Just before Christmas, Secretary of State for Defence Dr John Reid introduced the Government’s Defence Industrial Strategy (see also page 21). He highlighted that Government has already pledged to invest in a significant technology development programme for UAVs, adding that many aerospace OEMs and first tier suppliers are participating in real UAV projects.

Also speaking at the launch, Minister for Defence Procurement, Lord Drayson, said: “We need to explore the future mix of conventional aircraft with UAVs. The potential to allow UK industry to develop specific UAV commercial expertise is important in what is likely to be a significant growth market in the future.”

Indeed, according to Forecast International’s The Market for UAV Reconnaissance Systems, the global market for UAVs is expected to be worth some £7.2 billion by 2014, which equates to the sale of approximately 9,000 UAVs.

And UAVs should be viewed as an opportunity, says David Barnes, chairman of the UK’s Unmanned Vehicle Systems Association (UVSA). “At this point in time we are seeing a convergence of market requirement and UAV technical capability, which has developed to a point where a number of limitations set by manned aircraft can be overcome by autonomy. A significant proportion of the aerospace industry is lining up its sights on the opportunities presented by UAV systems.”

DEFINITION, PLEASE
The definition of a UAV varies from light UAVs with payloads of little more than 100 kg for surveillance operations, up to fully functional fighters. And although there are some private commercial programmes in operation, the majority of the UK aerospace supply chain will undoubtedly be attracted to the large scale military UAVs in development.

One of the most prominent is the X-47B (see below). US-based Northrop Grumman has been awarded a contract to build three X-47B demonstrator UAVs and supply an operational assessment phase to last from 2007-09.

Construction of these UAVs began in June 2005 with first flight scheduled for October this year. Main contractors for the project include Pratt & Whitney, which will supply its F100-220E engine. Other team members include Goodrich and Lockheed Martin, as well as Smiths Aerospace, which is supplying the landing gear from its Santa Ana, US facility.

The design, tooling and manufacture of the outboard wing and forward centre fuselage for these UAVs are being undertaken by British company GKN Aerospace at St Louis, USA, in a contract worth £30 million. However, if a subsequent production programme is given the go-ahead by the US, the contract would be worth over £1 billion to GKN. The outboard wings of the aircraft are of composite, aluminium and titanium design with the centre fuselage being of aluminium.

It has also recently been confirmed that GKN will produce the graphite composite skins (which cover 90 per cent of the aircraft’s surface), covers and

The ‘X’ factor

The X-47B is a stealth unmanned surveillance and attack aircraft for land and ship-based operations. It will be able to carry two JDAM smart weapons weighing over 900 kg each and will have a combat mission radius of 2,400 km. The X-47B will be over 11 m in length with a span of nearly 19 m.

Boeing’s X-45C (left) is a direct competitor. It will feature the capability to carry up to eight SDBs (small diameter bombs) or two JDAM smart weapons. The aircraft measures nearly 12 m in length with a span of nearly 15 m and will be able to be deployed over a combat radius of 2,220 km. The X-45C will be able to cruise at Mach 0.85.
doors for the X-47B, along with actuated doors for the weapons bay, nose and main landing gear.

“There is always a cost/weight trade off in aerospace manufacture,” explains Jim Gibson, vice president of sales and marketing for GKN Aerospace. “However, we are witnessing a definite increase in the use of composites.” Carbon fibre composites are 20-30 per cent lighter than aluminium alloys and GKN’s previous experience in composite component manufacture is well documented. For instance, GKN supplied several composite and metal alloy technology parts for the F135 military engine [JSF], including the fan inlet case, compressor case, inlet vane guides, containment case, forward fan case and the forward augmentor. Mr Gibson says the company already has a robust supply chain for composite components.

A potential competitor to the X-47B is Boeing’s X-45C (see box, opposite) being manufactured at the company’s St Louis, USA, facility. Boeing is building three aircraft, the first of which began manufacture in 2004. Its maiden flight is scheduled for later this year.

Among the main contractors working with Boeing on the X-45C are BAE Systems, Goodrich and GE, which will supply its F404-GE-102D engine to power the aircraft.

Despite the involvement of British companies on both the X-45C and X-47B UAV programmes, it appears that most of the engineering and manufacturing for these development projects will remain in the US for the present time.

However, UVSA’s Mr Barnes says that the UK will not miss out. “The UK is a leading source for UAV engines and powerplants in the world. UK contractors regularly bid and have input into...
UK’s eye on the sky

Watchkeeper will provide UK armed forces with ISTAR (intelligence, surveillance, target acquisition and reconnaissance) capability based on a tactical UAV system. It consists of the Watchkeeper WK450 UAV carrying day/night sensors and laser target designator connected by data link to a network of containerised ground stations where Army operators will control the entire mission.

Watchkeeper is designed to provide all weather, day and night surveillance in times of war, tension or during peace-keeping operations without the need to deploy troops into harmful situations. The UAV will be able to stay airborne for more than 16 hours.

worldwide UAV programmes.

"Naturally there are some differences in manufacturing parts for UAVs – production will be simpler as there is no need to make allowances for a stringent cockpit environment for the protection of the pilot. UAVs also call for wider use of composites and other pre-formed materials. Unmanned systems offer major opportunities for SMEs with niche capabilities. The supporting technologies required include everything from basic airframe building through to engine, communications and sensor systems."

UK UAV PROGRAMME

One UK UAV programme already up and running is Watchkeeper (see box above), a £700 million contract awarded by the MoD to Thales. Dr Reid says that the contract is expected to create or sustain up to 2,100 high-quality manufacturing jobs in the UK, which could rise (to 2,500) with export success. Although the Government is not releasing unit numbers, the aim is for Watchkeeper to be in service from 2010.

Alex Dorrian, CEO of Thales UK, says: “Based on this endorsement of our solution, we expect to secure export sales of at least £400 million over the next 10 years. The 2,100 jobs mentioned include systems integration, prime contracting, engineering and manufacturing roles – all of which will be within Thales UK, Watchkeeper team companies and throughout the UK supply chain.”

Thales UK has already established a joint venture with Leicester-based Elbit Systems to manufacture, support and upgrade tactical UAV sub-systems for both Watchkeeper and the rapidly growing worldwide UAV market. Another company on the Watchkeeper team is Cambridge-based Marshall Specialist Vehicles Ltd, which will provide the ground station vehicle systems and support infrastructure.

In Europe, too, UAVs are beginning to have an impact. For instance, EADS CASA of Spain and Dassault Aviation of France have signed a £205 million contract to provide the ground station vehicle systems and support infrastructure.

DTI RESEARCH FUNDING

A new DTI pilot scheme aimed at establishing world class UK/US collaborations has granted the University of Manchester £1.5 million over the next two years to develop new composite technologies and materials for future aircraft design in partnership with the University of Washington in Seattle. The tie-up will formally establish the Manchester Seattle Composite Partnership, which will work with the Northwest Aerospace Alliance, Airbus, Boeing and a wide range of businesses in the UK and US.

At the same time, the NWAA’s Aerospace Innovation Centre project team is to lead an in-depth study into the future of fibre reinforced composites. Companies already engaged in the study include BAE Systems, Airbus, Brookhouse Holdings, CML Group and Cytec Engineered Materials.

In another recent development, the Advanced Composites Group based in Heanor, East Midlands, has finalised plans that will see an investment of £7 million to establish a ‘world class’ composites manufacturing and technology centre. The centre is scheduled for opening in September this year and follows hot on the heels of GKN’s Advanced Composites Facility on the Isle of Wight, which was opened officially in August last year.

Eurofighter and JSF have years in them yet, but the industry, technology and manufacturing challenges are set to change and already the groundwork is being laid.