12. **3rd May 2016**

Supplementary Submission to:
The Foreign Affairs, Defence and Trade Committee
Australian Senate, PO Box 6100
Parliament House, Canberra ACT 2600

Transmitted by email to: fadt.sen@aph.gov.au

Subject: Inquiry into the F-35 Joint Strike Fighter:
Response to Dr Andrew Davies Question on Notice critique of the ZOCT

B**y:** Mr Marcus Kollakides

The game is *called show us yours because we sure aren't going to show you ours. The ZOCT reveals the extent to which the F-35 has misled and deceived the Parliament.*

1. Dr Davies, ADF, Lockheed Martin, where is your ZOCT ?

Before the F-35 order was ever placed:-

- Our Parliament should have been shown a clear statement of RAAF requirements for a future fighter jet.

- If the F-35 had been what it claimed to be, then Lockheed Martin, the USAF, our own ADF, would all have been only too pleased to have furnished the Parliament and Taxpayers, with their own ZOCT extolling the virtues of their aircraft. That they did not produce their own ZOCT speaks volumes.

- There should have followed something in accordance with the Charter of Budget Honesty, an open tender process of evaluating competitive bids, overseen by the Auditor General.

- If there had been an ethical above board process then Defence would have been showing us their ZOCT, not the other way around!

- Wrongdoing. The F-35 is the corrupt product of shutting down the ADF Evaluations process, failure to publicly state requirements, a lack of transparency in competition in selection, a lack of accountability and misuse of the national security classifications to hide F-35 shortcomings, abrogation of responsibility.

The significant stealth of the F-35 was to bypass Parliament,

bushwhacking it into a fait accompli, blank cheque for a dud aircraft.

The critical damage to due process was done by ADF brass a decade or more ago. It is small comfort that the current ADF leadership seems to be trying to argue as impartially as possible for the poison chalice which is the legacy of their predecessors

Fortunately the Air Power Australia ZOCT is not the invalid distraction which some F-35 supporters seem keen to occupy our time with.

So the ZOCT stands as the single most concise and statistically valid overview of this aircraft. A testament to the analytical failures of our own Defence establishment and to the pulling the wool over the eyes of Parliament as alluded to above.

The Ultimate Distraction, Dr Davies throws at the ZOCT is when he effectively contends that if he does not know something about the operational status of an adversary aircraft then somehow or other that aircraft surely cannot be "operational." On that basis he seeks to exclude those aircraft from the ZOCT.

The Ultimate Flaw in Dr Davies argument is he fails to consider the key characteristics of the aircraft which he does support as a true 5th Generation aircraft, the F22. So he agrees with the ZOCT for the F-22 but when the same ZOCT metrics are applied to the F-35, he disagrees. The ZOCT assesses the F22 metrics for example a large airframe with room to house powerful radars, powered by high growth engines, driving an all aspect stealth airframe, uncompromised in design, stealth weapons carriage and so on, the result is a score of true 5th Generation fighter. But when the same metrics are applied to the F-35 and it fails to qualify as a 5th Gen fighter, Dr Davies chooses to disagree.

The ZOCT simply shows the F-35 is not really a 5th Generation aircraft at all. Which may explain why rather than face up to the failings of the F-35, Dr Davies seeks to divert attention to try and exclude adversary aircraft. He basically to concedes the PAK-FA is like the F-22, a true 5th Generation fighter, so therefore he seeks to exclude as not yet 'operational' anything which would reveal by comparison that in fact the F-35 is not a 5th Gen aircraft.

The ZOCT reveals the F-35 is a scaled down imitation of a 5th Generation fighter. The fundamentals of the F-35 are fixed. It lacks the airframe size to carry a competitively powerful radar sensor suite, it lacks the high growth engine power to run such systems. The F-35 lacks all aspect 360 degree stealth and relies on only 20 degrees of head on aspect stealth. It's pilot is limited by its scaled down 4 missile stealth weapons bay. Carry more missiles on the wings and even the pitifully partial stealth is lost. These are functions of the basic F-35 airframe design and they can never be fixed.

2. Dr Andrew Davies QoN reply to the ZOCT is statistically invalid.

Dr Davies method is known as splitting hairs. By selectively isolating a few ZOCT criteria he speculates about the individual weighting assigned to margins for error. He does not provide alternative metrics, does not acknowledge that the underlying assumptions of the metrics are a level playing field across all the types tabulated in the ZOCT, but rather he simply 'questions' the underlying assumptions. It is Sir Humphreyesque.

Mathematically the ZOCT is a matrix of individual elements. Therefore as the elements progressively aggregate towards the bottom line score the cumulative level of accuracy increases. By adopting an arithmetic sum function, any error margins are progressively reduced and the ZOCT produces a mathematically reliable whole of aircraft modulus equally valid across each aircraft type.

When Dr Davies interrogates individual ZOCT criteria selectively, he adopts an apparent geometric growth rate for error margin. He then compounds the error by extrapolating his speculative weighting across the entire ZOCT. Such a method is unsound.

In analytical metaphor, the ZOCT reveals an F-35 Jack Russell possessed of few attributes such as high-level situational awareness and highly integrated avionics. These attributes are recognised in the ZOCT and the result shows the F-35 pilot will be situationally well aware of his impending destruction.

The adversary aircraft, measured by the same metrics loom like Rottweiler's. There is no bias in the ZOCT as it applies the same weighting and metrics to each aircraft type.

There is an old saying that if one does not like the answer then change the question. But it is simply mathematically invalid for Dr Davies to grab at only convenient criteria as key determinants so as to pre determine the favourable outcome he wants for the F-35. One must keep an open mind, allow the maths to develop and then read the bottom line total modulus of the final ZOCT score.

3. 'Operational' ?

Dr Davies claims the adversary aircraft are not ready or are only "test beds or prototypes" whereas the F-35, F-22 and FA-18 he states are 'operational'. This is a rubbery term. For a warplane by definition 'operational' is not necessarily the critical state of being **combat ready.** To this day **there still is not one F-35 anywhere, which is combat ready or even close**.

Howard Hughes' famous "Spruce Goose" seaplane was "operational." But it never flew higher than ten feet.

Dr Davies would be incorrect to infer adversary aircraft are not deployed The adversary aircraft in the ZOCT are all 'operational' or combat ready.

The type being acquired by Indonesia, the SU-35 has already been into combat in Syria this year and was observed on station, flying air dominance missions, armed with advanced IR seeking R-27T, R-74 and Vympel R77 air to air missiles.

48 Russian SU-35 fighters are reported already stationed at combat air bases including at Dzemgi, Akhtubinsk and Lipetsk. In January this year Commander of Russian Aerospace Forces, Colonel General Viktor Bondarev announced production had commenced for a further 50 SU-35s.

Dr Davies also suggests the PAK FA is only a "test bed or prototype" and he would like it excluded from the ZOCT.
Yet as far back as 2010, Russian President Putin attended Zhukovsky airfield and observed a demonstration flight for this aircraft. The aircraft Putin observed was not a T-50, the Russian designation for the aircraft in developmental form but rather it was a designated PAK SU-50, the Russian designation for a 'fully operational' PAK FA. After the flight Putin stated it would "only be few more years before the aircraft would go into mass production." He confirmed the PAK FA was the "highest priority of the Strategic Aerospace Command." Accordingly including the PAK FA in the ZOCT seems fully warranted.

2. Engines. Dr Davies informs us that "Russian engine development program has "probably demonstrated super cruise on an Su-35 airframe which will presumably migrate into the T-50 later." So from 'probably' he apparently does not know. Consider then what we do know and which the ZOCT reflects.

Jack Russell versus Rottweiler's.

	F-35	SU-35	PAK FA
Engines	1	2	2
Power Output in Pounds of Thrust	43,000	63,800	75,000
Mach Speed	1.61 (1,988 kmh)	2.25 (2,778 kmh)	2.3 (2,840 kmh)
Altitude in Feet	50,000+	60,000	65,000

3. ZOCT engine criteria - combat consequences

Engines: The F-35 only has one engine, hence no second engine redundancy.

Power Output in Pounds of Thrust: The low power output of the F-35 means:-

- **Limited Radar and Sensor suite** capability. No matter how sophisticated systems may be, the F-35 has less power to run them. Combined with the small F-35 nose and airframe, the adversary aircraft are able to house and power larger radars and sensor suites.

- **Speed:** The F-35 has limited maximum speed and its max speed is at a 28%-30% disadvantage. The compound problems of the F-35 power and speed disadvantage translate into further critical disadvantages as per below;-

- **Altitude:** Maximum service ceiling is critical. The F-35 celling capability is disputed between 51,000ft and 60,000ft. At the lower altitude the F-35 faces adversary aircraft with significant "*look down, shoot down*" advantage. To contend the F-35 has a high competitive ceiling, mathematically conflicts with its lower engine power.

- **Rate of Climb:** The extension of the F-35 engine power deficiency is apparently the reason behind us classifying its rate of climb as secret. Because it would be embarrassing. The mathematics of F-35 lower power output indicates only one conclusion, a slower rate of climb and a negative combat outcome.

- **The ZOCT reveals the Kinematic disadvantages of the F-35.** Measured against the existing SU35 for weapons performance the F-35 has to slow down to subsonic Mach 0.9 for weapons release. It cannot therefore achieve a high probability for success against an adversary releasing its own weapons at over Mach 2. The optimistic 'kill ratios' Dr Davies puts forward for the F-35 seem to be magical thinking defying the laws of physics.

4. The myth of F-35 Stealth or BVR Survivability

Like most supporters of the F-35 Dr Davies seems to accept the aircraft would have little probability of survival if engaged in within visual range combat. So he places greater hope in beyond visual range (BVR) encounters.

The ZOCT documents the mere 20 degrees of stealth which the F-35 can achieve when head on. By definition therefore the F-35 is not a 5th Generation aircraft. The real world consequences of this F-35 design flaw are simple. Two SU-35's with their more powerful longer range radars, will be only be required to fly a few miles abreast of each other to see the F-35 at a side on angle, from far away in the BVR envelope, target the F-35 and destroy it. What we are asked to believe by F-35 proponents, that the opposite will occur, is simply not supported by the facts. Once again the ZOCT confirms this F-35 inferiority.

Adversary SU35's are able launch weapons whilst super sonic. The F-35 fatally, cannot. When the F-35 eventually does detect the SU-35's, they will already have detected and launched a salvo of missiles against it. The adversary missiles will be homing on it with multiple different types of

seekers, purposefully varied to overwhelm the F-35s one at a time countermeasures capability. The adversary missiles will be accelerating in the descent from on high, and with the benefit of kinematic super sonic launch advantage, the F-35 will be trying to launch one or more its limited (4) number of missiles and then to try and regain speed with its lower power engine. Not being a hyper manouverable aircraft (such as is the SU-35) the F-35 will not be able to perform a last seconds evasion manouvre and still trying to regain speed, it will be destroyed.

This is the high probability scenario. It underlines the holistic strength of the ZOCT, its predictive value and is the real reason why F-35 proponents seek to avoid the ZOCT.

5. The Straw Man Threat.

Dr Davies seeks to turn some of the design failures of the F-35 like inadequate fuel load and limited range to be somehow an advantage. He suggests these failures would work in our favour if the **Chinese Air force** were to attack mainland Australia. His rationale being the Chinese aircraft that would be disadvantaged in terms of their own fuel and endurance at such long range from their bases. Well, apart from the obvious problem the Chinese would not have, that they would not be flying F-35 aircraft, this is really a fantasy scenario. Given that Australia is actually South of Indonesia and not in the China sphere of influence in the South China Sea and as long as we are not stupid enough to be drawn into another American war, then any attack from China would likely be surgical. As China enjoys doing business with Australia it would be unlikely to send us strategic devastation. Rather the highest probability would be tactical strikes against any of our military installations with a US presence, to prevent them being used for force projection into the South China Sea. Such attacks would be expected to come not from aircraft but from Chinese submarine launched land attack cruise missiles. Dr Davies seems to be making a straw man argument against China, when the real threat from adversary aircraft would in higher probability come from closer to home.

6. The Likely Aircraft Threat.

Perhaps for diplomatic reasons, Dr Davies overlooks **Indonesia.** Uncomfortably for Australia if we shrink from acquiring the F22, then we will only have F-35s to try and defend us from any incursions by Indonesian SU-35's.

The ZOCT records the qualitative advantage of these Indonesian aircraft over the F-35. The media informs us that by 2020 Indonesia will have the quantitative advantage in numbers of SU-35s such as to be able eliminate an F-35 equipped RAAF. The only question would be, what would we do then ?

7. Conclusion.

By attacking the ZOCT, Dr Davies draws our attention to four key factors.

- The ZOCT applies metrics without bias and the final score reveals the F22 is a 5th Generation aircraft and the F-35 is not.

- Adversary aircraft in the ZOCT deserve to be in the ZOCT because they are no longer mere test beds or prototypes but are in fact fully operational and some are already deployed.

- The ADF failed at the outset to formulate and declare a set of requirements for a future fighter. This failure was part of the overall failure and lack due diligence with no competitive evaluation and the reckless placing of the order on what is effectively a blank cheque at the expense of Australian taxpayers.

- From the outset the lack of an ADF ZOCT is more than a stunning oversight or incompetence, but a necessary omission in the course of some previous ADF brass playing with taxpayers funds for the benefit of their own careers and with scant regard for the Parliament.
