ACE Automated Analysis of Customers, Configured , Engines or Equipment

ADF Propulsion Systems Symposium

Oct 2018

Jon Wingler

Trusted to deliver excellence

Extensive Debris Analysis Experience

Rolls-Royce introduced automated debris analysis to the market in 1998 – and has been sustaining and growing our debris analysis capability ever since.

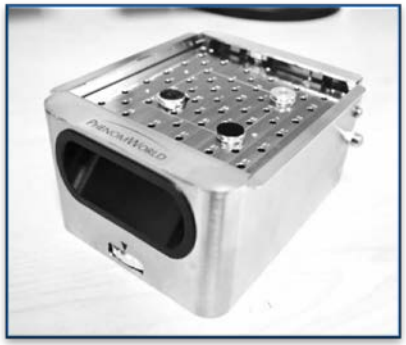
Debris Analysis Capability Applications:

- Rolls-Royce RB199 engine in the RAF's Tornado fighters / bombers
- EJ200 engine in the RAF and RSAF Eurofighters
- RR Adour engine in the RAF and RSAF Hawk
- RR Adour Test Stand in Bristol
- General Electric F110 engine in the F-16
- General Electric F118 engine in the U-2
- Rolls-Royce F402 engine in the US Marine Corp's AV-8B (Harrier)
- Pratt & Whitney J52 engine in the US Marine Corps and US Navy EA-6B
- Test Stand support for pass-off test for large Civil engines
- Test Stand support for LiftSystem in the F-35B
- Additional test cell locations within General Electric

Locations of Rolls-Royce debris analysis customers around the world

24 x 7 x 365 direct customer support keeps fleets flying around the world

Next-Generation Automated Debris Analysis



Captured debris, up to 30 carbon tabs in a single analysis

+

Tailorable Rolls-Royce Debris Analysis application simplifies data capture, reports, and decision-making

+

SEM completes elemental and morphological analyses on demand

Steps to use Automated Debris Analysis:

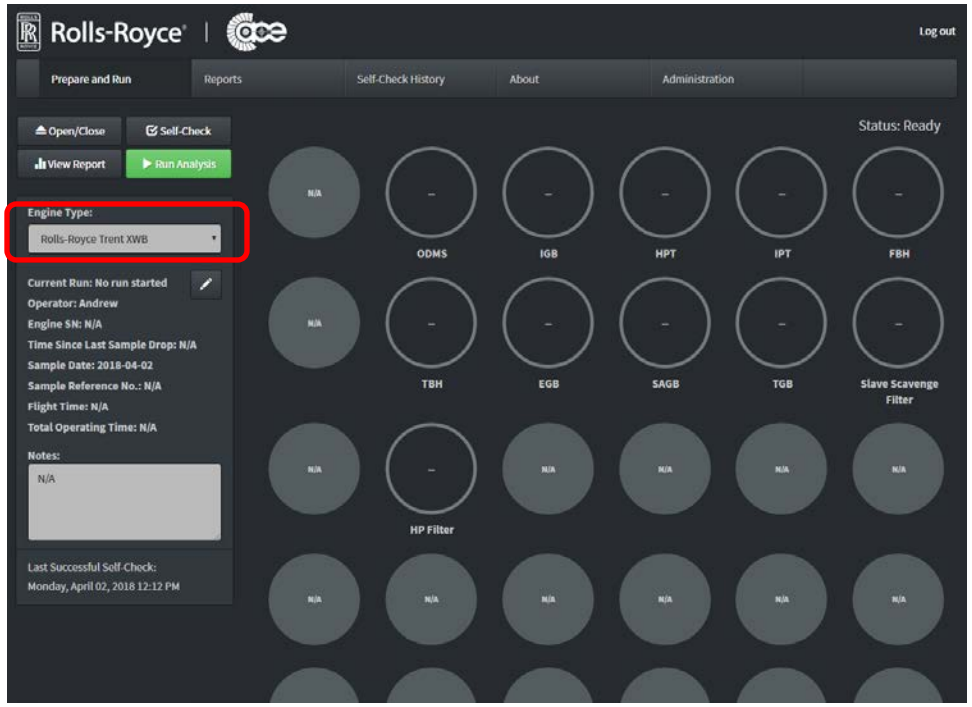
1. Capture debris
2. Load to Scanning Electron Microscope (SEM)
3. Enter key engine / equipment information
4. Click “Run Analysis” Against ECF and CCF
5. View your custom reports

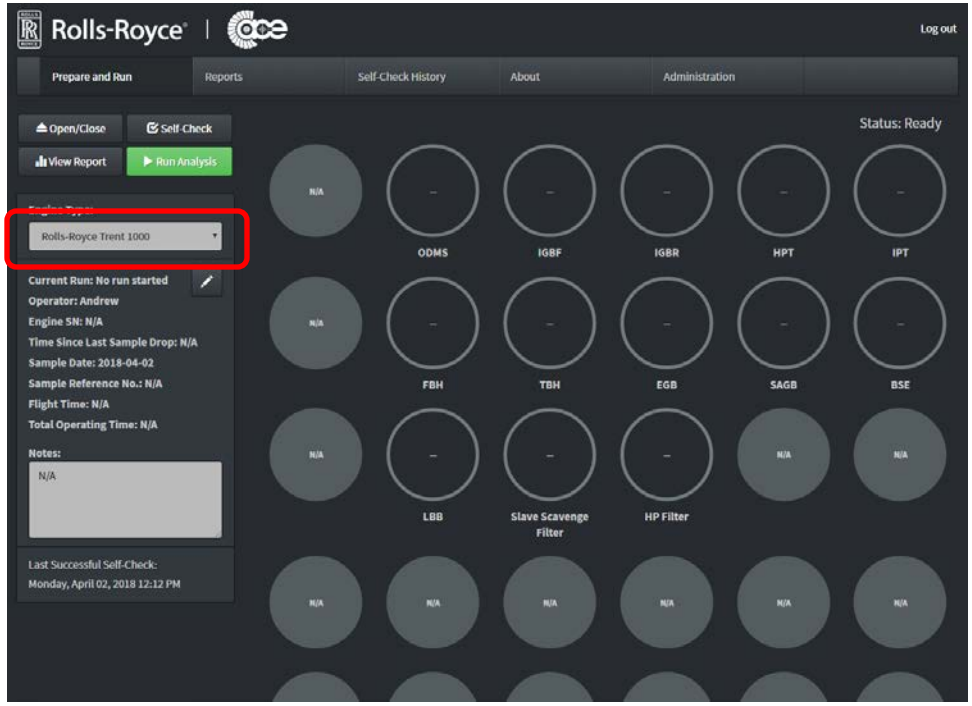
How to introduce the capability

- Customer identifies a product(s) for which to introduce Debris Analysis Capability
- Create Engine Configuration Files (ECF) Customer Configure Files (CCF)
- Design Custom Reports
- Integrate ECF/CCF & Custom Reports with Debris Analysis Application
- Productionize SEM solution
- Rolls-Royce Package, Install, and Train
- Rolls-Royce Ensures System Readiness

Multiple Engines ECF's can be used

Trent XWB	Trent 1000	Trent 900	Trent 700
ODMS	ODMS	EMCD	MASTER
IGB	IGBF	IGBF	IGB
HPT	IGBR	IGBR	EGB
IPT	HPT	HPT	HP/IP
FBH	IPT	IPT	FBH
TBH	FBH	FBH	TBH
EGB	TBH	TBH	SAGB
SAGB	EGB	EGB	
TGB	SAGB	SAGB/LBB	
	BSE	BREATHER	
	LBB		
Total = 9	Total = 11	Total = 10	Total = 7





MCD Locations Can be Utilized


Rolls-Royce
Log out
Prepare and Run
Reports
Self-Check History
About
Administration
Open/Close
Self-Check
View Report
Run Analysis
Status: Ready
Engine Type:
Rolls-Royce Trent XWB
Current Run: No run started
Operator: Andrew
Engine SN: N/A
Time Since Last Sample Drop: N/A
Sample Date: 2018-04-02
Sample Reference No.: N/A
Flight Time: N/A
Total Operating Time: N/A
Notes:
N/A
Last Successful Self-Check:
Monday, April 02, 2018 12:12 PM
ODMS
IGB
HPT
IPT
FBH
TBH
EGB
SAGB
TGB
Slave Scavenge Filter
HP Filter
N/A

Log out

Prepare and Run | Reports | Self-Check History | About | Administration

Open/Close | Self-Check | View Report | Run Analysis

Status: Ready

Engine Type:

Rolls-Royce Trent 1000

Current Run: No run started

Operator: Andrew

Engine SN: N/A

Time Since Last Sample Drop: N/A

Sample Date: 2018-04-02

Sample Reference No.: N/A

Flight Time: N/A

Total Operating Time: N/A

Notes:

N/A

Last Successful Self-Check:
Monday, April 02, 2018 12:12 PM

N/A	– ODMS	– IGBF	– IGBR	– HPT	– IPT
N/A	– FBH	– TBH	– EGB	– SAGB	– BSE
N/A	– LBB	– Slave Scavenge Filter	– HP Filter	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Data from ACE

- SEM generates debris data for a sample, identified by:
  - Engine type
  - Specific engine
  - Number of flying hours/Engine hours
  - Aircraft type
  - Customer
  - Etc.
- SEM can be connected to the internet via Ethernet
- SEM can be controlled remotely via VPN
- One customer may have multiple SEMs with data Linked
- Data for an individual SEM is stored locally on the SEM by default for customers that can't allow for an external interface.

Easy Questions????????