Transitioning to Whole Life Customer Support Solutions
Rolls-Royce plc

A high-integrity engineering group operating in civil aerospace, defence, marine and energy markets worldwide
Defence Aerospace

Holds a strong position in all key defence market sectors - combat, STOVL, light-attack, trainer, transport, helicopters, maritime reconnaissance and aerial surveillance

- More than 160 armed forces
- Unique VSTOL experience
- Participating in principal new programmes
- Innovative supporting services

Rolls-Royce
Worldwide aerospace operation and support

- Over 250 representatives
- Support for over 70 repair bases
Product Life Cycle Support – Managing Knowledge Integration

- Rolls-Royce like any business has to:
  - Create
  - Collect
  - Analyse /Use
  - Exchange and Deliver data

In order to produce its Products and Service’s

To deliver

Support Solutions

PLCS will fully support these elements
Total Support Packages

Tailored support from a full range of services, including fully integrated total support packages.

- Engine and parts supply
- Maintenance, Repair and Overhaul, including Engine Health Monitoring
- Data Management, including predictive modelling
- Technical Information
- Maintenance Capability Support
- Training
- Asset Management

Innovative Support and Business Arrangements
Extended Enterprise of OEM’s, Customer, Partners and Suppliers

Enterprise Integration through dedicated networks

Product Lifecycle Management (PLM)

Domain specific information systems (e.g. CAD, MRPII, Planning)

Product Life Cycle Support (PLCS)

Internet-based architecture and federated data models make possible implementations involving thousands of users across many sites

Product Life Cycle

Concept  Assessment  Demonstration  Manufacture  In-Service  Disposal

In Service Support
Product Life Cycle Support (PLCS)

When set against a timeline – the picture looks more like this!
MRMS meets customer driven opportunities

Commodity

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Service</th>
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<tbody>
<tr>
<td>Spey in Nimrod MR2</td>
<td>Gnome in Sea King</td>
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<tr>
<td>Adour in Jaguar</td>
<td>EJ200 in Eurofighter</td>
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<td>RB199 in Tornado</td>
<td>Pegasus in Harrier</td>
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<td>MFTS PDSCi</td>
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<tr>
<td>TRADITIONAL SUPPORT</td>
<td>SPARES INCLUSIVE</td>
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<td>SPARES INCLUSIVE</td>
<td>AVAILABILITY</td>
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<td>AVAILABILITY</td>
<td>CAPABILITY</td>
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<td>Customer Risk</td>
<td>Service Provider Risk</td>
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<td>Self Trust</td>
<td>Team Trust</td>
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Product Life Cycle Support – Managing Knowledge Integration

Integrated System enables proactive maintenance through health monitoring & forecast usage

Integration of all these parts will provide in-service PLM capability within a digital environment

Flight Deck
(Control Room)

Logistic Support Model
Engineering Models
LCC Model
Forecasting Model

DATA WAREHOUSE

Basic Algorithms

Enterprise Resource Planning
Customer Relationship Management
Product Data Management
Service Data Management

In development today

Models and basic automated analysis available and being developed

Available within Rolls-Royce and Accessible by MoD for data and Information storage

Integrated System enables proactive maintenance through health monitoring & forecast usage

Integration of all these parts will provide in-service PLM capability within a digital environment

Available within Rolls-Royce and Accessible by MoD for data and Information storage
Every bespoke bridge is an additional cost to create and maintain and a source of confusion and mistakes.
Product Life Cycle Support – Managing Knowledge Integration Business Benefits

With PLCS

Typical Business Schematic

PLCS Bridges

Rolls-Royce
Integrated supply chain design

- The key elements to enable an integrated supply chain are ……
  - Mapping the processes
  - Integrated information flow
  - End-to-end responsibility and accountability – customer focus
  - Comprehensive skill sets
  - Capability assessment
  - Agility

PLCS will fully support these elements
Product Life Cycle Support – Managing Knowledge Integration

Rolls-Royce & Ministry of Defence

Early Implementation of PLCS
MoD and Rolls-Royce are agreed they will gain significant and essential benefit from Early Implementation (EI) of PLCS.

A joint EI programme is being developed, to align with availability of PLCS deliverables, and cover our joint data requirements for operating TSP/CLS type contracts.

An initial element of this programme is already underway for Marine Olympus and Tyne

A further element is to involve the Defence Aerospace Software Application - Service Data Manager

This is a key part of the Information System for Defence Aerospace Service offering ‘Mission Ready Management Solutions’ (MRMS)
EI will enable

- The testing of the MoD LITS/Rolls-Royce Interface and RLI using the Defence Aerospace Service Data Manager project.
- An implementation process “template” & lessons learned data capture process.
- Actual benefit to current business from application of PLCS
- The audit of the completed modules

This is an opportunity for Rolls-Royce & MoD to work together to demonstrate what can be achieved and start to realise our investment in PLCS.
The Future for PLCS

- Implementation of PLCS will:
  - Reduce costs for both the customer and industry Rolls-Royce
  - Increase effectiveness and improve efficiency for the customer
  - Improve customer confidence in industries ability to deliver integrated ‘Support Solutions’

The PLCS ISO standard will facilitate the development of more diverse integrated teams and supply chains as it provides a neutral data exchange standard crossing all industries and all political barriers.
Whole Life Customer Support Solutions Opportunities

UK MoD Pegasus
US Navy Adour
F405

UK MoD RB199
US Navy T56

UK MoD Adour
Mk106

UK MoD Gnome
RAAF Adour

UK MoD EJ200
US Military
AE1107

Civil M250
US Marines
AE2100D3

Canadian NFTC
Adour

US Army M250
US Navy Adour
F405

UK MoD Defence Training Review

Nordic RTM322
Malaysia Adour
UK MoD Partnered Defence Supply Chain

Pipeline

Pipeline

UAE Adour

RAF T56 / AE2100

RTM322 Portugal

UK MoD Military Flying Training System