By a special correspondent

Unmanned air systems offered great potential to the UK defence industry and was an important area of technological development, a committee of MPs heard today.

The following people gave evidence to the House of Commons Defence Committee's inquiry into 'ISTAR':

&#65533; David Barnes, Thales UK/UAVS;
&#65533; Simon Jewell, BAE Systems/SBAC;
&#65533; Clive Richardson, QinetiQ/Intellect;
&#65533; Moira Smith, Waterfall Solutions/DMA Opening the exchanges, following brief introductions from the witnesses, Committee Chairman James Arbuthnot asked for a brief overview of the different terms involved.

David Barnes responded that there was a lot of confusion with the terms used regarding unmanned aerial vehicles (UAVs), noting they had been called uninhabited air vehicles.

The general usage these days was to refer in the UK at least to unmanned air vehicles, he said.
Simon Jewell said that the movement over the years from UAVs to unmanned air systems (UASs) reflected the fact that systems historically were piloted remotely, whereas now they were moving towards systems which were capable of operating at least partly autonomously.

The system component was recognition that it was not simply the platform, he said, explaining UAV was generally taken to mean just the platform.

Direct, Collect, Process and Disseminate (DCPD) generally referred to the Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) activity, Mr Barnes further clarified.
On the importance of the technology to the defence industry, Ms Smith asserted that it was a key technology to the UK industry at the minute.

UAV or UAS technology was wide-ranging, she further emphasised, adding that companies were investing in this technology because they believed the technology was 'here to stay'.

Mr Barnes asserted that there was still a distance to go in terms of designing, installing and improving such systems, as in collision avoidance problems, adding that there needed to be developments in communications technology.

Mr Jewell noted while people had different opinions as to when systems would mature, the technology could be very important to the UK and was a key opportunity.

Responding to questioning from Labour MP David Crausby on Hermes 450 and Desert Hawk being procured under urgent operational requirements, Mr Barnes explained that the programmes in question were bought overseas and were required for urgent deployment.

However UK industrial activity in those programmes was comparatively small and was largely operational assistance, not technological, he said.

The lessons learned were being fed back in terms of changes to operational requirements now being put to UK industry by the MOD, he maintained.

Mr Richardson believed that as the other elements of the UAS system became embedded in the ISTAR architecture, there would be increasing involvement from the UK industry.

Ideally, there would be UK platforms and programmes, though it had not been funded over the years and consequently if there was an urgent operational requirement, it was in the UK interests that the capability itself was deployed, he maintained.

Mr Jewell stated that it was a sensitive area since everyone recognised the need for urgent operational requirement, yet it should not become the strategy to provide the capability in the longer-term.

There needed to be a balance, he insisted, emphasising the importance of not undermining national capability in this respect.

Conservative MP Robert Key said he was surprised the MOD claimed it had enough UAVs.
Mr Richardson responded that they were collecting vast amounts of data, asserting if the MOD said it had enough; then they had sufficient.

Mr Jewell asserted that the systems the MOD currently operated placed a massive burden on the exploitation of the information chain, explaining autonomous systems would reduce that

burden.
He asserted that while the MOD might not have the wrong number, they did have the wrong type.
The military wanted precise information and the next generation would be able to apply more applicable data back to the military intelligence community, he said.

Mr Barnes believed that the force mix would change over the years and would probably embrace more unmanned air vehicles over the longer-term.

On improving the effectiveness of UAVs, Mr Richardson noted that there was a cost-capability trade-off.

There could be analysis capability on the platform itself, so it was sifting the information in the air, which reduced the need for data analysis capability on the ground, he said.

He explained there were a number of areas which could continue to be invested in.

Mr Richardson said he was convinced the architecture as it was drawn up today required Nimrod. It would be a huge task to re-draw the architecture, he stated.

The most important area for improvement concerned information management, Mr Barnes maintained, asserting the MOD was conscious of these issues and changes were starting to be implemented.

Mr Jewell asserted that the next generation needed to be considerably leaner.

In response to further questioning from Labour MP Linda Gilroy on rates of attrition, Mr Richardson said UAVs were not particularly stealthy, while explaining some systems were less vulnerable.
There was a constant trade-off, he maintained, explaining the trade-off was of considerable importance for developing new capability.

Mr Jewell explained the air worthiness component for a systems design was based around equivalence of safety as a manned platform, though when placed in a war zone it would end up in conflict losses.

Regarding maritime UAVs, Mr Barnes explained that trials had been carried out with maritime orientated UAVs in the UK and the US.

The MOD would have to make the balance between ship-borne and land-based UAV capability, he said.

On the possibility of armed UAVs, Mr Barnes explained that one of the programmes was armed, adding he believed armed UAVs were being considered by the MOD, also mentioning the loitering munitions programme.

Mr Jewell explained that there were various options for munitions capable of sustained flight.
Responding to further questioning, Mr Richardson noted there was a problem that collecting more information meant that more information had to be analysed and more information potentially would be wasted.

It was vital to ensure that the information collected was managed and used intelligently, he maintained.

Collecting the information would always be the priority, though it was necessary to focus on analysing data, he insisted, believing it was now becoming a priority at the MOD.

British industry was involved in all aspects of the UAS loop, he insisted.

Ms Smith noted that the shift was towards processing technology and turning data into knowledge, asserting that this was noted by the MOD.

The technology was relatively new and small companies were entering into the field, she said, believing a shift was occurring.

The UAV in its routine patrol duplicated a lot of information already held, though there was potential for much greater coverage and it was persistent in its collection of information, Mr Barnes pointed out.
On the defence technology centre, Mr Jewell explained it was co-funded by the industry and the MOD.

Outlining its areas of focus, he said a lot of the work was now centred on the system being able to recognise new information and react to the information itself.

It was only the early stage of this work, though the maturation rate of this technology was extremely fast, he insisted, asserting that the MOD needed to be continually upgrading its systems as technology was moving so fast.

Through the National Defence Industries Council (NDIC), there were several joint working groups between industry and the MOD examining revisions to

acquisition, he said.

Mr Richardson asserted that there was no really effective way of putting a UAV into a controlled air space at the moment since there was no collision avoidance system.

There was no human in the loop and it was a huge issue at the moment for a commercial organisation deciding to invest in this area, he stated.

Mr Jewell said that the industry was investing in the defence technology centre, which was a six year commitment, also mentioning the Autonomous Systems Technology Related Airborne Evaluation and Assessment (ASTRAEA) programme. He pointed out that the latter did not receive any MOD funding.
Very significant investment had taken place in this capability, he insisted.

Mr Barnes observed DEFRA had recently initiated a programme which would examine an evaluation of a maritime control capability for fisheries protection on a commercial basis.

There were a vast range of small companies investing in aspects of technology geared towards UAS, Ms Smith said.

Mr Jewell emphasised a number of universities were contributing to the Systems Engineering for Autonomous Systems (SEAS) Defence Technology Centre (DTC).

It was important not to examine the issue in terms of a 'snap-shot' in time, Mr Richardson maintained in response to further questioning.

The use to which information was put today would inform the development of platform capability in the future, or at least it should do, he insisted.

Mr Jewell emphasised that it was not possible to operate a UAV in the UK today, except under extremely restrictive conditions.

Labour MP Kevan Jones asked whether the witnesses were merely selling the MOD the latest technology, which would result in overloading individuals with too much information.

Mr Jewell responded that from his experience in the armed forces, lack of information had been a key issue. The capabilities on offer today were what he would have wanted 30 years ago when in the services, he insisted, assuring it was not just technology for technology's sake.

He advocated a move towards a more intelligent use of information.

Mr Barnes acknowledged the danger of information overload, pointing out that the user needed to get the right information at the right time.

Ms Smith also outlined the importance of allowing end-users to be involved in ensuring systems met user requirements.

Mr Richardson said it was for the MOD to implement training regimes and processes to ensure that information was exploited effectively.

There was no shortfall of the skills and competences in the UK for autonomous systems development, Mr Jewell insisted in response to further questioning.

He said the defence technology plan was a step towards bridging gaps in priority areas.

On the defence industrial strategy, Mr Richardson said that it needed to be better defined than at present.

At the last meeting of the NDIC, it was still being developed, he stated, adding that there was a review of the budget.

Mr Jewell acknowledged the need for budget outcome to be known before DIS II was finalised.
He defended the changes to the defence technology plan, believing it was a positive step forward, emphasising the need for clarity of direction.

Regarding the MOD's consultation with industry, Mr Jewell explained that the industry was working with the MOD on the future direction for defence.

Ms Smith said that small and medium enterprises (SMEs) were also involved, adding there was a day recently at the Queen Elizabeth Centre when SMEs were able to engage directly with the MOD.
Mr Barnes insisted that it was important to examine information management handling.

It would be beneficial to improve the skills set in the UK, though there was an excellent skills basis to build upon, Ms Smith maintained, emphasising the importance of teaching key aspects of engineering, technology and science.

Mr Barnes believed that 14-year olds should be taught to understand the technology behind

computer games.

Digital bandwidth would be a problem, Mr Richardson observed.

In response to further questioning from Conservative MP Bernard Jenkin, Mr Richardson stated that situation awareness was indispensable and that the MOD would continue to fund whatever technology enabled them to stay within that decision loop.

Responding to Mr Crausby on the potential for autonomy to be the way of the future, Mr Barnes agreed with evidence from BAE Systems that the direction of travel was towards autonomy.

Mr Jewell insisted that competence had been invested in the UK and the question was whether it was wanted, which was a question from the customer. He warned that if it was not wanted then it would perish.

There should be a national strategy from the MOD and a national strategy within the wider economy, he maintained.

The MOD would want to procure where possible from UK sources, Mr Barnes believed. Sovereignty was an important consideration, he maintained.

He pointed out that there was a difference between the satisfaction of a requirement through the urgent operational requirement and long-term planning for defence capability.

In the longer-term context, he believed the MOD wished to retain its sovereignty.

Responding to further questioning from Mr Arbuthnot, Mr Richardson explained there was a company which had quite good technology which could detect pitch and roll on a ship deck, though unfortunately it was not a British company.
Mr Barnes outlined experimentation with maritime recovery, explaining it was used extensively by tuna fisherman in the Pacific.

The defence technology centre was experimenting with options, Mr Jewell said.

In response to further questioning on the International Traffic in Arms Regulations (ITAR) process, Mr Barnes stated that he hoped discussions would make it easier to get agreements within the suppliers in the US in particular to supply components into UK systems which would not embargo its application, use or resale.

It was not just the US - other nationalities also had similar restrictions, he said.

Mr Barnes said it was important to be conscious of the potential problems resulting from ITARs when using American componentary.

Ms Smith pointed out it also worked in the other countries when UK companies wanted to get their technology out in the US.

Mr Richardson asserted that the ITAR problem was not specific to the development of these systems; items would still be sourced overseas even if there was the capability in the UK.

Responding to further questioning, Mr Barnes said he had views on the validity of full-motion video and potential advantages were being examined, though Thales had not yet started working on any activity based on delivering full-motion video, to his knowledge.

Interoperability remained a major consideration, Mr Barnes insisted, explaining it presented UK industry with some problems.

Mr Jenkin noted the importance of bandwidth and frequencies.

The next world radio conference would be held in 2011 and the preparatory work was being carried out now, managed by the Civil Aviation Authority, Mr Jewell said, explaining it was a significant investment and extremely important.

There was a requirement to reduce the level of bandwidth and the frequency allocation was still essential and could not be overlooked, he went on to explain.

The bandwidth allocation was key and securing it was also vital, he maintained.

Mr Richardson insisted that all these technologies resided in the UK; the country was leading the field in many of these areas.

In order to have safe navigation, GPS and other technologies should be available, Mr Jewell insisted, explaining other technologies were being developed including synchronised location and mapping.
He expected to see a combination of technologies to see the degree of robustness that the regulator would require.

The balance between the UAV

component and exploitation component was essential, he said.
Mr Barnes said that there were ways to reduce the threat to navigation from jamming or emergent switch off, noting that Galileo was being developed as an alternative to GPS. There were ways to reduce the impact of jamming as well, he said.

However, GPS was very important to UAVs, he noted.

The industry response was the ASTRAEA initiative, which brought together 13 different investment bodies, Mr Jewell explained in response to further questioning.

'Sense and avoid' needed to be developed for UAVs, he said, adding that UAVs would have to be embedded in the air traffic control system.

It was an industry and regional initiative, he said, explaining the MOD was supportive, though did not fund it directly.

He hoped the MOD would commit resources into the next phase of the programme.

Mr Barnes pointed out that it was an international consideration as well - there needed to be international agreement on regulatory clearance and approval of technologies.

Labour MP Dai Havard noted the general population needed to be reassured about any use of these new technologies.

In response, Mr Richardson acknowledged it would be necessary to demonstrate equivalence to a manned aircraft, if not more.</p>