

**Written evidence submitted by General Dynamics**

1 September 2021

Rt Hon Tobias Ellwood MP  
Chair, Defence Select Committee  
House of Commons  
London  
SW1A 0AA

Dear Tobias,

RE: Further evidence on the Ajax Programme

I appreciate the opportunity to provide further information regarding the Ajax Programme following the evidence session with the Defence select Committee on 20 July 2021. I trust the attached response addresses the Committee's questions.

I can assure you and the Committee that General Dynamics is committed to the Ajax Programme and will, in partnership with the British Army and Ministry of Defence (MoD), bring all variants into service successfully.

General Dynamics takes the issues of noise and vibration very seriously and an acceptable solution is in the process of being developed and implemented. However, I would like to take this opportunity to rebut unrelated rumours concerning Ajax' performance and capabilities – I have done this for each of them in an 'Executive Summary' to our response. I intend to provide video evidence to the Committee, supporting our position on each of these, once they are approved for release by the MoD.

I would be delighted to welcome you and the Committee to our facility in Merthyr Tydfil, where you can see production of the Ajax fleet first-hand and I can answer any further questions the Committee may have.

I look forward to hearing from you.

Yours sincerely,

Carew Wilks  
Vice President & General Manager

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## **Executive Summary**

- General Dynamics Land Systems–UK (GDLS–UK), along with the General Dynamics Corporation, is fully-committed to the Ajax Programme and to our ongoing role in supporting the British Armed Forces from our UK facilities, supported by our extensive UK-based supply chain.
- GDLS–UK recognises Ajax is a transformational capability for the British Army, and that the Ajax fleet is the spearhead platform for its modernisation plans. GDLS–UK will deliver Ajax into service successfully and ensure it provides the best-in-class capability required by the British Army to provide manned battlefield reconnaissance.
- 20 per cent of the Ajax fleet are built and have been delivered, or are pending delivery, to the British Army; a further 30 vehicles are undergoing Assembly, Integration and Test (AIT) in Merthyr Tydfil and 50 per cent of the 589 hulls are built. 25 vehicles across the six Ajax variants were delivered to the British Army in June 2021.
- GDLS–UK categorically refutes recent media and online speculation and rumour concerning Ajax and its performance.
- In short:
  - AJAX can fire its CT40mm Cannon on the move against static and moving targets, and has demonstrated this successfully with a high level of accuracy;
  - All Ajax variants can safely drive up to its maximum speed of 70kph;
  - All Ajax variants successfully operate over all terrain and obstacles, including reverse step climb in excess of 75cm;
  - The AJAX variant hull and turret do not crack when firing the CT40 Cannon and there are no wider turret issues;
  - All Ajax variants meet the specified Ministry of Defence (MoD) requirements to be safely transported by air, land and sea;
  - Noise and vibration injuries were not raised with GDLS–UK prior to autumn 2020;
  - GDLS–UK employees have reported no injuries regarding excessive noise and vibration on the production-standard Ajax fleet during trials;
  - The first 25 vehicles across all variants were delivered to the British Army in June 2021, including the necessary training equipment and logistics support, in preparation for the MoD to declare Initial Operating Capability (IOC).
- Following concerns raised on noise and vibration, GDLS-UK is working collaboratively with the Ministry of Defence (MoD) and British Army to undertake a detailed review of all aspects of the system, including the suitability, performance and integration of the MoD supplied audio equipment and hearing protection, to identify the causes of these concerns and potential improvements. GDLS–UK does not anticipate that any significant system or chassis modifications are required to address feedback on noise and vibration raised by vehicle Users. Noise and vibration are characteristics of all tracked Armoured Fighting Vehicles (AFVs), and have been mitigated by design to levels consistent with other similar AFVs and at levels that are within safe limits for the mission profile specified when operated with appropriate protective equipment and procedures.
- GDLS–UK will deliver the Ajax Programme defined contract requirements within the agreed firm-price, which has remained the same since the production contract was awarded in September 2014.

## Defence Select Committee Follow-up Questions

### 1. Further information on the 2019 recast agreement, including details of the issues addressed by the recast and the new requirement introduced to which Mr Wilks referred. (Q1)

Given the concurrency of the development and production phases of the Ajax Programme, there was a need to address requirements and other challenges at the 2019 Recast Agreement between GDLS-UK and the Ministry of Defence. At Recast, the following issues and new requirements were addressed:

- Introduction of Capability Drops to incrementally introduce contracted capabilities across all Ajax variants
- Updating requirements to align with Capability Drops
- Updating the Bowman C4I system across all Ajax variants to BCIP 5.6 at Capability Drop 3
- Incorporation of the latest CT40mm cannon baseline

### 2. What is General Dynamics estimate of the most optimistic and worst-case timings of IOC and subsequent stages of the programme being achieved? (Q25-31)

GDLS-UK has delivered (in June 2021) the 25 vehicles required for IOC, plus the necessary training equipment and logistics support. The MoD is responsible for declaring IOC. The timings for subsequent stages are determined jointly with the MoD.

### 3. Additional information on the "contractual incentives and penalties" if the programme is delivered late (Q27)

The detailed Terms and Conditions of the contract for the Ajax Programme are commercially sensitive, but do include incentive measures consistent with other MoD contracts.

### 4. Further information on when General Dynamics became aware of noise and vibration concerns (including clarification of the information held in 2010, 2017 and 2020)? (Q33-40)

The management of noise and vibration characteristics is a routine aspect of the system engineering design process for tracked Armoured Fighting Vehicles such as Ajax. GDLS-UK refutes allegations that the company was aware of anything other than regular noise and vibration reports regarding Ajax prior to spring 2020. Concerns raised by MoD users about noise and vibration effects were relayed to GDLS-UK by the MoD in autumn 2020.

### 5. Further information on the "number of vibration sources on the platform". (Q40)

- *Do you consider the weight of the Ajax vehicles to be a contributory factor to the noise and vibration problems?*
- *Are noise and vibration issues being experienced on all variants of the Ajax fleet?*

The control of noise and vibration has been considered throughout the design process for all Ajax variants.

GDLS-UK do not consider weight as a driving factor of noise and vibration concerns raised by the User.

### 6. Further information on the "mitigations to the issues that have been identified on noise and vibration" and how these will be embedded on the platform (Q53)

- *Further information on the Mara trials "to identify mitigations and to confirm the improvements, which we will embody on to our production vehicles for delivery to the Army".*
- *Clarification on the process for MoD and Army testing and acceptance of the mitigations and improvements.*

Working with partners, GDLS-UK is evaluating potential modifications in crew station design to improve fightability across all variants, which are currently undergoing validation following trials of design concepts prior to joint approval

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and potential embodiment. These trials indicate that reduced levels of vibration can be achieved in the crew positions, potentially enhancing the fightability of the Ajax vehicles, whilst continuing to remain within health and safety legislation limits.

In regards noise, GDLS-UK is working collaboratively with the MoD and British Army to undertake a detailed review of all aspects of the system, including the suitability, performance and integration of the MoD supplied audio equipment and hearing protection.

#### **7. Further information on any problems with the turret and firing on the move (Q61-66)**

No turret issues have been identified on AJAX. GDLS-UK has fired more than 4,000 40mm cannon rounds during extensive live fire trials, including against moving targets and from a moving vehicle. Recent trials of AJAX firing on the move proved successful, demonstrating the high performance of the lethality system. GDLS-UK is confident in the turret design.

#### **8. General Dynamics response to the NAO's concerns on the Morpheus programme and what measures have been taken to address them, particularly with reference to its impact on the Ajax programme (Q66-72)**

General Dynamics Mission Systems is working with the Authority to complete the Transition Partner (TP) contract for Morpheus, which is part of MoD's broader Land Environment Tactical Communications and Information Systems (LE TacCIS) programme. General Dynamics is not the contractor for Morpheus, although is working constructively with the Authority on a TP contract extension, which is currently going through Authority approvals.

The TP contract, also known as EvO or Evolve to Open, is the first part of the Morpheus programme. It was signed in April 2017 for £330M and will deliver an open architecture system to support the future competitive phases of Morpheus. Under this contract, the MoD (not General Dynamics) will own the intellectual property arising from the contract, which will allow the MoD to become *de facto* prime, avoiding vendor lock-in and enabling the MoD to drive value by competing the development, upgrading and augmentation of individual elements of the Morpheus system. General Dynamics understand that the MoD's strategy in those future phases will include tendering for new radios, and this does not form part of the TP contract with General Dynamics.

The current Bowman BCIP 5.6 system is intended to be replaced by Morpheus across the vehicle fleet (as well as the dismounted soldier fits), although the timing of such replacement will be determined by the MoD in line with the relevant vehicle programme schedules, including Ajax. The Morpheus hardware being delivered by the TP contract is designed to simplify the BCIP 5.6-to-Morpheus upgrade with a so-called "Box-off, Box-on" approach. This is something that has been successfully demonstrated on a number of first-of-type vehicles, thereby allowing faster and more cost-effective updating of the vehicle fleet.

#### **9. Details of General Dynamics investment in the Ajax programme (in addition to the £40million investment in Merthyr Tydfil) (Q79)**

In connection with the Ajax Programme, General Dynamics Land Systems (GDLS) has invested an aggregate of approximately £298 million through capital investment, carrying costs for inventory on the balance sheet and GD-funded expenditures for programme development and production to date.

The Committee is already aware of the specific £40m capital investment into our two South Wales facilities, establishing a Centre of Excellence for Armoured Fighting Vehicle Design and Development and a Production Centre of Excellence for AFV Assembly, Integration and Test (AIT).

GDLS-UK provides the full life-cycle of AFV capabilities, based in the UK, rebuilding a national capability for AFV design and manufacture which had atrophied for over 30 years. This included the following enterprise wide capabilities:

- **Armoured Vehicles Design and System Integration Laboratory:** our Centre of Excellence for AFV Design and Development, based in Oakdale in South Wales, is an engineering hub with a large team of highly-skilled engineers across all disciplines relevant for the modern digital armoured vehicles, including system engineering, software, survivability, lethality, and other unique armoured vehicles engineering skills. This

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design capability is enabled by a modern purpose built Systems Integration Laboratory, which is unique to modern digital armoured vehicles and essential for the system level design, validation, and through-life sustainment.

- **Armoured Vehicles Production:** at Merthyr Tydfil, we are able to undertake the assembly, integration and test of armoured vehicles, with a site that has been designed to handle all armoured vehicles up to the weight of a Main Battle Tank, like Challenger 2, and includes a newly-built test track with ancillary capabilities, along with space for further expansion.
- **Through-Life Capability Management:** investment in both traditional Sustainment (spares and repairs etc) and the through-life Capability Growth that digital AFVs facilitate, with their digital architectures, including undertaking Research and Development to support these activities.
- **Supply Chain Development:** GDLS-UK has built a strategic supplier team for armoured vehicles manufacture to select and manage the key suppliers needed for the Ajax armoured vehicles programme. This has resulted in the development of a mature supplier base to support the programme.
- **Employment:** through this supply chain expertise, the Ajax Programme currently supports 4,100 direct jobs across more than 230 UK-based companies, with UK programme content at 65-70% of total contract spend. On a conservative estimate, GDLS-UK supports a further 8,000 indirect jobs through its activities on the Ajax Programme.
- **Skills development:** GDLS-UK has worked hard to support the re-creation of a UK-based AFV industry and the necessary skillsets that had atrophied in the UK in the early 2000s. GDLS-UK has invested significant resources into providing skills training to its own employees, including embedding engineers (funded by GDLS-UK) to help train and support those small-and-medium-sized enterprises (SMEs) in its supply chain, as well as creating graduate and apprenticeship schemes to train the next generation of engineers.

In addition, at our General Dynamics UK Mission System's Oakdale facility in South Wales, the company develop and deliver the Bowman system that provides secure radio, telephone, intercom and tactical internet services to more than 18,000 platforms, including all Land vehicles (including armoured vehicles), helicopters, naval vessels, landing craft and fixed HQ buildings.

#### 10. Information on General Dynamics net profit on the Ajax contract (Q85)

Net profit is commercially sensitive and, accordingly, GDLS-UK is not able to provide this information without harm to its competitive position. As a reminder, GDLS-UK will deliver the Ajax Programme and all agreed deliverables under a firm-price contract of £4.62bn (excluding VAT) for the defined contract requirements.

#### 11. Further information on the integration of Brimstone onto Ajax variants (Q92-93)

GDLS-UK has worked with MBDA to develop a concept demonstrator highlighting Ajax' ability to provide an Overwatch (Anti-Tank Guided Weapon) capability. GDLS-UK will be displaying this concept demonstrator at DSEI 2021, which is taking place on 14 – 17 September 2021 at the London ExCeL Centre.

Whilst the MoD has expressed a general interest about integrating Anti-Tank Guided Weapons on its future AFVs, there is no extant requirement that GDLS-UK is aware of or ongoing conversations with GDLS-UK regarding this potential capability enhancement for Ajax.

#### 12. Information on the number and type of injuries sustained by General Dynamics staff during Ajax testing (see Surgeon General's answer to Q149)

More than 50 full-time trials personnel have operated the Ajax fleet during trials spanning January 2016 to present. As a result of GDLS-UK's robust safety protocols and risk assessments, all trials are conducted within the legislatively

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mandated limits and as such, based upon employee feedback and our employee health surveillance programme, GDLS-UK has not recorded injuries caused by noise and vibration.

**13. Are General Dynamics undertaking any contingency planning for the possible cancellation of the programme?**

- ***What is General Dynamics assessment of the impact of cancellation on the supply chain?***

GDLS-UK continues to keep its entire global supply chain operational on the programme. In the UK, the Ajax Programme supports 4,100 direct jobs across more than 230 UK-based companies.

**14. What lessons have General Dynamics learned from the Ajax programme especially for future procurement projects with the MoD?**

GDLS-UK has identified the following

1. **Concurrence between demonstration and production:** the concurrency between demonstration and production phases, in order to achieve an earlier IOC than equivalent legacy programmes but with concomitant risk, is unique to the Ajax Programme for land programmes. As the first to go through this process, GDLS-UK and the MoD have needed to learn throughout the Ajax Programme. One key lesson learned has been the need for all parties to make joint-decisions quickly and collaborate closely to maintain momentum in the delivery of the programme.
2. **Requirements management:** the Ajax Programme has more than 1,000 individual requirements, a number of which are contradictory when considered at system level. All parties must work closely to understand the inherent trade-offs required to define a final balanced design.
3. **Long-term strategy:** GDLS-UK has worked hard to support the re-creation of a UK-based Armoured Fighting Vehicle (AFV) industry and the necessary skillsets that had atrophied in the UK in the early 2000s. A long-term Land Industrial Strategy is required to support all parties to retain the necessary skillsets to support UK AFV design, development, upgrade and sustainment.
4. **Considering exports at the outset:** all parties should consider the applicability of exports through all stages of UK AFV design and development, including when defining requirements, to support the UK Government's aim of promoting UK prosperity and exports.

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