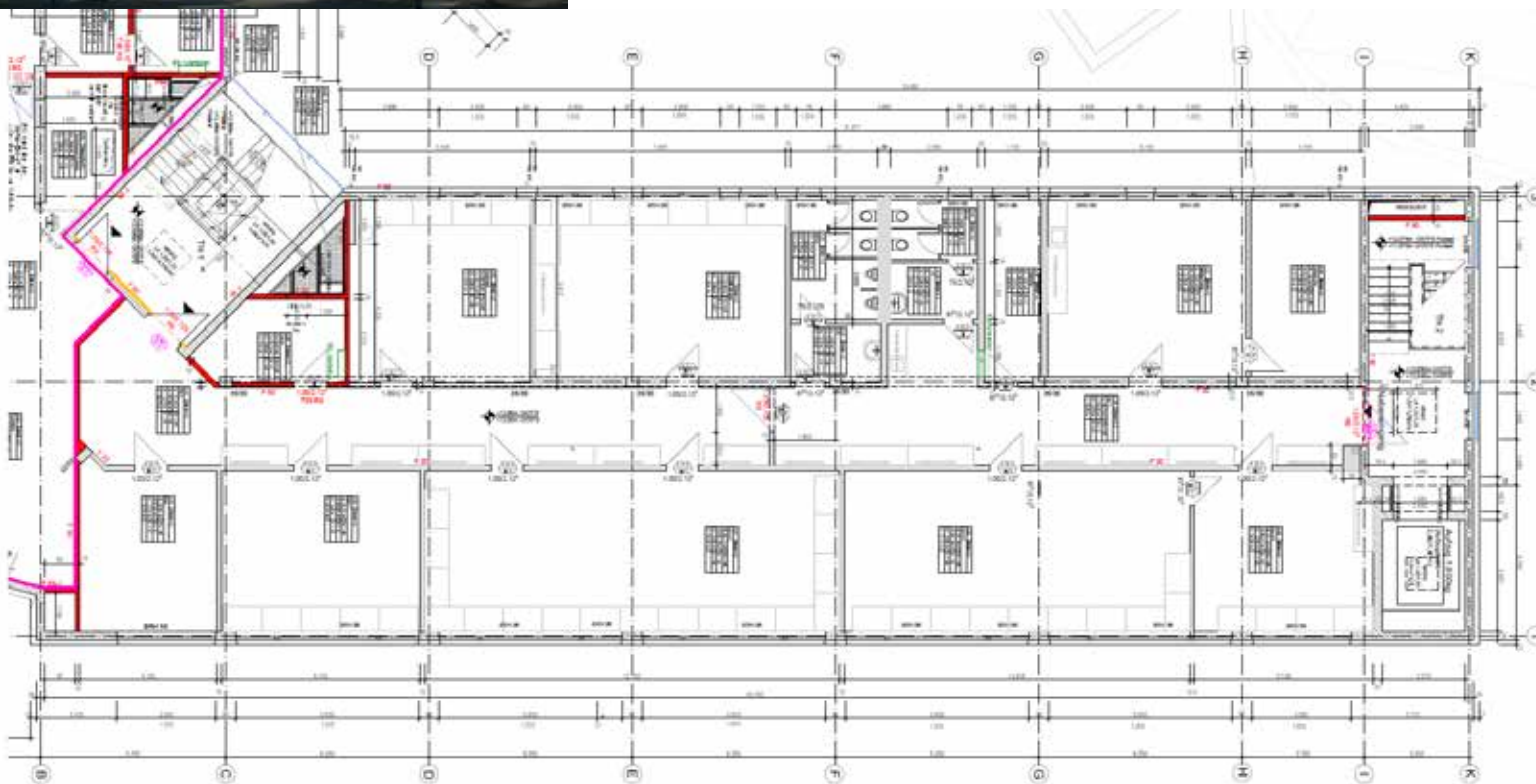
# FCL implementation plan



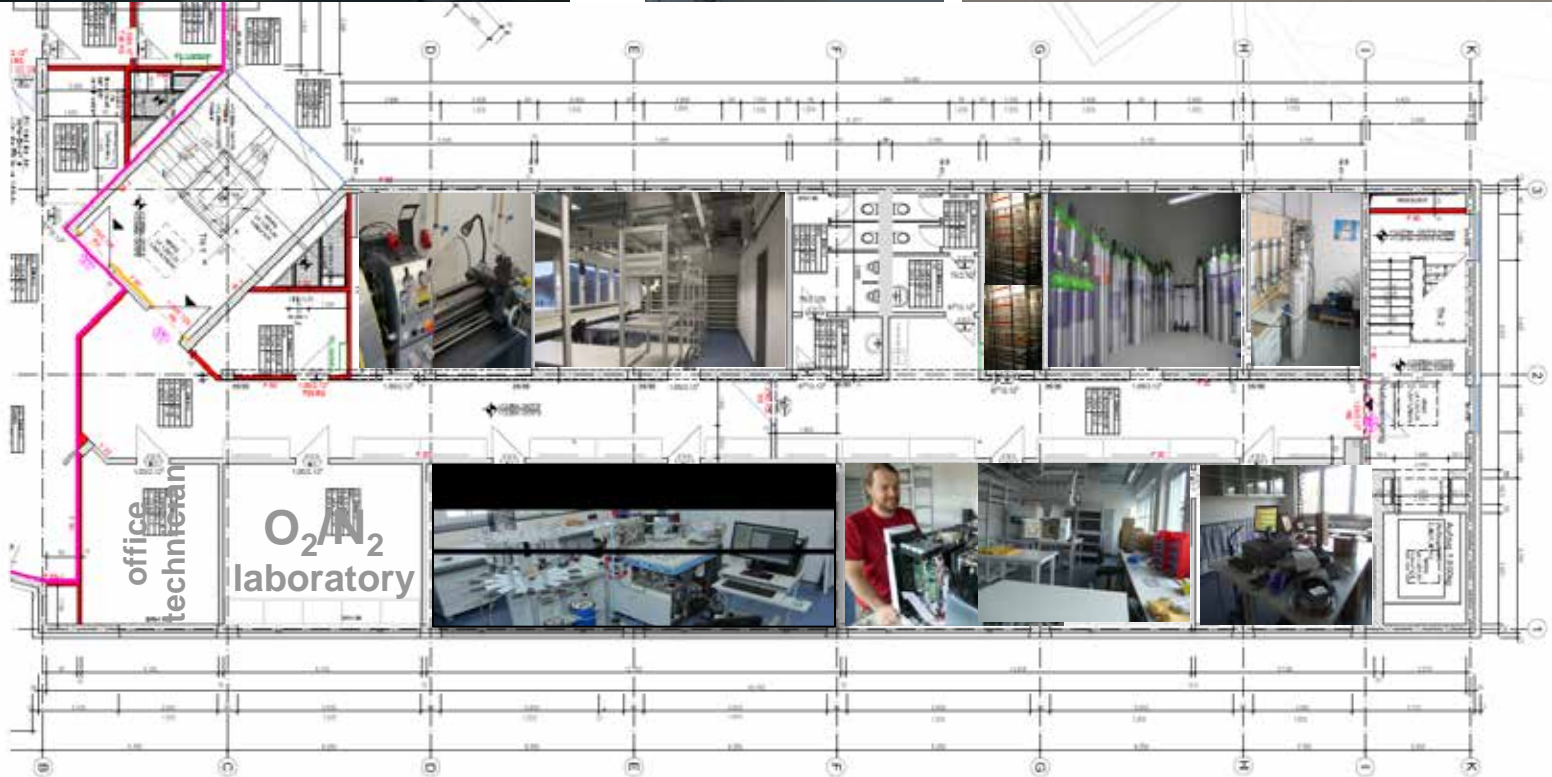
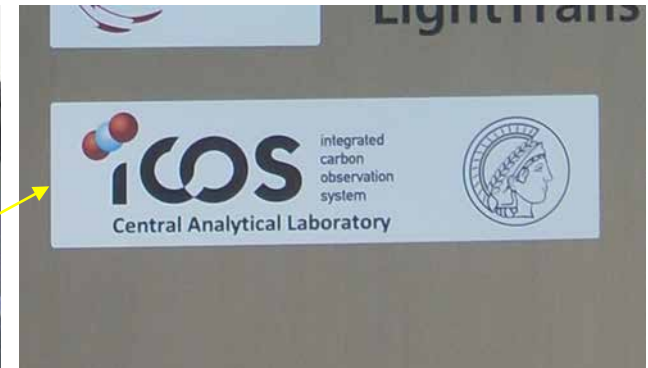
# Laboratory space



Technologiesteuer am Felsenkeller  
Kahlaische Straße 4  
07745 Jena  
Germany



# Installation of laboratory infrastructure

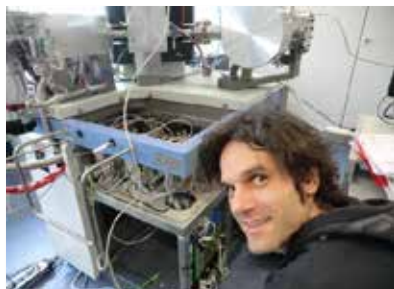




# Flask & Calibration Lab team



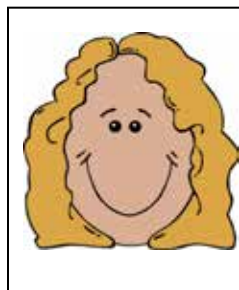
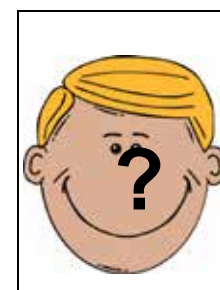
Bert Steinberg  
Engineer Trace gases



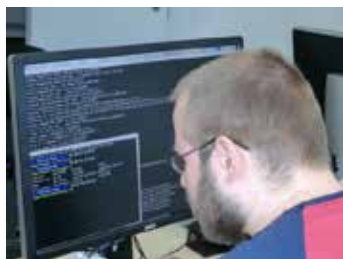
Daniel Rzesanke  
Lab Manager Trace gases



N.N. - Lab Manager  
& Engineer Stable Isotopes



Maria Büttner  
Technician



Frank Lanitz  
IT-System-Manager



Rico Hengst  
Programmer Database



Christian Lütz  
Programmer Database



Michael Hielscher  
Construction Engineer

## Future staff planning

- + 1-2 technician for stable isotopes
- + 1 technician for standard gases
- + 1 administrative support / logistics
- 1 programmer



# CAL task list - Summary FCL

## Will do:

- Prepare reference gases
- calibrate standards relative to WMO scales, re-analyse standards
- analyse flask air samples for CO<sub>2</sub>, d<sup>13</sup>CO<sub>2</sub>, d<sup>18</sup>O-CO<sub>2</sub>, CH<sub>4</sub>, d<sup>13</sup>CH<sub>4</sub>, dD-CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, O<sub>2</sub>/N<sub>2</sub>
- communicate flask air analysis data to ATC
- leak - check flask after analysis, repair flasks if necessary
- communicate with station PIs for flask shipment and in cases of problems
- condition flasks with dried ambient air
- keep track of flask location
- develop flask sampler prototype and initiate commercialization

## Task List

## Status

## Start\*

Prepare reference gases

Calibrate standards relative to  
WMO scales, re-analyse standards

analyse flask air samples for  $\text{CO}_2$ ,  
 $\text{d}^{13}\text{CO}_2$ ,  $\text{d}^{18}\text{O}-\text{CO}_2$ ,  $\text{CH}_4$ , ( $\text{d}^{13}\text{CH}_4$ ,  $\text{dD}-$   
 $\text{CH}_4$ ),  $\text{N}_2\text{O}$ ,  $\text{SF}_6$ ,  $\text{O}_2/\text{N}_2$

condition flasks with dried air

leak - check flask after analysis,  
repair flasks if necessary

communicate flask air analysis data  
to ATC

communicate with station PIs for  
flask shipment and in cases of  
problems

keep track of flask location

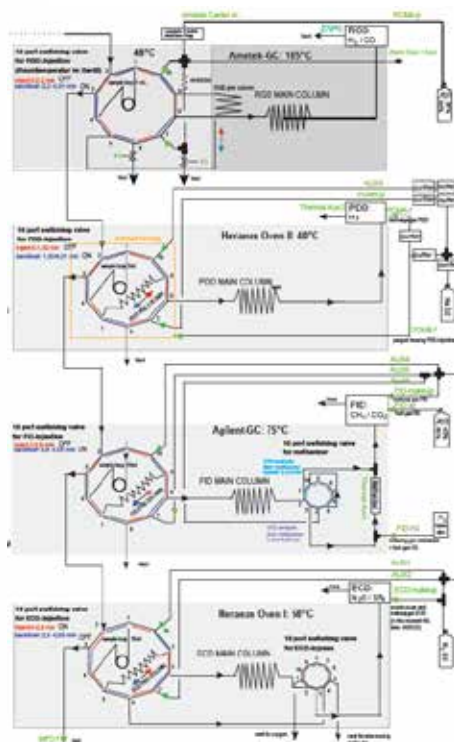
develop flask sampler prototype  
and initiate commercialization



# Gas chromatography system set-up



## Multi-detector system



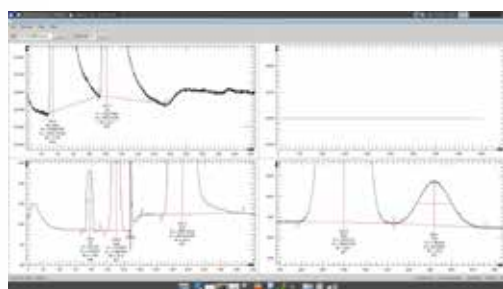
Ametek RGA

Valco PDD

Agilent FID

Agilent µECD

GCWerks software



## Range set by WMO standards

CO <sub>2</sub> [ppm]	CH <sub>4</sub> [ppb]	CO [ppb]	N <sub>2</sub> O [ppb]	SF <sub>6</sub> [ppt]	H <sub>2</sub> [ppb]
250	1598	34	317	6	401
339	1744	78	320	7	439
365	1897	110	327	8	495
390	2032	118	330	9	556
412	2193	157	334	10	593
434	2297	198	335	11	635
459	2342	245	340	13	677
485	2728	694	349	13	678
515	2926	1091	362	21	774

## Repeatability test runs

CO <sub>2</sub>	CH <sub>4</sub>	CO	N <sub>2</sub> O	SF <sub>6</sub>	H <sub>2</sub>
0.03 ppm	0.6 ppb	0.3 ppb	0.13 ppb	0.025 ppt	0.3 ppb