

**Written Evidence Submitted by Future Flights Concept Ltd
(RFA0090)**

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This is needed in part to avoid UK SMEs with ground-breaking ideas being adversely-excluded from enjoying playing a vital (early-stage-funded) part in the coming golden age of electric aviation.

Britain should not just wait for the best ‘zero carbon’ powertrains to materialise on their own. It should start making whole airframes to embrace them, specifically for small regional, sub-regional, and general aviation aircraft. Making just high-value-added parts is not good enough. The Vickers Viscount, BAC One Eleven, and HS 125 were all notable commercial successes because of vertically-integrated supply chains.

Now is just the dawn of ‘zero-carbon’ civil aircraft manufacturing. Pilots are still needed. UAVs and drones have many regulatory issues to overcome - particularly concerning perceived noise - before acceptance in our crowded UK airspace. Military equivalents cannot be dependent on hackable GPS signals either. Still less drones and UAVs.

An aviation-focussed ARPA is a particularly pressing need as the risk-averse InnovateUK/Aerospace Technology Institute (ATI) - expected to loyally support outstanding SME aerospace technology from their captive massive annual budget through much of the NASA/EU TRL1-9 journey - admits it is NOT FIT FOR PURPOSE as evidenced by their below timely contribution to this Call for Evidence:

“Currently, Innovate UK allocates funding for technological research and development with commercial applications. However, the relatively large amounts of money allocated and the conditions attached to their allocation make it unsuitable for smaller firms with very disruptive, high-risk ideas.

To complement Innovate UK, ARPA’s role should be to identify and fund the transformative and often higher risk projects that would otherwise not be funded by existing Innovate UK funding mechanisms.”

Please no patronising and no ‘complementing’. Let’s just let SMEs enjoy some healthy competition. A UK ARPA’s own project-selection choices and role should be quite independent of InnovateUK’s.

Even bogus ‘competitions’, if unavoidable for appearances sake, should have no entry barriers - like a minimum critical mass or minimum trading period, or - much worse - scope for name-recognition influence. Entry should be by number for at least initial anonymity. Then it’s back to the real world for the lucky ones. ‘Level playing fields’ have never existed nor ever will. Trout tickling skills still play a key role. Of course they do. A UK ARPA will also need them when dealing with fickle politicians.

Introduction

Future Flight Concepts Ltd - registered but not yet ‘trading’ pending the Brexit outcome - has been judiciously reaching out to the MoD trying to plug a massive logistics capability gap: a lack of large numbers of small agile manned ‘point-to-point’ aerial vehicles promising near-vertical take-off at a price the MoD can afford - and easily accommodated within the 2% of GDP committed to the Defence Spending Review. Right now the government just needs to acknowledge *concept eligibility*, not make any actual purchase commitments - still less to an SME not shackled to a Tier 1 supplier. (Like saying sorry, saying *eligible* can be so hard to do. I’m still waiting.)

Covid-19 has exposed how the Army is likely to be called on to distribute PPE when Public Health England is again found wanting. But that’s just the tip of the likely civil contingencies demand: search & rescue, fire fighting, UV-sanitised operating theatres, air ambulance, NBC incidents, flood control, aerial surveillance, disaster relief, distribution of vaccines and food parcels to the poor, VIP travel, etc. And what better for family camping, fishing, and hunting trips? Floats and skis are options too.

Our vulnerable aircraft carriers and supply ships should all carry such vehicles, suitably weaponized with Martlet missiles or larger. They can be off the deck flying minutes before any Lockheed Martin F-35B that needs warming up. (Time will matter when incoming Mach 5 missiles are on the way launched from space.) They can also lay Ultra’s sonobuoys.

So, on any UK ARPA list of projects deserving life support at birth should be my small state-of-the-art 'zero-carbon emissions' fixed-narrow-wing aircraft credibly-promising a quieter on-demand safe near-instant leap into the air followed by rapid stabilised-transition to fast forward flight. (It has to be the nearest a short take-off & landing (STOL) aircraft can be to a helicopter without being one.)

The ample-girth logistics version with a one ton payload and foldable wings will accommodate a small car - like the Miles Aerovan, a much smaller precursor to the Shorts Skyvan, did in 1945 - but speed will not be this one's forté. It will be very basic: aircon, pressurisation, fancy flat panel avionics, any batteries, and much else, extra. But the many anticipated private high-net-worth buyers may get to enjoy a free BRS and Helipaddy App subscription. Obviously the cost of FAR and/or EASA certification will be included for them.

(The proposed slimmer faster aircraft concept with VTO-capability certainly merited the Pentagon attention it got! But then it's not every day that a 'limey' credibly-claims the ability to deliver faster speeds - but not the same lethality - than the Bell and Sikorsky rotorcraft battling it out like sumo wrestlers for the lucrative FARA contract? Physical demonstration of the whole or part of something full-size is essential. A slick VR presentation of something that might or might not scale-up simply won't cut it with top brass there.)

Noise matters, particularly perceived noise in urban environments. Both versions, easily fitted out for multiple roles, promise to be much quieter and faster than helicopters while able to do most of what they can (except autorotation) at a fraction of helicopter capital, running, and servicing costs. Range will always depend on the energy on board. Powertrains with battery and green hydrogen fuel cell options + spares are likely to be sourced from the automotive industry. (If the Border Force needs something readily affordable equipped with Martlet missiles to threaten French fishermen they should contact Future Flight Concepts Ltd.)

Dealing with the Committee's six bulleted questions consecutively in this context:

- **The R&D gap needing attention is the optimum way of using electricity sparingly to achieve the above product objectives, while keeping cost and weight down.** The many inter-dependent variables defy collective numerical validation. Printed wing parts need wind tunnel evaluation working together. (Dependent range expectations will be addressed too.)

An ARPA/DARPA-style approach will nail the advantages and technical merit of an expected accelerated *angst*-free transition phase from zero to forward flight, when fixed wings carry all the load. These can be bench-marked against the best of the many alternatives listed on the frequently-updated [evtol.news/aircraft](#) link. So the safest shortest transition phase promised by anyone?

My way optimally-exploits the high torque electric motors can deliver for instant maximum forward thrust availability at zero speed. **And compliments this with enough optional vertical lift capability at this point should a very steep departure be called for.** This can be promised stably in a number of ways.

That's the gist of it: enjoying the best of both worlds. If not engaged in VTO-mode, aircraft default to normal easy-to-fly STOL ones able to use any convenient short runways, hard or soft.

- **Profound: some healthy customer choice for SMEs now.**

For an SME, streetwise or not, applying for any R&D funding from the existing bureaucracy can be a very long and tortuous process with no guaranteed positive outcome at the end - unfortunately for many an annoying and expensive waste of company time dealing with numerous people operating in silos across government pre-occupied with box-ticking. Once bitten:twice shy. Why bother if an ARPA can cut to the chase?

The UK is still pre-occupied with micro-managing the EU State Aid Rules applied to SMEs, forcing them to join collaborative partnerships, share IP, etc. Hopefully post-Brexit, UK SMEs will

be finally free from the cloying EU State Aid Rules ignored by others. (The French can be trusted to look after their own interests.)

- **Long-term sustainable UK manufacturing jobs delivering leading-edge affordable exportable products people want to buy.**

ARPA should focus help on UK-registered/owned/controlled companies and UK-registered/owned/controlled supply chains; UK **manufacturing** being prioritised. With R&D spending money front-loaded, such companies can then negotiate R&D contracts direct with universities and other R&D providers from a position of strength, ensuring deliverables are delivered on time and on budget. Cash is king. Universities need it. And I need wind tunnel access and supergurus on top of Ansys Fluent CFD (computational fluid dynamics) and Siemens PLM software.

- After Brexit, at least one quarter of the money already budgeted for ATI distribution to the aviation industry should be transferred to ARPA to be allocated by ARPA to SME manufacturing; each project having a “hands-on” ARPA-appointed professional Project Manager to drive it forward. (Most inventors are hopeless at project management.)
- **That they get things done pragmatically.**

What UK can learn from U.S.A. is to pass the equivalent of their Defense Production Act. Government prodding ARPA/DARPA with orders - and funding - to deliver physical products within short time frames is highly desirable. DARPA delivers discipline.

Criticism of the MoD/Dstl for being institutionally-acclimatised to glacially-slow military procurement of ‘stuff’ that may quickly become obsolete can be taken care of by a hand-brake turn. But first the Defence Spending Review needs to clarify fundable objectives. My projects should all have Dstl staff purring. Constantly re-fettling legacy purchases to keep them operational can’t be good for moral. I assume Green Goddesses defunct now.

I don't think DARPA cares where ideas come from, just their immediate military relevance. They are not averse to projects where a leap into the unknown would instantly breach typical UK risk lending thresholds. We need a **manufacturing** economy too.

- UK ARPA should be acquired-own-project-focussed and based well away from the perennial well-fed 'usual suspect' grant applicants found on or near university campuses. A base outside the 'Golden Triangle? c/o Nicola Sturgeon. Not my decision.

There are now hundreds of projects hoping to succeed in the US UAM space, collectively backed by hundreds of millions of dollars in U.S.A. alone. Most are expected to fail commercially.

The UK has all the civil + military resources to field a job-creating winner in this global race. Drawing on such resources, my project justifies at least an each way bet. However to be a winning jockey you do need to be given a horse to ride.

(July 2020)