

OSIC
oil smell in cabin

aerotracer

**a new method for the detection of
lubricating oils in the bleed air**

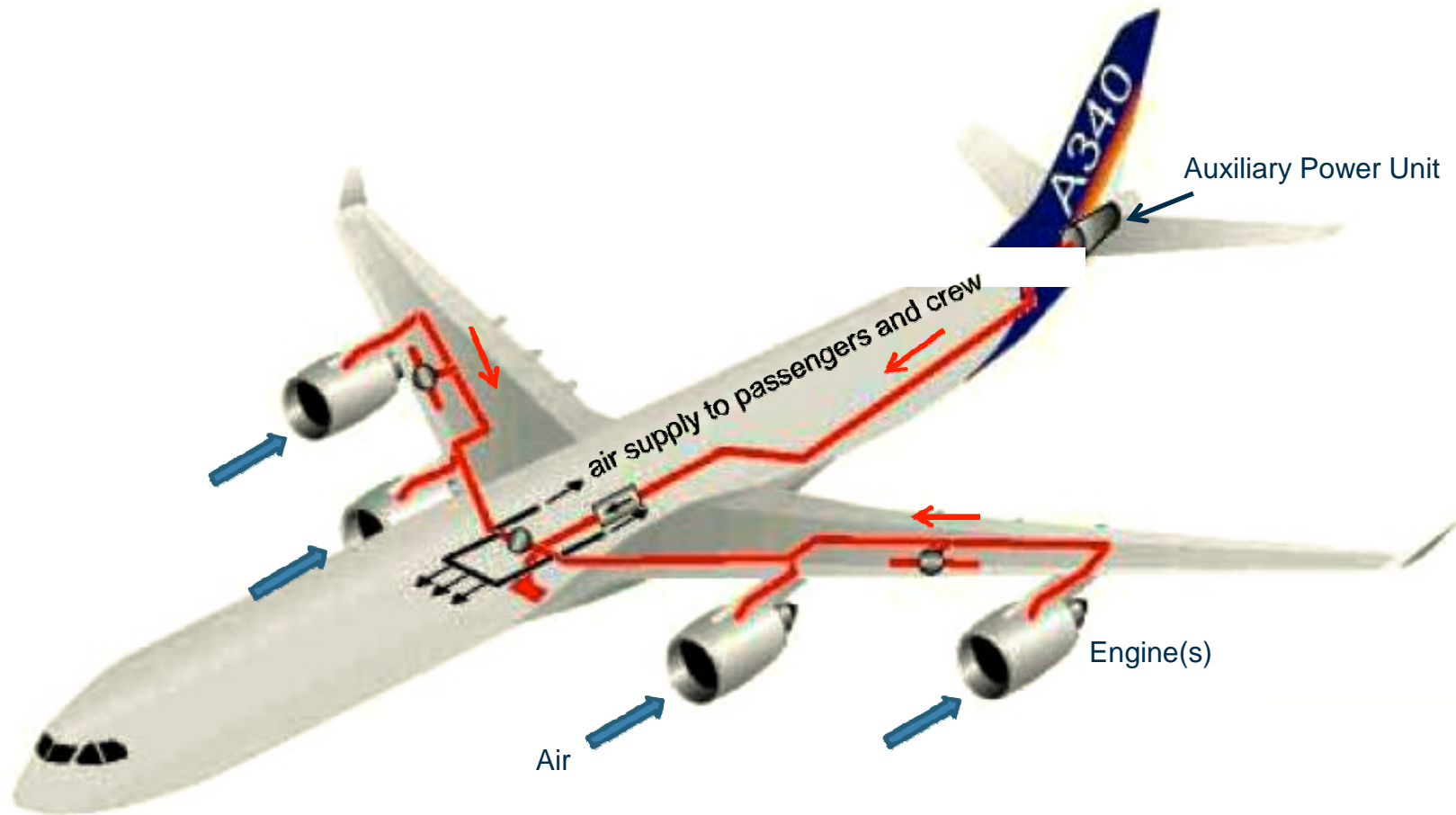
Who is AIRSENSE Analytics?

- **German company**
- **founded in 1996 by Dipl.- Ing. Wolf Münchmeyer & Dr.- Ing. Andreas Walte**
- **manufacturer and supplier of analytical instruments, core business is the gas detection**
- **products are used worldwide in desaster management and chemical industry**
- **business worldwide**
- **25 employees and various distributors in abroad**

What does bleed air mean ?

- **bleed air is compressed air taken from outside through the engine(s) after the compressor stage(s)**
- **compressed air is used within an aircraft for many different ways**
 - **air supply to the cabin (passengers and crew)**
 - **de-icing**
 - **pressurizing the cabin**
- **bleed air means**
 - **high temperature**
 - **high pressure**
 - **not filtered**

Bleed air supply system



What is the problem ?

- **bleed air can be contaminated with lubricating oils**
 - **by failed seals from the bearing chamber**
 - **sources are the engine(s) and APU**

- **bleed air can be contaminated with de-icing fluid**
 - **by air from outside mixed with de-icing fluid**
 - **source is mostly the APU (Auxiliary Power Unit)**

- **cabin can be contaminated with other contaminants in case of**
 - **electrical problems**
 - **elec smell**
 - **burning smell**
 - **contaminated fuel filters**
 - **leakages in galley area**

What is the problem ?

- **what kind of smell ?**
 - **no measurement methods available to confirm or exclude the type of smell**
 - **smell of engine oil**
 - **de-icing fluid**
 - **elec smell**

- **what is the source of smell ?**
 - **no procedure available to locate or eliminate the source of smell**
 - **which engine(s)**
 - **APU**
 - **packs**
 - **cabin (galley area)**

What is the problem ?

- **from the technical point of view**
 - **persistent complaints**
 - **costly search for causes**
 - **unnecessary engine removals**
 - **expensive return of engines to the engine shop**
 - **diversions**
 - **all problems lead to longer total downtimes & sequences of operation are instantly affected ...**

- **Health and Safety**
 - **human exposure uncontrolled & frequently**
 - **time consuming**
 - **expensive**
 - **flight safety impact**

Solution



aerotracer

a

joint

product

between

AIRSENSE

Analytics GmbH

and

Lufthansa Technik

AG

What is the aerotracer ?

- a joint product between AIRSENSE & Lufthansa Technik
- developed to support and assist maintenance providers, engineers and ground staff with analytical and technical information
- portable analyzer capable of detecting contaminants
- sensitive enough to locate or eliminate the source of smell
- lightweight and battery operated device
- fast response time and understandable indication

How does the aerotracer work ?

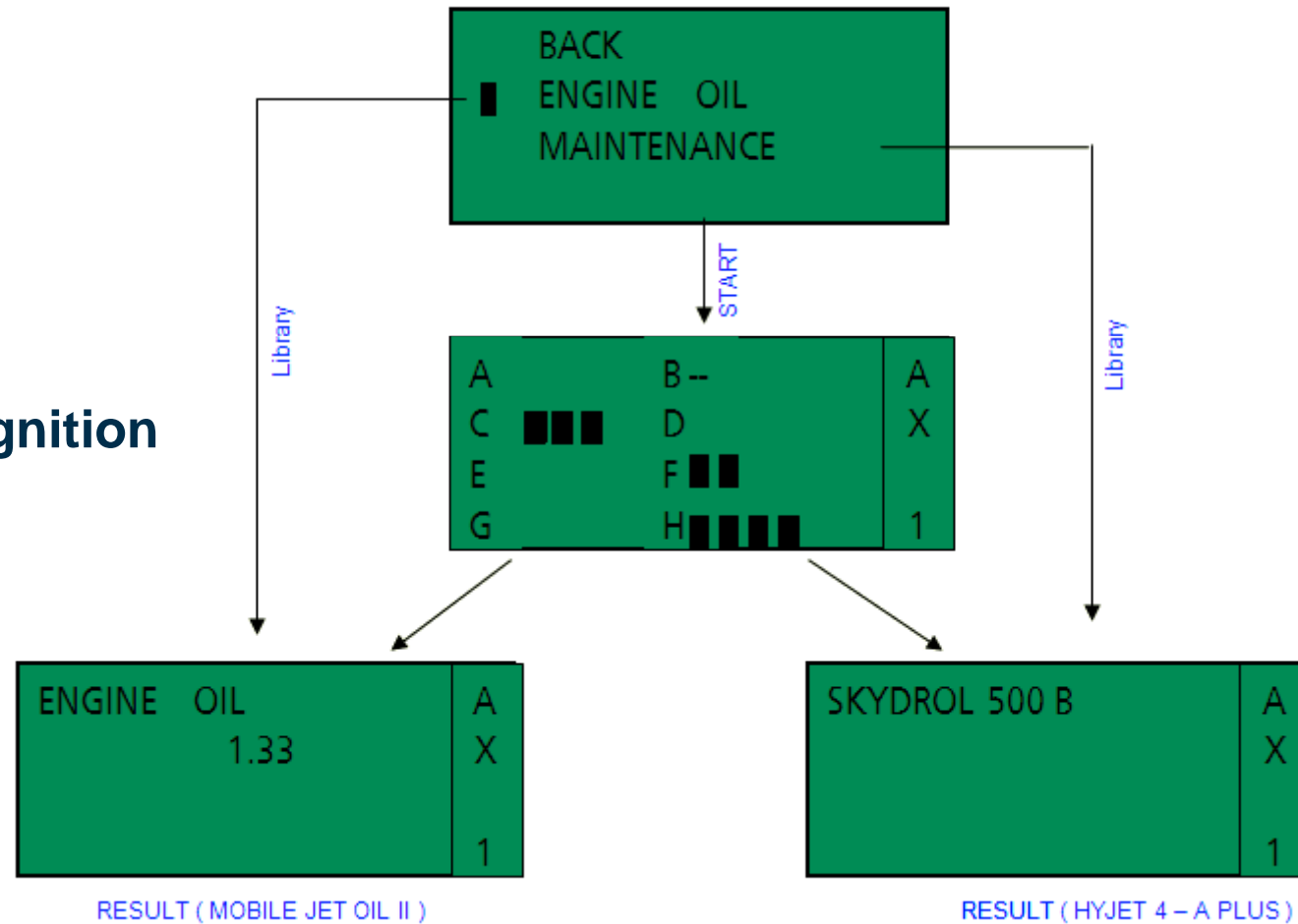
- in front of the gas inlet chemicals are automatically sucked in
- chemicals channel through the sensor array
- within few seconds sensors react to the chemicals
- few seconds later the pattern is compared to the database
- the indication and the odor rating is displayed
 - no need to prepare the sample
 - fast response
 - easy to operate
 - battery operated
 - results are comparable and reliable

The functionality is very simple !

➤ database

➤ pattern recognition

➤ results



What can be measured ?

- **engine oils**
- **hydraulic oils**
- **de-icing fluids**
- **cooling mediums**
- **glues**
- **kerosine**
- **corrosion paints**
- **and more ...**

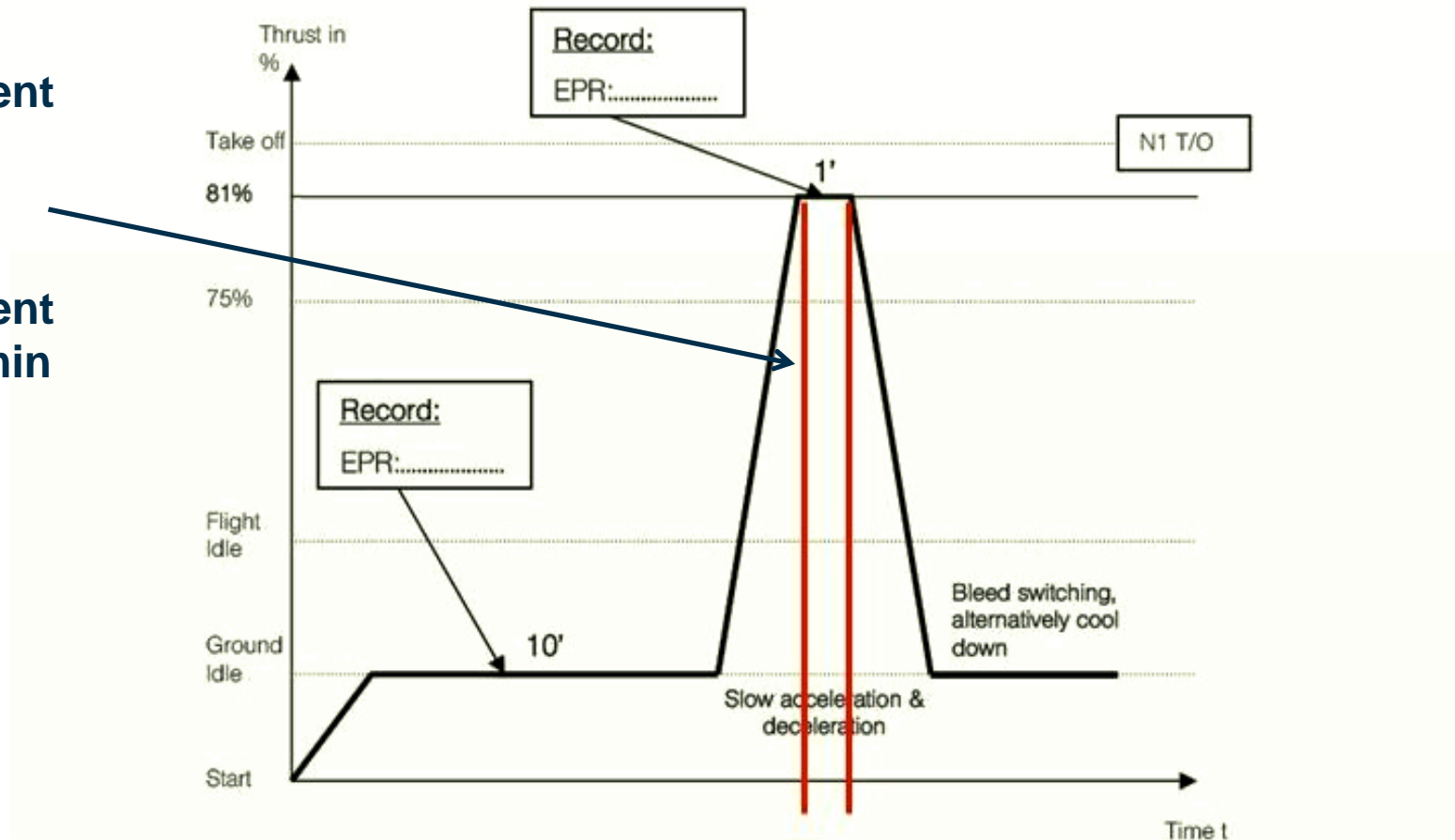
How is the aerotracer used during High Power Run Up ?

- **High Power Run Up**
 - **measurement**
 - **source switching**
 - **results**
 - **reporting**
 - **decision**
-
- **the fastest way to eliminate or locate the troublemaker**

High Power R/U

Aircraft Tail sign: Engine # SN: Test date:

- measurement with aerotracer
- measurement time 1 - 3 min

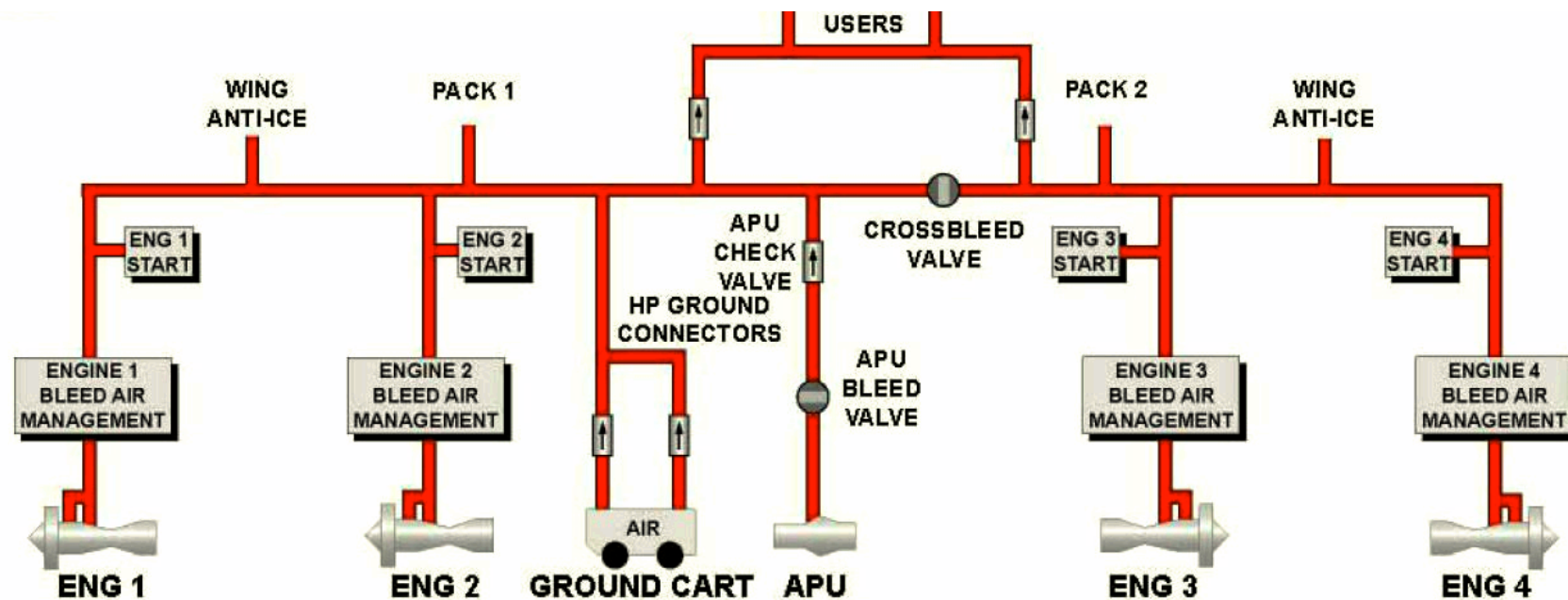


Measurement

- **aerotracer is operated with battery**
- **cabin air is automatically sucked in**
- **distance to the air nozzle about 10 - 20 cm**
- **no sample preparation**
- **immediate indication on engine oil or de-icing fluid**
- **continous measuring mode**
- **data logging for reporting**



Source switching

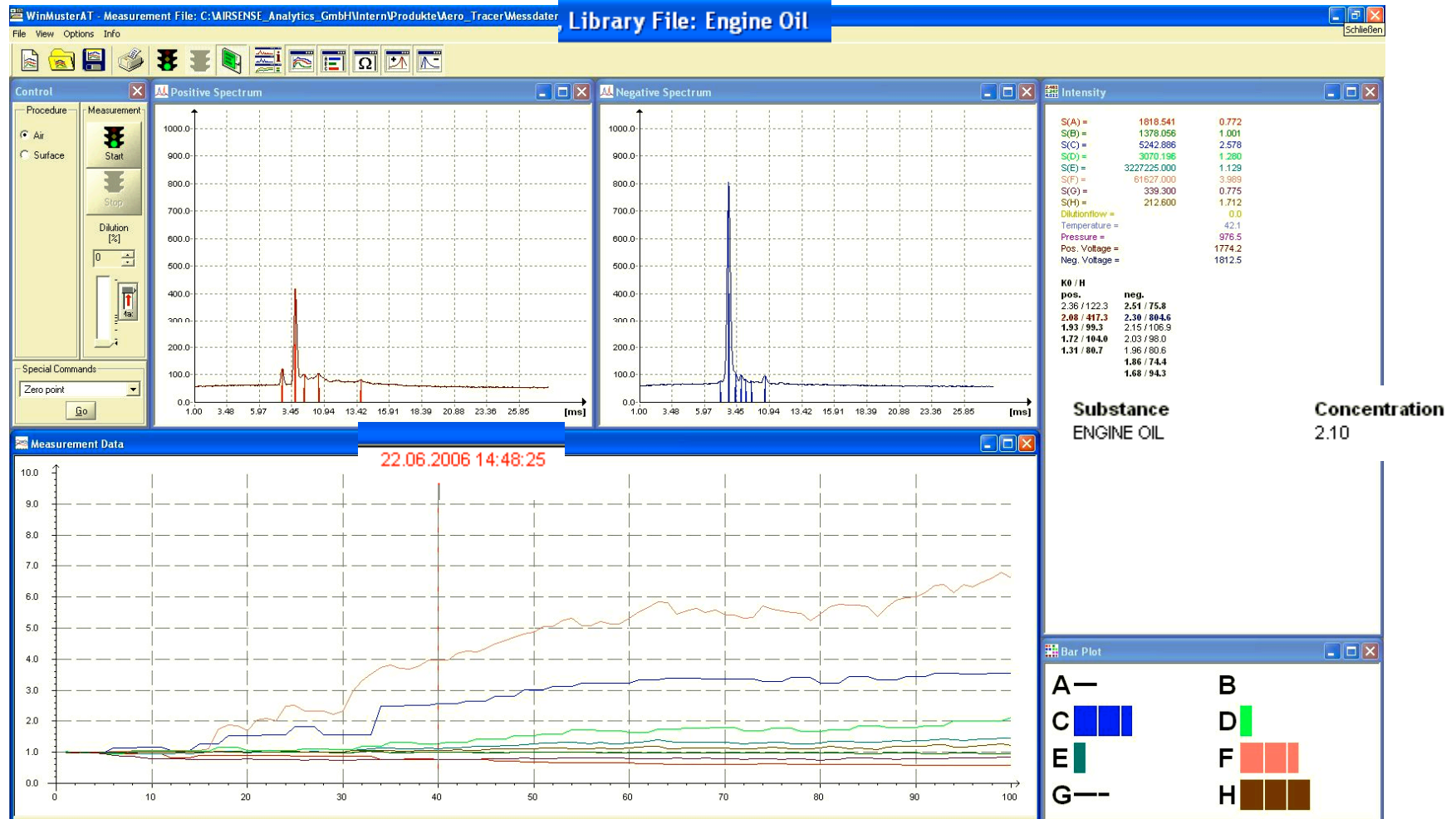


Eng#1 ON, Eng#2 OFF, PACK 1 ON, PACK 2 OFF, APU OFF ... one engine after the other will be moved up and measured.

Result



Result



Odour rating

Odour rating	Perceived oil odour level
0	Non apparent
1	Very faint
2	Faint
3	Medium
4	Medium strong
5	Strong
6	Very strong
7	Extremely strong

evaluated and approved by airlines and engine manufacturer

Reporting

PROTOKOLL "ECS-SOURCE-SWITCHING"

A/C Registration: [REDACTED]

Testdate: *27.03.07*

Engine #1 SN: [REDACTED]

Engine #2 SN: [REDACTED]

Engine #3 SN: [REDACTED]

Engine #4 SN: [REDACTED]

									RESULT	
									NO SMELL	SMELL
Check Engine #1										
Engine bleed #1 "ON"; Engine bleed #2,3,4 "OFF"; Crossbleed "CLOSE"; Pack #1 "ON"; Pack #2 "OFF"; APU "OFF"										
ENG#1	ENG#2	ENG#3	ENG#4	CROSSBLEED	PACK#1	PACK#2	APU		X	

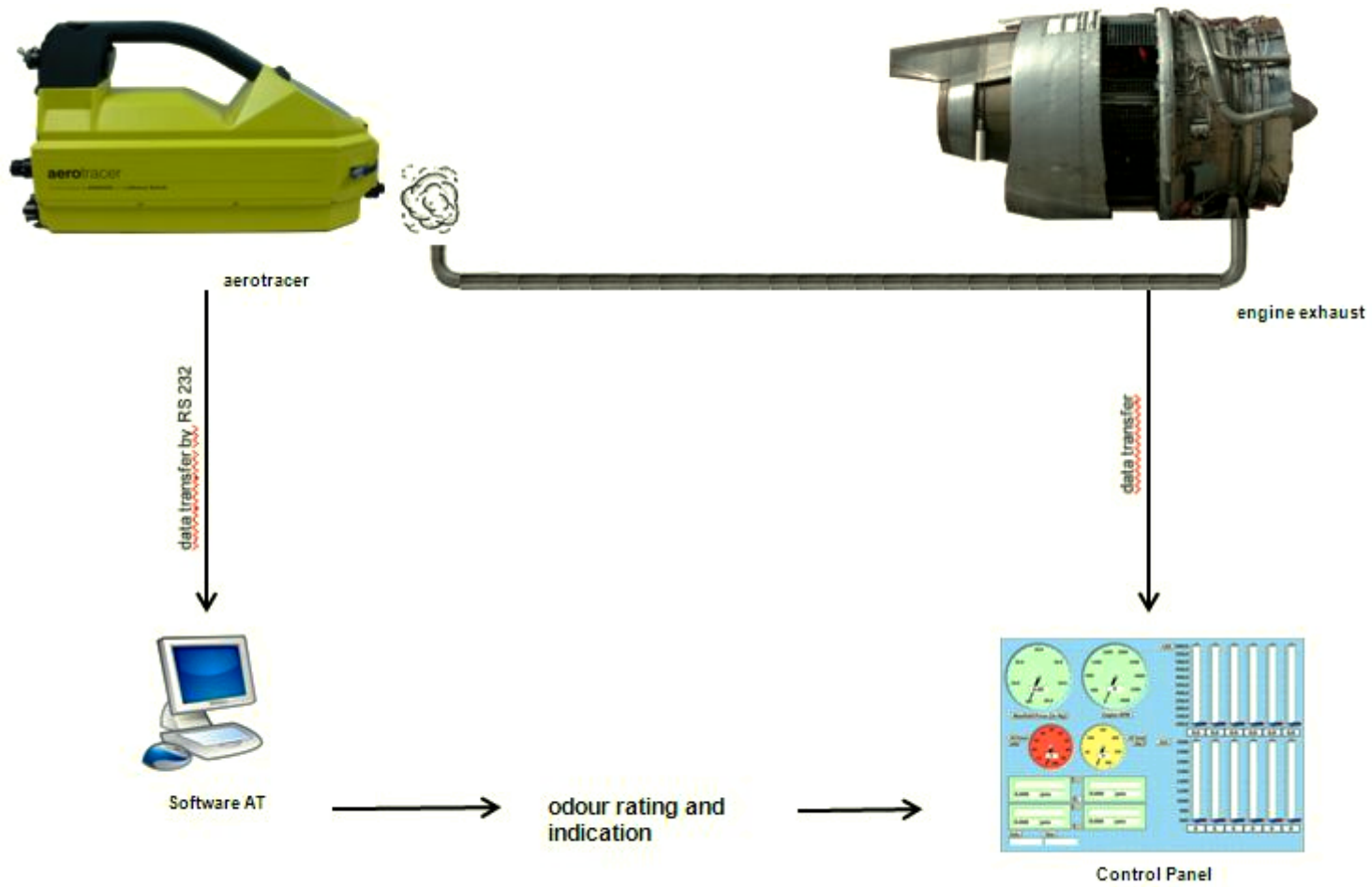
									RESULT	
									NO SMELL	SMELL
Check Engine #2										
Engine bleed #2 "ON"; Engine bleed #1,3,4 "OFF"; Crossbleed "CLOSE"; Pack #1 "ON"; Pack #2 "OFF"; APU "OFF"										
ENG#1	ENG#2	ENG#3	ENG#4	CROSSBLEED	PACK#1	PACK#2	APU		X	

									RESULT	
									NO SMELL	SMELL
Check Engine #3										
Engine bleed #3 "ON"; Engine bleed #1,2,4 "OFF"; Crossbleed "OPEN"; Pack #1 "ON"; Pack #2 "OFF"; APU "OFF"										
ENG#1	ENG#2	ENG#3	ENG#4	CROSSBLEED	PACK#1	PACK#2	APU			X

									RESULT	
									NO SMELL	SMELL
Check Engine #4										
Engine bleed #4 "ON"; Engine bleed #1,2,3 "OFF"; Crossbleed "OPEN"; Pack #1 "ON"; Pack #2 "OFF"; APU "OFF"										
ENG#1	ENG#2	ENG#3	ENG#4	CROSSBLEED	PACK#1	PACK#2	APU		X	

									RESULT	
									NO SMELL	SMELL
Check APU										
APU bleed "ON"; Engine bleed #1,2,3,4 "OFF"; Crossbleed "CLOSE"; Pack #1 "ON"; Pack #2 "OFF"										
ENG#1	ENG#2	ENG#3	ENG#4	CROSSBLEED	PACK#1	PACK#2	APU		X	

APU tests on test bench



The aerotracer is used by ...

- **airlines**
- **MRO shops**
- **maintenance providers - Aircraft Support Team(s)**
- **engine manufacturers**
- **aircraft manufacturers**

Summary

- **use the aerotracer to detect and identify smells on board**
- **use the aerotracer during High Power Run Up to confirm or exclude engine oil smell in bleed air**
- **use the aerotracer during High Power Run Up to locate or eliminate the source of smell**
- **use the aerotracer to avoid unnecessary engine removals**

Summary

- **use the aerotracer to confirm or exclude engine oil smell in bleed air on test bench**
- **use the aerotracer to investigate the success of modification after engine removal and modification on test bench**
- **use the aerotracer as leak search device in and around an aircraft**

Key benefits

- **reduce the costs during High Power**
- **reduce the total downtime during maintenance**
- **reduce or avoid unnecessary engine removals**
- **reduce the exposure of passengers and crews to harmful substances**

aerotracer - a powerful tool - which will definitely increase the flight safety !

questions ?

please feel free to contact us

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