

# WHITE PAPER



## DEFENCE OF OUR GREEN AND PLEASANT LAND



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# DEFENCE OF OUR GREEN AND PLEASANT LAND

A white paper on how the measurement of ecological impact can be achieved within Defence

## EXTRACT

World Governments have already agreed (Bali talks) to jointly step up international efforts to combat climate change and get to an agreed outcome. The follow up round took place in Copenhagen in December 2009.

Under the Kyoto Protocol (which expires in 2012), the 15 countries which were EU member states, when the Protocol was agreed (the EU-15), are committed to reducing their collective greenhouse gas emissions in the period 2008-2012 to 8% below levels in a chosen base year (1990 in most cases). This collective commitment has been translated into differentiated national emission targets for each EU-15 member state which are binding under EU law<sup>1</sup>.

The UK government has therefore committed to reductions in emissions being enshrined in legislation (Climate Change Act 2008 and Energy Act 2008) and there is a real focus on the reduction of emissions known to be detrimental to the global climate. These are being disaggregated as targets to industry, government departments and agencies<sup>2</sup>.

However, there is also a direct linkage between this greening strategy and the UK Government Sustainable Procurement strategy. Here there is an impact to procurement considerations for sustainment of the environment, longevity of sustainment (e.g. availability of fuel stocks in future years) and operational procurement considerations (eg in terms of reducing the logistics footprint). The UK Government has also committed to being amongst the leaders in the EU on sustainable procurement and the UK MOD now has a Sustainable Procurement strategy and action plan as well as a Sustainable Procurement team<sup>3,4</sup>.

As such, there is also an operational linkage to a greening strategy being different views of the same issues that manifests itself most significantly within the UK MOD where equipment is procured for extended periods often up to 30 plus years<sup>5,6</sup>.

<sup>1</sup> [http://ec.europa.eu/environment/climat/home\\_en.htm](http://ec.europa.eu/environment/climat/home_en.htm)

<sup>2</sup> <http://www.decc.gov.uk/default.aspx>

<sup>3</sup> <http://www.mod.uk/DefenceInternet/MicroSite/DES/OurTeams/BusinessGroups/SustainableProcurementTeam.htm>

<sup>4</sup> <http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/SSDCD/SustainableDevelopmentPolicyTeam.htm>

<sup>5</sup> <http://www.defra.gov.uk/sustainable/government/>

<sup>6</sup> <http://www.idea.gov.uk/idk/aio/7643299>

By way of example, this linkage between reductions in greenhouse gas emissions, procurement considerations for sustainment of the environment, longevity of sustainment and operational procurement considerations is not just about the CO<sub>2</sub> emissions of a Challenger tank or Tornado squadron and how that can be reduced through life—albeit a commendable objective in itself—But, the much wider target of the CO<sub>2</sub> emissions of that Challenger tank or Tornado squadron together with which fuel it uses, how much fuel it uses, the logistics footprint, what might the supply of fuel be in 30 years and how that should all be measured against targets and optimised.

This paper explores a way forward with a focus on measurement as a key driver for achievement in the area of Defence Logistics and addresses Defence Greening, Defence Sustainable Procurement and Defence ICT.

## **OVERALL UK GOVERNMENTAL POSITION**

The UK has an overarching target to reduce greenhouse gases by 26% or more by 2020 and by at least 60% by 2050. It has further set a target for the central government office estate to achieve carbon neutrality by 2012. In addition to the current Sustainable Operations on the Government Estate (SOGE) targets that were announced by the Prime Minister in 2006, the Government has further committed Departments (including the UK MOD) to sourcing at least 10% of electricity from renewable resources and to source at least 15% of electricity from Combined Heat and Power.

The Department for Energy and Climate Change will lead the drive towards the 2050 targets in green house gas emissions in the UK and has set out intermediate targets to ensure progress along the way.

## **THE UK MOD POSITION (GREENING STRATEGY)**

As the MOD is responsible for an estimated 70%<sup>7</sup> of government emissions it is critical that those generated as part of military activity be reduced if government is to set a leading example in achieving the stated reductions or actually to achieve those targets<sup>8</sup>.

The UK MOD Climate Change Aim has been stated as:

“To be a leader amongst UK Government Departments and defence departments in EU and NATO states in the sustained reduction of CO<sub>2</sub> and other GHG emissions, and to ensure the continued delivery of Defence capability in a changing climate.”

<sup>7</sup> This figure can portray UK MOD adversely as it lacks the ability to differentiate and measure office to non office based output within its operation.

<sup>8</sup> <http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/SSDCD/ClimateChangeAndEnergy.htm>

In addition, the UK MOD has noted that the 2008 National Security Strategy identified Climate Change as:

“...potentially the greatest threat to global and national security.”

Therefore, the UK MOD can be seen to take very seriously its responsibilities with regards to climate change, both through Mitigation (reducing its own emissions to minimise its contributions to climate change); and Adaptation (adapting its own policy planning, equipment and estate to the potential threats posed by climate change, as well as contributing to wider UK Government campaigns to raise awareness of the dangers of climate change).

As such, the UK MOD Climate Change Vision has been set out as:

“Effective delivery of Defence capability that is robust to climate change and does not substantially contribute to its causes.”

*But this challenge needs to be measured and directed across a complex estate with complex processes and complex equipments.*

## **THE UK MOD POSITION (DEFENCE SUSTAINABLE PROCUREMENT)**

As set out above, in addition to reductions in greenhouse gas emissions, and procurement considerations for sustainment of the environment, longevity of sustainment and operational procurement considerations are particularly relevant to the UK MOD operational and business model. The UK MOD has identified significant operational benefits if it is able to reduce its consumption of fossil fuels.

“Reducing the amount of fuel needed at the front line could lead to a reduced logistics trail, meaning UK armed forces can be more agile and that fewer personnel would be put at risk protecting fuel convoys. In addition, a reduction in fuel use will have a direct impact on our estate energy bills and the cost of fuel for our ships, aircraft and ground vehicles.”

In addition, the UK MOD has further identified the risk of increased threat around the wider climate debate:

“... a changing climate may well act as a multiplier of threat in areas of the globe where high tensions already exist, as well as potentially opening up new areas of conflict. The MOD recognises the need to factor this into policy planning and force development.”

and of note:

“Fuel purchased for 33 pence per litre in Pakistan costs £85 per litre by the time it reaches a forward operating base—and it costs lives to get it there (military, but also civilian drivers driving fuel in from Pakistan)—this fact alone drives the reduction of energy consumption and the reduction of the logistic footprint.

“Fuel is a battle winning enabler—without bullets you can run away, but without fuel you’re on foot! Estimated that 15% of the Defence budget is energy related.

“The UK MOD are currently looking seriously at the options available when conventional oil resources run out or become prohibitively expensive.”—Policy on this will be inserted into JSP 886 shortly.

The UK MOD has identified that there are changes to business that can be made immediately that will have some impact on the MOD’s response to climate change, but many of the solutions are long term and will require a joined-up and measurable approach to ensure effective delivery. In short, the Government sustainability agenda (and therefore that of the UK MOD) seeks to ‘meet present needs without compromising the ability to meet the needs of future generations.’ The key issues here are that:

- Energy use is too high—UK MOD energy bill is approximately £1Bn per year.
- Non-renewable resources are finite and increasingly scarce (especially rare-earth metals).
- Waste generation cannot continue at the present rate (UK 335M tonnes per year to landfill)—the MOD has declared its intent to become a ‘zero waste to landfill’ organisation.
- The MOD estate produces approx 70% of the entire UK Government estate emissions.
- There are energy efficiencies that can be achieved across all equipment platforms if they can be identified, measured and optimised.
- Support miles (like food miles) need to be reduced;
- The use of hazardous materials, packaging and consumables need to be reduced to enable a move towards zero disposal.

The UK MOD ‘Securing the future’ paper lays out its strategy here and the Sustainable Procurement task force was set up in 2005 (Gen Andrew Figures is the MOD

representative). The MOD signed the Sustainable Procurement Charter in 2008 and all business cases must now confirm that sustainable development practices have been considered. For DE&S (Defence Equipment & Support) there is a focus on looking for specific evidence of compliance<sup>9</sup>.

*But again, to be effective, this needs to be measured and directed across a complex estate with complex processes and complex equipments if Through-Life Energy Management is to be embedded within Capability Area Plans, there is to be maximum utilisation of existing data to profile usage and a capability provided to measure and report greenhouse gas production.*

## THE UK GOVERNMENTAL POSITION (ICT)

In addition to the general emission, sustainable procurement and operational targets there is a current and strong focus on the specific area of introducing sustainability/green targets into UK Government ICT (Information and Communication Technologies). Further reading can be found in the following articles and the Government Green ICT White Paper—Cabinet Office led initiative<sup>10</sup>:

### 1. Computing (15 Sep 2009)

“The government claims it has saved £7m in the past year through its green IT strategy, and cut the carbon footprint of Whitehall technology by 12,000 tonnes – equivalent to taking 5,000 cars off the road. Cabinet Office minister Angela Smith told the Greening Government ICT conference in London...”<sup>11</sup>

### 2. Computing (17 Jul 2008)

“The government revealed plans this morning to make the energy consumption of public sector IT carbon neutral within four years. The Cabinet Office has outlined 18 key steps...”<sup>12</sup>

The UK Government IT strategy (which whilst still technically in draft) has been approved by the Government CIO Council, and is with Ministers for sign-off (Note that the MOD is represented on the CIO Council by Air Cdre Tony Boyle<sup>13, 14</sup>). Within this the Greening Government ICT strategy will in time include mandated

<sup>9</sup> <http://www.mod.uk/DefenceInternet/DefenceNews/DefencePolicyAndBusiness/ModSignsSustainableProcurementCharter.htm>

<sup>10</sup> [http://www.cabinetoffice.gov.uk/about\\_the\\_cabinet\\_office/speeches/smith-angela/greenict.aspx](http://www.cabinetoffice.gov.uk/about_the_cabinet_office/speeches/smith-angela/greenict.aspx)

<sup>11</sup> <http://www.computing.co.uk/computing/news/2249490/government-saves-7m-green>

<sup>12</sup> <http://www.computing.co.uk/computing/news/2221916/government-carbon-neutral-years>

<sup>13</sup> <http://www.cabinetoffice.gov.uk/cio.aspx>

<sup>14</sup> [http://www.123people.co.uk/ext/frm?ti=person%20finder&search\\_term=owen%20pengelly&search\\_country=GB&st=person%20finder&target\\_url=http%3A%2F%2Fwww.cabinetoffice.gov.uk%2Fcio%2Fchief\\_technology\\_officer%2Fcto\\_members.aspx&section=weblink&wrt\\_id=216](http://www.123people.co.uk/ext/frm?ti=person%20finder&search_term=owen%20pengelly&search_country=GB&st=person%20finder&target_url=http%3A%2F%2Fwww.cabinetoffice.gov.uk%2Fcio%2Fchief_technology_officer%2Fcto_members.aspx&section=weblink&wrt_id=216)

targets for government agencies and Chief Information Officers (CIO) at UK government agencies and departments which may include penalties for noncompliance to targets. To support this the CIO Council has developed a list of key objectives for making a greener IT in UK government and distilled a number of objectives for first-round implementation—the key points are summarised below:

- All departments are to address and consider the impact on carbon emissions and by 2020 government must be ICT carbon neutral across its life cycle.

All new ICT purchases building on existing mandatory “Quick Wins” standards or certain aspects of sustainable ICT purchasing across government.

- By 2020 the government aims to comply with and where possible lead and go beyond global best practice for sustainability across the whole lifecycle.

This will cover carbon neutrality and processes for use of materials, water, accommodation and transport in the manufacture, use and disposal of ICT.

- Extend the business/IT Strategy to include a green ICT plan and extend the lifecycle of all ICT purchases to their natural demise.

Either caused by failure, inability to support the business objectives of the organization, excessive maintenance costs or excessive carbon footprint and energy consumption, as opposed to frequent automatic refresh and replacement programs, where such extension will have environmental benefits across the product lifecycle.

- CIOs to demonstrate leadership—sign a sustainable ICT charter with industry providers—and implement as many actions from “Areas for ICT Carbon Reduction” as are practicable and necessary.

However, it has been recognized that ICT is a key enabler for most Transformational Government programmes and can be used to generate environmental benefits in Defence Logistics. For example:

- Through telephone and video conferencing.
- Reductions in building occupancy and travel.
- Increased efficiency in the operation, configuration, maintenance and Supply Chain of equipments within the inventory particularly for major and complex equipments such as aircraft and vehicles.

*But again to achieve these benefits it is likely to require an increase in ICT investments to achieve measurable information capture and target achievement benefits particularly within the UK MOD where measurement needs to be directed across a complex estate, with complex processes and complex equipments.*

## THE IFS A&D APPROACH

“A central challenge in all sustainability discussions is that most are driven by gut feeling—a ‘that doesn’t seem right’ approach—but companies must rapidly progress beyond well-meaning intuition. What’s needed is engineering-type methodology and meaningful underlying data for serious environmental evaluations.”

Derek Prior, AMR Alert Article October 15, 2008.

IFS recognised that the breadth and depth available within its ERP solution already contained much of the infrastructure that would be required for calculating the environmental impact of business activity. Additionally the Applications particular focus on Asset Management, Fleet Management and Project Based Logistics Capability, coupled with significant experience in the defence domain, ideally position IFS to transition this opportunity into the Defence environment.

In short to leverage the Greening and Sustainability opportunity in current Defence Logistics implementations that are based upon IFS Applications (eg programmes such as JAMES (with LM), UMMS (UK RN), BACMS (with GDUK), eCapability (with BAES) and similar global implementations with Bristow, GE, HAL, RNorAF, SAAB, Goodrich, Gables, Hawker Pacific etc).

What was needed was to:

- Bring together the different strands of the embedded positions of IFS Applications and its enterprise breadth.
- Feed from the specific IFS Aerospace & Defence (A&D) Packaged solutions – Component MRO, Heavy Maintenance, Complex MRO, Spare Parts Management Solution, Fleet and Asset Management Solution, Project Based Manufacturing plus the Maritime specific on board UMMS Solution.
- Deliver an integrated and additional functionality able to leverage meaningful environmental information as a value added capability.

The first step required the ability to offer a consistent unit of measure that could be applied to the various A&D activities—i.e. ability to support the complex core logistics task with the agility to deliver understandable and actionable environmental metrics.

## IFS ECO-FOOTPRINT

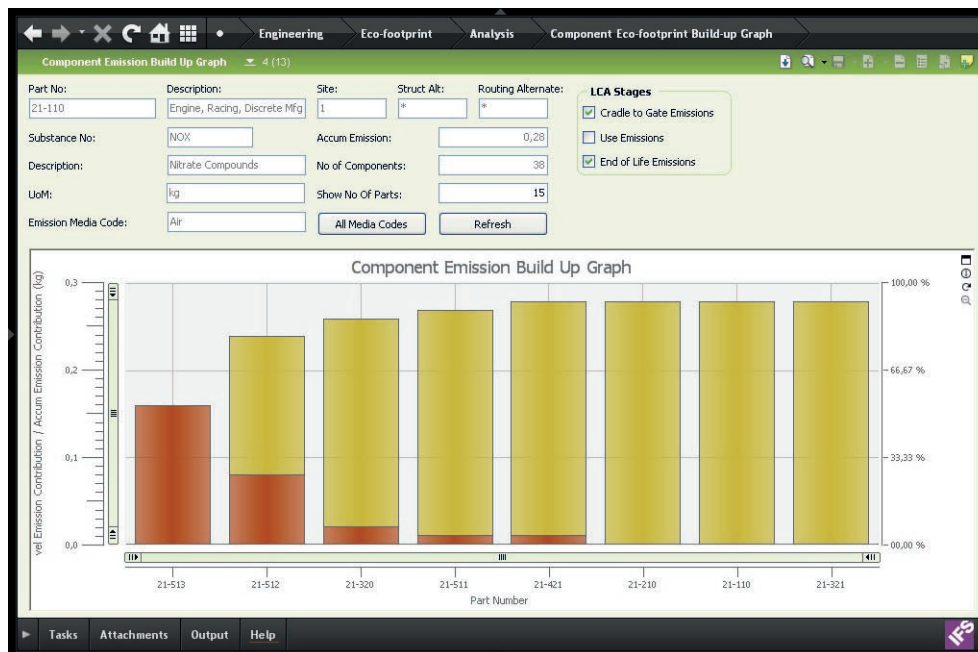


IFS have developed the ecoFootprint module to build upon its modular based application [http://www.ifsworld.com/solutions2/eco-footprint\\_management/default.asp](http://www.ifsworld.com/solutions2/eco-footprint_management/default.asp)

Research into this area by IFS R&D revealed that such a common ‘currency’ was developed by the IPCC (Intergovernmental Panel on Climate Change) and adopted for use in the Kyoto Protocol<sup>15</sup>.

Global Warming Potential (GWP) takes CO<sub>2</sub> as the baseline unit (and therefore has a GWP of 1) other substances are then given a standard rating relative to this. For example Methane has a GWP of 72 and Nitrous Oxide a GWP of 289<sup>16, 17</sup>.

The IFS ecoFootprint module calculates GWP (as well as ODP etc) alongside the constituent pollutants of a product. It provides a total ‘rolled-up’ ecological footprint of a product or configured asset or Defence equipment through the various sub-assemblies, components and activities that make up the whole. In this way

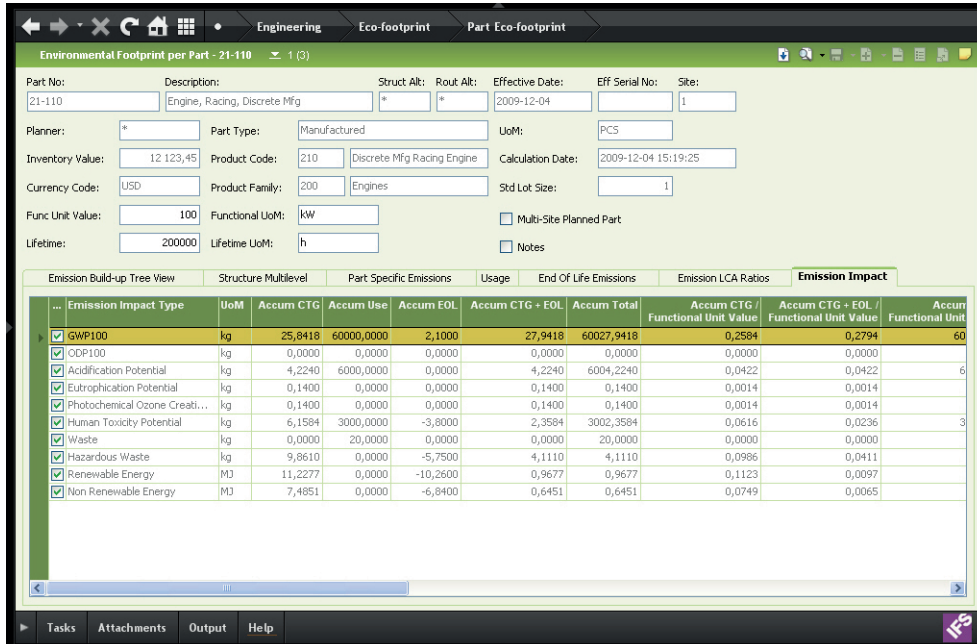


<sup>15</sup> Indeed, a number of internationally recognised measures can now be applied to normalise the disparate causes of environmental impact even if caused by different processes and business activities.

<sup>16</sup> GWP is not the only recognised ecological unit of measure, others include Ozone Depletion Potential (ODP), Human Toxicity Potential (HTP) Acidification Potential (AP), Eutrophication Potential (EP), Photochemical Ozone Creation Potential (POCP).

<sup>17</sup> As most of these substances decay over time in the atmosphere it is usual for the figures to be set for a time period. The example figures were taken from the 2007 IPCC AR4 report and are 20 year figures.

<sup>18</sup> [http://www.ifsworld.com/solutions2/cp/eco-footprint\\_management/default.asp](http://www.ifsworld.com/solutions2/cp/eco-footprint_management/default.asp)



Part No: 21-110 Description: Engine, Racing, Discrete Mfg Struct Alt: \* Rout Alt: \* Effective Date: 2009-12-04 Eff Serial No: Site: 1

Planner: \* Part Type: Manufactured UoM: PCS

Inventory Value: 12 123,45 Product Code: 210 Discrete Mfg Racing Engine Calculation Date: 2009-12-04 15:19:25

Currency Code: USD Product Family: 200 Engines Std Lot Size: 1

Func Unit Value: 100 Functional UoM: KW Multi-Site Planned Part

Lifetime: 200000 Lifetime UoM: h Notes

Emission Impact Type	UoM	Accum CTG	Accum Use	Accum EOL	Accum CTG + EOL	Accum Total	Accum CTG / Functional Unit Value	Accum CTG + EOL / Functional Unit Value	Accum Functional Unit
<input checked="" type="checkbox"/> GWP100	kg	25,8418	60000,0000	2,1000	27,9418	60027,9418	0,2584	0,2794	60
<input checked="" type="checkbox"/> ODP100	kg	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	
<input checked="" type="checkbox"/> Acidification Potential	kg	4,2240	6000,0000	0,0000	4,2240	6004,2240	0,0422	0,0422	6
<input checked="" type="checkbox"/> Eutrophication Potential	kg	0,1400	0,0000	0,0000	0,1400	0,1400	0,0014	0,0014	
<input checked="" type="checkbox"/> Photochemical Ozone Creat...	kg	0,1400	0,0000	0,0000	0,1400	0,1400	0,0014	0,0014	
<input checked="" type="checkbox"/> Human Toxicity Potential	kg	6,1584	3000,0000	-3,8000	2,3584	3002,3584	0,0616	0,0236	3
<input checked="" type="checkbox"/> Waste	kg	0,0000	20,0000	0,0000	0,0000	20,0000	0,0000	0,0000	
<input checked="" type="checkbox"/> Hazardous Waste	kg	9,8610	0,0000	-5,7500	4,1110	4,1110	0,0986	0,0411	
<input checked="" type="checkbox"/> Renewable Energy	MJ	11,2277	0,0000	-10,2600	0,9677	0,9677	0,1123	0,0097	
<input checked="" type="checkbox"/> Non Renewable Energy	MJ	7,4851	0,0000	-6,8400	0,6451	0,6451	0,0749	0,0065	

components or sub-assemblies that have a high-impact/contribution can be readily identified and suitable actions taken<sup>18</sup>.

When used in conjunction with the IFS Applications configuration, maintenance and fleet management strengths either the GWP picture or the operational impact picture can be developed to support real Logistics process challenges. For example:

- The application could be used to estimate future eco impacts by taking into account the current MRP forecast and production plan.
- Activities such as manufacture, transportation, through-life and end-of life activity can be represented in terms of a baseline (i.e. CO<sub>2</sub>) as well as the other standard measures.
- Cost Centre/Workshop areas can be monitored and analysed for GWP efficiency as part of a wider operational reporting infrastructure.
- CLS/PBL providers can offer value added services to improve efficiencies and effectiveness and support to MOD GWP reporting.

IFS have achieved this by extending the existing data structures to include an emissions tab to the relevant base data. However, it is important to note that there is minimal maintenance overhead of the solution. Once the base data is in place within the IFS ecoFootprint there is little additional, operational overhead from a systems point of view. This is because the normal enterprise events of purchasing, managing

the supply-chain, transportation of goods etc. will proceed as normal, with the ecological impact of these activities being a natural calculation by applying the defined emissions data. The solution can also be adopted in a mixed application environment and does not require IFS Applications to be extended across the whole enterprise.

The first ‘early adopters’ have taken delivery of the ecoFootprint solution and it is now ready for deployment within a Defence Logistics Value Added Capability that specifically targets the ecoFootprint of Defence equipments and supply chains in complex military environments.

“Whether our customers are complying with government mandates to reduce their environmental impact or are executing on a proactive sustainability initiative, this is precisely the kind of tool they will need. IFS is able to rapidly develop and deploy this fully-integrated, Enterprise standard functionality because we have structured our product and our company with agility and speed to market in mind. This tool will help our customers manage board-level risk, position themselves in the market and comply with those more stringent regulations. That is why environmental foot-printing is a high priority for IFS.

The Eco-Footprint management tool is available to early adopter customers as of today.”

IFS AB President and CEO Alastair Sorbie.

## ABOUT IFS DEFENCE

Aerospace & Defence is a key vertical industry focus for IFS Defence and IFS Applications™, and for more than 10 years, IFS Defence has delivered value-adding business Solutions to customers in this sector. IFS' project-based solutions support: Fleet Operators, MRO suppliers and OEMs deliver Asset & Fleet Management, MRO, Supply Chain Management and Product Life-cycle Management—where our application development is driven to meet the rigorous demands of this changing market.

IFS Defence has an unrivalled pedigree in helping leading military and civil Aerospace & Defense organizations in the UK, EMEA, USA and across the globe adapt to the challenges of transformation. IFS offer the Aerospace & Defence industry a unique, evolutionary and agile solution to meeting the transformation challenge; by providing flexibility in a single product and a step-by-step approach to implementation, enabling a faster ROI and ongoing lower TCO. Solutions that underpin the delivery of significant reductions in inventory investments and increased fleet availability and visibility for enhanced operational readiness.

More details can be found at [www.IFSWORLD.com](http://www.IFSWORLD.com).

For further information, e-mail to [info@ifsworld.com](mailto:info@ifsworld.com)

<b>AMERICAS</b> .....	<b>+1 888 437 4968</b>
ARGENTINA, BRAZIL, CANADA, MEXICO, UNITED STATES	
<b>ASIA PACIFIC</b> .....	<b>+61 2 8904 9222</b>
AUSTRALIA, INDONESIA, JAPAN, MALAYSIA, NEW ZEALAND, PHILIPPINES, PR CHINA, SINGAPORE, THAILAND	
<b>EUROPE EAST AND CENTRAL ASIA</b> .....	<b>+48 22 577 45 00</b>
BALKANS, CZECH REPUBLIC, GEORGIA, GREECE, HUNGARY, KAZAKHSTAN, POLAND, RUSSIA AND CIS, SLOVAKIA, TURKEY, UKRAINE	
<b>EUROPE CENTRAL</b> .....	<b>+49 9131 77 340</b>
AUSTRIA, BELGIUM, GERMANY, ITALY, NETHERLANDS, SWITZERLAND	
<b>EUROPE WEST</b> .....	<b>+44 1494 428 900</b>
FRANCE, PORTUGAL, SPAIN, UNITED KINGDOM	
<b>MIDDLE EAST AND AFRICA</b> .....	<b>+9714 390 0888</b>
INDIA, SOUTH AFRICA, SRI LANKA, UNITED ARAB EMIRATES	
<b>NORDIC</b> .....	<b>+46 13 460 4000</b>
DENMARK, NORWAY, SWEDEN	
<b>FINLAND AND THE BALTIC AREA</b> .....	<b>+358 102 17 9300</b>
ESTONIA, FINLAND, LATVIA, LITHUANIA	

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