



AERIAL APPLICATION ASSOCIATION OF AUSTRALIA LTD.

ABN 13 002 501 886 • ACN 002 501 886

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22 May 2020

Solicitor Assisting the Royal Commission Into Natural Disaster Arrangements
King & Wood Mallesons, Level 61, Governor Phillip
Tower, 1 Farrer Place, Sydney, NSW

By Email: RCNDA.Notices@royalcommission.gov.au

Dear Solicitor Assisting

Re: Notice to Give Information - NTG-HB2-333

Please find following the AAAA information to the questions contained in the Schedule of the Notice above.

Please note that, with respect, many of the questions do not reflect the reality of aerial firefighting operations or supporting systems such as procurement or tasking. AAAA has made its best efforts to provide the relevant information, including where necessary, clarifications of the questions and suggestions of who may hold relevant information.

Many of the questions are simply not within the knowledge or experience of the Association and this is indicated clearly where relevant, including alternative sources where the Commission may find the information.

AAAA is a small Association staffed by a team of three, with only the CEO having the knowledge and experience to reply to this notice, with the support of AAAA Directors. Consequently, AAAA is not in a position to provide a more thorough explanation to some questions due to resource and time limitations.

AAAA trusts that our best efforts will provide the Commission with further useful information.

Yours faithfully

Phillip (Phil) Hurst
CEO - AAAA

COMMONWEALTH OF AUSTRALIA

Royal Commissions Act 1902

ROYAL COMMISSION INTO
NATIONAL NATURAL DISASTER
ARRANGEMENTS

NOTICE TO GIVE INFORMATION
NTG-HB2-333

To: Philip Hurst, CEO
Aerial Application Association of Australia (AAAA) PO Box 353
Mitchell ACT 2911

Pursuant to s2(3C) of the *Royal Commissions Act* 1902 (Cth), I, AIR CHIEF MARSHAL MARK BINSKIN AC (Retd), Commissioner of the Royal Commission established under Letters Patent dated 20 February 2020 in response to the extreme bushfire season of 2019-20,¹ require you to give this Notice, and the information described in the Schedule, to:

The Solicitor Assisting the Commission at
King & Wood Mallesons, Level 61, Governor Phillip
Tower, 1 Farrer Place, Sydney, NSW
on or before Friday, 22 May 2020 at 4pm AEST.

SCHEDULE

1. **In the context of bushfire behaviour such as that which was observed during the 2019-2020 bushfire season, identify the type/class of aircraft which you consider to be the most capable of:**
 - a. **mounting a timely and effective response to bushfire; and**
 - b. **providing protection to communities and critical infrastructure.**
 - There is no single aircraft type that is 'most capable', with there being an underpinning principle of using the 'right tool for the job' as outlined in our submission.
 - This requires a mixture of types including Single Engine Air Tankers (SEATs) and medium and heavy helicopters.
 - AAAA does not believe that Large Air Tankers or Very Large Air Tankers would play a significant role in initial fire suppression if a suitable number of SEATs and medium/heavy helicopters are deployed in aggressive initial attack. LATs and VLATs may be a useful tool – used in coordination with SEATs and helicopters - if a fire is very large and there is little hope of containment by any other means, however, there are a range of other considerations that come into play with trying to compare LAT/VLAT effectiveness with other firefighting platforms including for LATs/VLATs:
 - long ferry distances from specialised bases
 - relatively slow turnarounds (normally around 2 hours or longer)
 - high cost
 - high risk of unavailability due to international operators (eg COVID19 border closures) and aircraft complexity/potential mechanical failure with a commensurate negative impact on redundancy and maintaining an attack

- disruption to existing air attack due to poor coordination between State Air Desk despatch and LAT and Air Attack Supervisors with consequent negative impacts on coordination with existing SEATs and helicopters already tasked on the individual fire,
 - accuracy, drop height and drop speed depending on type
 - poor current integration with other aircraft and
 - the limited number of drops possible per day.
- In terms of SEATs, the Air Tractor AT802 (3000 litre hopper) is a recognised world leading aircraft for the task and is readily available in Australia. The Thrush 710 with larger longitudinal fire doors/hopper capacity is also a useful asset (close to 3000 litres). Smaller capacity 'agricultural' aircraft (eg 1900 litre capacity) have been used successfully on fire suppression and because of their multi-use nature in agriculture and their geographic location offer a range of cost-effective attributes. It is worth noting that even these smaller agricultural aircraft have a capacity larger than 'light' helicopters that are still in use in some jurisdictions.
 - The float equipped Air Tractor AT802F 'Fireboss' is an extremely effective platform, especially where the fire attack location is close to a navigable water source for 'on-the-go' water pick-up. This combines with the onboard foam or gel tank to maximise effectiveness of the platform. The Fireboss can also operate from a land-based runway.
 - In terms of helicopters, larger capacity helicopters (eg not 'light' heli) also play a key role in aggressive initial attack, especially where short ferry times from water source to fire attack location exist. The longer the ferry time, the less effective this platform becomes because of ferry speed.
 - In terms of asset protection role, both the SEAT and medium/heavy heli are best placed to perform due to manoeuvrability and lower airspeed control during the drop phase. This is often conducted in close proximity of ground fire firefighters and their safety – through accurate bombing – is critical. A common asset protection method used by SEATS is to await the fire to almost engulf an asset before applying the suppression load. The subsequent result is the fire burns around the asset. Dropping too far away from the asset leaves fuel between the asset and the fire front, subsequently leaving potential for the fire to 'hop over' and the loss of the asset.
 - There are a range of other considerations in assessing the appropriate fit of aircraft types in the national aerial firefighting fleet including:
 - Urgent response to ensure aerial assets can respond to identified fire outbreaks. The 'Golden Hour' is a well-established principle in fire attack and emergency response. By ensuring that assets are capable of fast response, are located close to likely fire danger areas, are contracted on short standby times (such as 5-10 minutes from scramble to airborne) and are empowered by pre-determined despatch rules and despatched in flights of multiple aircraft – then the greatest advantage can be taken of the 'Golden Hour' for limiting the spread of a fire.
 - The ability of a number of SEATs to be despatched together in a 'swarm' approach. The experience of some States in despatching multiple aircraft is that their efficacy and impact on the fire increases almost exponentially with a small increase in numbers – for example from 2 aircraft to 3 despatched.
 - Strategic redundancy – if significant resources are tied up in a single asset (such as a LAT, VLAT or heavy helicopter) there is an increased risk that should that asset not be available for despatch – potentially due to a mechanical failure of a more complex aircraft – then there is no redundancy to allow an aerial attack to continue. By ensuring there are several assets available due to their cost effectiveness, then strategic redundancy is also improved as the failure of one asset will not cripple the overall firefighting effort.
 - Strategic despatch from greater numbers of assets – if investment is made in having multiple aircraft available, then they can be despatched to multiple fires if necessary, whereas a single asset (eg LAT/VLAT) can only be sent to one fire at a time.
 - AAAA strongly supports independent research into a range of considerations in terms of effectiveness, efficiency and cost across the firefighting fleet to establish some scientifically derived guidance – potentially including key performance indicators such as litres delivered to the fire - for State agency tasking and NAFC contracting to ensure the best available tool for the job is actually used. This is why AAAA has proposed a National Centre for Excellence for Aerial Firefighting to research, identify and communicate best practice.

- 2. In the case of the aircraft identified in (1) above, describe the arrangements within Australia (including within individual States and Territories) for:**
- a. procurement, including (as relevant):**
 - i. ownership; and/or**
 - ii. loan/ sharing (both between Australian States and Territories, and internationally); and**
 - b. tasking (i.e. in the context of an active bushfire emergency, which individual(s) within an emergency management / incident control structure determine where resources are needed and issue related directions).**
- A national industry-government partnership and a national aerial firefighting strategy is at the heart of the potential to improve aerial firefighting across a range of parameters. A national strategy to address many of the impediments identified in this paper would significantly change the methodology by which Australia assesses, assembles and manages its aerial firefighting fleet. The lack of a national strategy throughout recent fire seasons continues to impede the development of the industry and the protection of the Australian community.
 - All SEATs are owned by Australian private companies and contracted to either NAFC or the State/Territory agencies. Almost all helicopters are owned by Australian private companies and contracted to either NAFC or the State/Territory agencies.
 - A range of contracting arrangements apply – including full availability contracts, partial availability contracts or call-when-needed arrangements.
 - A key issue is that apparently due to a lack of funding, there are only quite limited numbers of aircraft on full availability contracts across the fire season in some jurisdictions. There does not appear to be a clear strategy for establishing how many aircraft on full availability contracts should be in each State/Territory, or available nationally as a 'surge' capacity.
 - One jurisdiction only (NSW) is building a fleet of its own aircraft including helicopters and a 737 (LAT) converted for firebombing. There has been no transparency in the business case for this approach and industry has been actively misled by RFS NSW as to its intent. AAAA does not support these arrangements due to the high cost impact on taxpayers and the distorting impacts on an otherwise open market, especially in terms of despatch decisions and using the right tool for the job – as outlined in the AAAA/AHIA National Aerial Firefighting Policy.
 - While contract arrangements (including procurement) is now largely in the hands of NAFC there are a range of improvements available, especially in terms of longer contract periods to encourage industry to invest in suitable aircraft. For example, an Air Tractor 802 (SEAT) on floats – the Fireboss – is valued at around \$AUS 5.5 million (exchange rate dependent) is a significant investment if contracts are limited to 3 years + 1 +1 year option.
 - NAFC contracts are 3 +1 +1 years - the minimum guarantee of contract is only 3 years with two 1 year options. The 1 year options are only advised 2 months from expiry. Expiry is typically 30th June. Therefore, for a primary contract there is only 3 years of certainty – and NAFC/Agency only have to advise if there is a Year 4 by 30th April in that year – which is then repeated if required for Year 5. This creates considerable contract uncertainty and a diminished ability to secure long-term finance on this basis. In addition, NAFC contracts demand an unrevokable bank guarantee when you are awarded a primary contract that must be provided at the start for the full 5 years.
 - It is critical to note that another improvement in the broader economic/government framework would be the provision in Australia of accelerated depreciation or expensing as it is in the USA. A fuel excise rebate would also support aerial firefighting in Australia.
 - A particular problem has been the short timeframe available to operators to develop contract proposals and the lengthy delays by NAFC in announcing contracts – which are never done publicly or in a transparent manner. The delays in the announcement of a contract to a winning contractor are such that there is seldom sufficient time for a contractor to be innovative or source potential aircraft – with most contractors being forced because of this to only offer aircraft already available in Australia. Australian private companies are able to purchase aircraft worldwide, but require suitable lead times for these transactions. In some cases, the time

from contract announcement to start of the contract has been only a few weeks. There is also a significant impact on unsuccessful tenderers who are also not advised of their situation until close to the start date. Longer leads times, greater certainty and transparency around NAFC decisions and timing and much longer lead times would lead to far better outcomes for both contractors, agencies and NAFC.

- Tasking in some States/Territories is efficient and effective – based on the principle of aggressive initial attack and getting aircraft onto the fire while it is small and controllable. Pre-determined dispatch in WA, SA and Victoria is a game changing system that should be adopted nationally. These States employ early fire detection coupled with 5 minute ‘scramble’ for aircraft to be airborne providing maximum impact in the ‘Golden Hour’ of a fire while buying valuable time for ground-based assets to arrive. Tasking principles should be established to ensure contracted aircraft are tasked at the same time as ground based firefighting equipment, but due to the aircraft’s speed it will be the first platform to attack the small fire and provide intelligence to incoming ground crews. Some jurisdictions lag behind by decades in their tasking procedures which are opaque at best and seldom result in aircraft on the fire in a timely manner. While the ARENA program used by NAFC and States/Territories is a great advance, some jurisdictions appear to continue to make tasking decisions on price alone, rather than asset proximity to a fire, capabilities or other ‘effectiveness’ measures.
 - While contractual arrangements including procurement is largely handled by NAFC (with obvious input from State/Territory agencies on who should be awarded contracts), tasking is almost solely the domain of State Air Desks and the relevant agency controllers. There is significant variation between States in capacities, timeliness, effectiveness, use of different assets and use of different contracting arrangements.
 - An overall test of the ‘national interest’ should be applied in determining the best way forward for aerial firefighting in Australia and combined with a national partnership approach between industry and government.
 - The ‘national interest’ would clearly be served by building on the existing aircraft, skilled personnel and supporting systems already available in Australia. Not only will this serve to support Australian jobs, it will ensure Commonwealth and State/Territory funds remain in Australia, building the economy, skills, and capacity.
 - The ‘sovereign risk’ element of relying on overseas assets has been brought home during the COVID19 border closures. As northern hemisphere fire seasons also extend in length, Australia places itself at increased risk at not having access to appropriate assets. In addition, Commonwealth and State funding is then exported – along with jobs and skills. By building a national partnership with industry, government would be able to assist industry in securing assets that are in Australia year-round and which directly benefit the Australian economy.
 - As a further element of considering the ‘national interest’ it should be noted that a unique feature of SEAT and helicopter availability in Australia is their flexibility in being able to contribute to the agricultural sector as well as aerial firefighting – but during different times of the year. This can assist in making the SEAT particularly useful if an overall test of the national interest is applied.
3. **By way of example(s), describe how aerial firefighting assets might be deployed on any given day during a bushfire season in Australia, including but not limited to:**
- a. **how they are called out and who calls them out;**
 - b. **how long it takes to deploy;**
 - c. **who is in charge of the overall operations of the aircraft while being deployed;**
 - d. **who is in charge of controlling the air space when deployed; and**
 - e. **who is responsible for ensuring the co-ordination with on the ground fire assets?**
- There is significant concern that the fire agency personnel who are currently charged with the overall management of aircraft may not be the best placed to manage despatch and use of aerial assets. This problem would benefit from a detailed review of agency procedures and the identification of best practice.
 - In addition to aircraft not being tasked/despached at optimum times in some jurisdictions, there is often considerable inefficiency caused by not despatching the closest asset or the best suited to the job. In addition, internal processes in some agencies are leading to work-arounds to avoid additional internal red-tape and to minimise costs incurred as a result of ‘standing assets up’. While it is a challenging decision-

making environment for State Air Desks and others, a review of these systems will be critical in removing delays, improving responsiveness and improving outcomes on fires.

- Aircraft despatch is generally determined by the State Air Desk in each jurisdiction and, other than in the case of pre-determined despatch (see below), this is either in response to a request from the field – for example by a fire controller – or at the initiative of the State Air Desk staff.
- This is a major impediment to the smooth and early despatch of aircraft on aggressive initial attack. In some cases, the personnel responsible for call-out for aircraft or despatch simply may not have the level of competence or knowledge to understand the potential impact of aircraft and to despatch at a time that would be the most impactful on a fire. There is significant potential to improve this situation by increasing the powers (and training) of the airborne Air Attack Supervisor to request and manage aircraft – including despatch of additional aerial assets.
- If aircraft are already on a fire-ground or nearby aerodrome (for example on a fire lasting several days), they will most likely be managed by the Air Base Manager or Incident Management Team hierarchy in control of that fire.
- In terms of tasking an almost any day, few agencies are able to get aircraft into the air and onto a fire much before 10 or 11 am – especially on campaign fires running over a number of days and despite most of the issues being well understood. In some cases this may be because of agency staff shift changes or new intelligence gathering and redevelopment of the fire attack plan, but regardless, the outcome does not assist fire control. Pilots and operators, who often work in other sectors outside the fire season, are generally attuned to being ready for work at dawn – especially in the agricultural sector. This is an operational penalty that is not tolerated in private sector operations and is a significant impediment to effective use of aircraft during the best flying conditions with lower temperatures, less turbulence and often better visibility.
- Pre-determined despatch in WA, SA and Victoria is a game-changer for aerial firefighting, whereby the despatch of several aircraft at the first sighting of smoke has resulted in many small fires being controlled before they became big fires. Several Airtractor 802 aircraft in these States are contracted to be airborne within 5 minutes of despatch. Culture, contracting and tasking arrangements in other jurisdictions clearly mitigate against the development of appropriate trust and effective procedures for the implementation of Pre-determined despatch – but it is clearly best practice.
- Pre-deployment of aircraft on days of high fire risk is not nationally consistent, and AAAA believes this is being driven by two considerations – perceived cost - and potentially a lack of competence or supporting systems within some agencies to drive this type of strategic thinking. By pre-deploying aircraft and putting them on stand-by (with appropriate costs) agencies may be fearful of the accusation of wasting limited resources. However, having aircraft strategically placed serves the purpose of aggressive initial attack.
- While the Pilot in Command has ultimate control for the safety of their aircraft, there are a range of other people involved who have the power to influence or even direct the pilot during any flight. In addition to on-the-ground fire controllers making despatch decisions, there is often an Air Attack Supervisor in a helicopter/fixed wing aircraft ‘controlling’ the aircraft working the fire. From aviation safety theory including the study of human factors and organisational culture, there are clearly a number of opportunities for pilots to be influenced by others – regardless of the ultimate contractual and regulatory requirement that the pilot is responsible.
- For this system to work well, all personnel must be fully trained to a ‘professional’ level of competence, having ongoing currency to the task and must understand the potential of their role to impact on aviation safety as well as efficacy. Non-pilot staff must be accountable and supported by effective systems including safety management, incident reporting, quality management and continuous improvement. Standardised systems for briefing, tasking and despatch are critical. This is currently not uniformly the case across the country.
- The airspace around a fire may or may not be the subject of air traffic control, depending on location. For example, firebombing out of Canberra airport in the 2019-20 season (for the first time) took place largely in controlled airspace, meaning that an air traffic controller was in charge of approving aircraft approach to and departure from the airport and tracking to and from the fire – including all of the advantages and disadvantages of that process.
- By comparison, many if not most fires are fought outside of controlled airspace (often in ‘G’ class airspace) where ‘see and avoid’ rules apply and aircraft self-separate. Generally, the first aircraft on scene will establish a standard pattern using procedural height separation for safety, which subsequent aircraft then follow. This simple but robust system is well understood by pilots and improves aircraft separation when backed up by

appropriate radio calls to improve situational awareness. There is some potential in this environment for safety to be compromised by aircraft being on wrong frequencies and by low visibility operations. In some cases, this is further compromised by having to monitor several frequencies at the same time including potentially the fire CTAF, the local CTAF and potentially others for traffic (eg if LATs/VLATs are not using the same frequencies as has occurred).

- In addition, there may be an Air Attack Supervisor in an aircraft who is acting as a *de facto* air traffic controller to try and improve aircraft separation (often without any formal training or qualifications in air traffic control) and direct bombing activities to improve efficacy. The Air Attack Supervisor will also coordinate with ground personnel, although often this is managed directly from the cockpit of the bombing aircraft. Further, the State agency may contact CASA / Airservices to establish a Fire CTAF (Common Traffic Advisory Frequency) around the airspace of a fire to assist in keeping other general non-fire traffic away and improving communications. AAAA has identified a number of issues with this approach and has included them in our submission to the Commission, including in our Continuous Improvement Program.

4. Describe any key challenges encountered in:

- a. procuring and owning firefighting aircraft (including any contractual issues and tenure); and**
 - b. sharing equipment and resources between jurisdictions including as a consequence of emerging trends (e.g. increasing length of bushfire seasons, competing demands for resources in other jurisdictions).**
- AAAA has long argued for a national partnership between government and industry in the aerial firefighting sector to maximise cost effectiveness, capacity and capability as well as eliminating sovereign risk caused by relying in international assets. COVID 19 has made it very clear just how vulnerable Australia is due to this lack of a national partnership approach. The development of a joint industry-government National Aerial Firefighting Strategy would help build trust and improve performance. The AAAA submission to the Commission covers this initiative.
 - Many aerial firefighting companies in Australia – both rotary wing and fixed wing – are family businesses based in rural and regional Australia. They are largely small businesses (private companies generally) by most government definitions and consequently need long lead times to secure investment resources for new aircraft to be purposed for aerial firefighting. Short contracts offered by NAFC (3 years +1+1 options) are not long enough to encourage long term investment and building the fleet. A move to longer contracts – such as 5 years with options – would be a significant improvement for both industry, agencies and the capacity of the national firefighting fleet.
 - There is little security offered in the NAFC contracts and NAFC seeks to place a wide range of liabilities onto the contracting company – up to and including non-use of aircraft, penalties or termination of the contract – despite the aircraft being under the direct and very firm control of agencies in terms of usage, position and dispatch. For example, NAFC contracts require:
 - an unrevokable bank guarantee – ‘Performance Bond’ - when you are awarded a primary contract that must be provided at the start for the full 5 years
 - a range of notification timings that are largely in favour of NAFC/Agencies and which are often ignored by NAFC and agencies if the contractor is required to start earlier than the contract period
 - a wide range of equipment, personnel and training requirements
 - Owning any aircraft is an expensive proposition. Owning an aerial firefighting platform brings with it significant additional challenges. Securing finance if required, maintaining insurance in a very uncompetitive Australian market (currently with only one aviation insurance company providing cover in Australia), aircraft refit with highly specialised equipment which may be specific to a single State and compliance costs as a result of CASA regulation are significant expenses in addition to the normal operating costs of aircrew, aircraft maintenance, fuel etc.
 - In addition, a range of NAFC contractual requirements which must be in place to be eligible for consideration for a contract include:
 - significant radio fitout for firefighting (up to five additional radios depending on which jurisdiction)
 - extra and ongoing (non-regulated) pilot training
 - purchase and fitment of appropriate firefighting doors/related equipment to aircraft
 - aircraft and engine tracking and recording equipment
 - required maximum aircraft age (applies to SEATs but not other categories)

- In terms of aircraft sharing across jurisdictions, this is driven by NAFC and State agency processes. At an industry level there is a significant amount of cooperation between operators in meeting contractual requirements, even though it is a competitive environment. For example, if one jurisdiction was to extend or increase contracts to cover a longer season or significant events, these aircraft could be sourced by the prime contractor through industry colleagues – as long as the aircraft meet the contract specifications. As another example, there are approximately 83 Air Tractor 802s in Australia (from the CASA aircraft registry) with a range of smaller SEATs also available. However, because of a lack of a national partnership or strategy, there is no clear intent from government as to how this number could be used most effectively or grown to provide an even stronger aerial firefighting capacity.

5. Describe the funding arrangements for aerial firefighting assets in Australia.

- There is no national industry-government partnership approach as discussed above, however, NAFC now controls almost the entire procurement and contracting chain – obviously in cooperation with the State/Territory agencies that constitute NAFC.
- It is important to understand that NAFC's role is essentially a contract broker on behalf of the States and Territories. As NAFC is now constituted under AFAC, this relationship is even clearer when the membership of NAFC is considered (see http://nafc.org.au/?page_id=111). Essentially, NAFC is working on behalf of the States/Territories and anything it can achieve in terms of national standardisation or continuous improvement must be undertaken with the cooperation of the States/Territories. Put bluntly, NAFC is not the 'boss' of the States/Territories and in many ways this relationship makes national standardisation and a nationally consistent aerial firefighting strategy even more difficult.
- AAAA understands that NAFC receives funding from the Commonwealth, but until the fire emergency over the 2019-20 summer, long-requested funds (AAAA understands over some 3 years) to support NAFC had not been supplied.
- NAFC clearly needs both a longer-term funding strategy and a commitment from the Commonwealth at least for additional funding to increase the aerial firefighting fleet to meet emerging demands from longer fire seasons. AAAA notes that as recently as the 15/5/2020, Minister Littleproud announced an additional \$11 million per year for NAFC. This is very welcome if it makes its way to more aircraft on contract and systems improvements that address the issues AAAA has raised.
- AAAA understand NAFC also manages contracting and procurement processes for most States/Territories based on their available budgets. AAAA strongly believes that all States and Territories should commit additional funding to aerial firefighting to meet the emerging challenges of longer and more intense fire seasons – coupled with a significant overhaul of tasking and management practices to pursue better practice – especially including national pre-determined dispatch arrangements for an expanded aerial fleet on full availability contracts.
- Contracts are issued on the basis of either full availability contracts, partial availability contracts or call-when-needed arrangements. In some jurisdictions, the use of these different types of contracts appears to be aimed at establishing a 'race-to-the-bottom' on price – with little regard for effectiveness or outcomes. While there is clearly the need for a 'surge' capacity in bad fire seasons, this can be better managed in a range of ways – including incorporating this surge capacity into prime full availability contracts.
- In some jurisdictions, sub-optimal contract arrangements have encouraged 'tow-trucking', where operators are encouraged by the system to pre-position aircraft nearer to fires at their own cost to improve their chances of being tasked – in other words to 'game' the system. This is a direct result of poor management of contract arrangements and a lack of clarity around recognising genuine 'local' operators who provide services and jobs in that location year-round. AAAA is strongly opposed to the arrangements that lead to this behaviour and is confident it would be eliminated by improving the contract structure in place and the protocols for tasking in the two jurisdictions where this is a problem – Queensland and NSW.
- While contracts are managed by NAFC, invoicing and payment arrangements are managed by State/Territory agencies. This can – and has – resulted in significant delays (several months) in payments for services already delivered. This leaves small businesses – and their suppliers – playing bankers to government agencies that simply do not have particularly effective or timely payment systems, or who seek to quibble over small, immaterial costs and consequently hold up large payments.

6. Identify the training required to allow the effective and safe use of aerial firefighting assets, and whether the AAAA considers there is a need for, or value in developing, national standards for training and competency.

- Aviation training standards are already highly regulated by CASA and at an appropriate level for the risk exposure of aerial firefighting. AAAA is working positively with CASA on improving its regulatory approach to pilot training through an improved Civil Aviation Safety Regulation Part 61. The bulk of this work is aimed at simplifying requirements introduced in 2014 which have subsequently proven to be ineffective and a significant impediment to effective aerial firefighting training pathways. AAAA is hopeful this will be remedied within the next two fire seasons – dependent on CASA.
- However, there is an urgent need to significantly lift the training, standardisation and performance of agency-side staff involved in aerial firefighting. In many cases, non-aviation qualified personnel are actively involved in aviation operations that directly impact on safety – even though they don't know that because they are not aviation trained – in other words – *they don't know what they don't know*. In some cases, it has only been the solid safety training provided to pilots and the strong safety culture throughout aerial firefighting aircrew and operators, that has empowered pilots to refuse unsafe operations requested by non-aviation trained agency personnel. The AAAA submission to the Commission has identified key areas in need of urgent reform and improved, nationally consistent training. The AAAA proposed National Aerial Firefighting Centre for Excellence is aimed squarely at this issue – building on the experience and knowledge of 'master practitioners' - with an aim of developing best practice guidance which all jurisdictions would be unable to ignore.
- AAAA is aware that a national approach to training through ASQA is being developed for non-pilot aviation skills and positions. Puzzlingly but not surprisingly, neither AAAA nor its members have been consulted or involved in the development of draft competencies for a range of aviation critical positions – and which our members would have key insights into in terms of safety and performance of aerial firefighting tasks.

7. Provide an overview of:

- a. the efficacy of aerial firefighting;**
- b. the effectiveness of alternative aircraft types;**
- c. the cost of purchasing and operating the aircraft (by type); and**
- d. the role of aerial firefighting resources (e.g. fire containment, prevention etc.)**

- Some elements of the questions above have already been covered by previous answers, especially to question 1.
- Aerial firefighting is highly efficacious especially when conducted in accordance with best practice principles.
- This can sometimes be a challenge as pilots are not in charge of the fire ground situation or of critical components such as pre-positioning, aggressive initial attack or tasking. Even replenishment of bombers is in some jurisdictions undertaken by agency staff (sometimes volunteers) and this can significantly impact on turn-around times. These powers have been retained by agencies. This is an interesting comparison to other sectors – such as agricultural work – where the pilot or operator have greater control over the task, replenishment (using the practiced, extremely competent – and fast - loader/mixers already employed by operators).
- International experience and practice also support the use of aerial firefighting and Australian companies and pilots have provided aerial firefighting services around the world including Greece, Portugal, Spain, Indonesia, Italy, Canada and the US. International practice also supports the use of SEATS and medium and heavy helicopters in an aggressive initial attack role, with some countries mounting flying patrols by firebombers during high risk days.
- Some limited research has been done in Australia to assess the impact of aerial firefighting, including in an economic cost/benefit approach. However, this work was conducted by different State agencies and is not readily available. AAAA recalls that WA did a report in the 1990s that identified that in a single season the use of aerial firefighting saved the State over \$9 million net in assets with a total expenditure of approximately \$400,000 on 2 aggressive initial attack SEAT aircraft over a 14 week period. Victoria also presented some very positive information at a previous AAAA National Aerial Firefighting Conference - assessments that identified significant community and economic value from aerial firefighting using a combination of aggressive

initial attack SEATS and medium/heavy lift helicopters. Victoria also previously conducted an assessment on the use of VLATs in Australia.

- Not all aerial firefighting is the same. It is critical to understand that the same aircraft can perform different roles – often on the same fireground. For example, attacking a fire head or flank is a different role to laying down a line of retardant, which is very different from close-in asset-protection which is very different again to survey. Without a detailed knowledge of the different roles played by aerial platforms, it is difficult to make sense of the question posed regarding effectiveness. In the right situation with the right tool, clearly aircraft are highly effective.
- For example, a key purpose of SEATS in WA/SA is to attack the head of the fire and slow the rate of spread, buying time for ground assets to arrive and establish themselves. The aircraft are also highly effective at attacking the flank of the fire so that if there is a wind change, the size of the new front heading in a different direction is much smaller and easier to control. Another successful strategy used by WA/SA when tackling a fire is to put a bulldozer on the flank, tracking a firebreak. Before aerial support the bulldozer would have to stand off the flank of the fire by 10 metres or so to prevent the bulldozer from overheating. This would leave 10 metres of fuel between the fire flank and the firebreak. With the fuel loading between firebreak and fire flank, chances of an ember jumping the firebreak was significant and progress on the mineral earth firebreak was relatively slow. With aerial support from SEATs the drops are accurately placed 10 to 20 metres directly in front of the bulldozer – suppressing fire and heat on the flank and the bulldozer can cut its firebreak with a portion of its blade in the burnt country, leaving no fuel loading in its wake. Consequently, chances of a ‘hop over’ are significantly reduced and progress along the flank is significantly increased. Upon reaching the head of the fire with both flanks tracked, several SEATs drop within minutes to suppress the head fire so the bulldozers on each flank can crossover. While this scenario will not be relevant on all firegrounds, it provides an example where the integration of aircraft with ground equipment can make a significant improvement to efficacy and productivity of both assets.
- Efficacy and effectiveness of different aircraft types can be affected by a wide range of variables, including:
 - Role - attacking a fire head or flank / building a line of retardant /close-in asset-protection / fire attack supervision (ie aerial coordination of assets especially bombers) / survey.
 - Distance of the platform from the fire when first tasked
 - Distance of a water source from the fire (ie ferry time) for replenishing
 - Ground fuel type and fuel load
 - Ground canopy – and whether the fire is crowning or burning under the canopy
 - Type of fire – a fast running grass or crop fire is very different to a fire in steep, heavily treed National Park
 - Coverage levels from different aircraft
 - Material being dropped – water only, foam, gel, retardant
 - Aircraft capacity and capability – rotary or fixed wing, land-based or on floats, hopper size, performance with load
 - Skill of the pilot or skill of the Air Attack Supervisor in directing the pilot
 - Meteorological conditions – including turbulence, high wind speeds
 - Visibility – a particular issue during the 2019-2020 season
 - Terrain – including access, escape routes, steepness that may affect drop heights
 - Location of ground personnel – for their safety
- Various research has sought to establish the effectiveness of different aircraft types, such as that from the US Forestry Service and others that have established coverage levels and related parameters. The former Australian Bushfire CRC published a report on the issue in 2007. However, much of the available research is dated and may not be relevant in an Australian context with our fuel types and fuel loads.
- AAAA strongly supports new research into this area to improve tasking and performance by getting the ‘right tool for the job’ through the establishment of best practice guidelines for agencies in control of the fireground.
- AAAA is not privy to the purchasing or operating costs of different aircraft types and is unable to answer this question. Operating costs are commercial-in-confidence issues for each operator.
- Information on the cost of operating aircraft should be directed to NAFC who hold this commercial in confidence detail as a result of receiving and awarding contracts. NAFC should be able to provide deidentified and averaged information to inform the Commission.

- It is critical to assess costs on the basis of 'whole of cost' – including standby charges (and if they include, as in some jurisdictions, allowance for 2 hours flying within that charge or not), hourly operating costs, and 'free' operations required to be included by contracts such as training and relocation costs if any.
- For example, NAFC contracts are based on both a daily standby fee in addition to any hourly operating costs and it is critical to understand all of the financial arrangements around a particular platform to enable a fair comparison to be made. Hourly operating costs are a component of this, but only one component. NAFC should be able to provide a more thorough explanation of their arrangements.
- The NAFC website has full details of aircraft used and the capacity of different aircraft – see http://nafc.org.au/?page_id=168#AircraftTypes

8. Describe how effective was aerial firefighting in the 2019-2020 bushfire season.

- Aerial firefighting was a highly effective component of the firefighting toolbox in the past season. While AAAA has made a range of suggestions about how to improve the performance of the sector and the agencies through our submitted Aerial Firefighting Continuous Improvement Program, this in no way detracts from the extremely effective use of aircraft during the season and the commitment and professionalism of pilots and supporting crew including aircraft maintainers.
- Aerial firefighting in the close-in asset protection role was instrumental in saving millions of dollars worth of assets across the country. A number of media reports, agency reports and direct pilot witnesses validate this claim. Unfortunately, due to the lack of a quality assurance feedback system in any agency or NAFC, AAAA is not able to provide particular examples.
- In jurisdictions that have enabled pre-determined dispatch to allow genuine aggressive initial attack, many fires were kept much smaller than their potential without aircraft.
- Where optimal placement of a navigable water source, short ferry times and the Air Tractor 802(SEAT) 'Fireboss' despatched in multiples (4 aircraft) occurred, aerial firefighting pilots were able to deliver upwards of 600,000 litres to a fire in a single day. This makes a real difference to on-the-ground firefighters protecting assets including villages and towns. This clearly demonstrates the values of SEATs in numbers on a fire.
- However, when fuel loads and poor weather conditions combine, even aerial firefighting may be challenged in meeting the fire behaviour, as occurred in many places during the past season – often characterised by high fuel loads, very dry fuel as a result of the drought and severe weather events. This often requires a different tactical approach – especially in heavily timbered areas – of letting fires burn back to an established line of retardant built on suitable terrain that can be defended - rather than direct attack. This can be especially useful in areas where asset loss (houses etc) is minimal eg National Parks. Aircraft are the only platform that can effectively undertake this work, especially where it is in support of ground crews and heavy earthmoving machinery.

9. Describe any key operational and safety challenges encountered in coordinating and responding to fires associated with the use of aircraft and aerial firefighting techniques.

- While fires do not recognise State/Territory boundaries, current aerial firefighting arrangements certainly do. While some States (eg SA/Vic) have in place various working arrangements near borders, other jurisdictions do not.
- A number of compounding effects currently work against easy sharing of resources across State/Territory boundaries, including:
 - Aircraft are contracted to a particular State/Territory through NAFC
 - While aircraft may be 'visible' on the NAFC tasking program ARENA, they cannot be tasked out of the State to which they are contracted without State to State or State to NAFC discussions
 - Different State radio fit requirements
 - Different aviation frequency requirements on the same fire that may straddle a border
 - Different State replenishment fitting – eg different pump couplings
 - State concerns with not releasing their capacity to another State, thereby reducing their own protection

- The lack of clear feedback on the effectiveness of drops or the overall impact of aircraft use on a particular fire creates problems for quality assurance, continuous improvement, training and morale of aircrew and others. The establishment of the national systems identified in the AAAA submission to the Commission – namely safety management, quality assurance and continuous improvement - would provide a significantly improved basis for informed discussion and decision making across a range of issues.
- The AAAA submission to the Commission and especially the AAAA Aerial Firefighting Continuous Improvement Program identified a range of other issues affecting operational and especially safety challenges.

10. Describe any ways in which aerial firefighting could be made more effective.

- The AAAA submission to the Commission and especially the AAAA Aerial Firefighting Continuous Improvement Program identified a range of initiatives. Central to this is the establishment of a number of national systems including safety management, quality assurance and continuous improvement, within a National Aerial Firefighting Strategy based on a government-industry partnership.
- The establishment of the AAAA proposed Centre for Excellence in Aerial Firefighting would be a significant initiative to drive improvements across all jurisdictions.
- As an example, arrangements to ensure the best firebombing additive (gel) is available for first attack consistently across all jurisdictions would be an immediate and relatively simple improvement – ‘best shot first shot’. Similarly, immediately permitting ‘hot refuelling’ of all turbine aircraft with single point refuelling (standard industry practice) would improve turnaround times and improve engine management and reliability. There are many other examples in the AAAA Aerial Firefighting Continuous Improvement Program which is an appendix to the AAAA Submission to the Commission.

11. Describe any key challenges encountered in determining priorities and/or issuing instructions to firefighting aircraft in border areas.

- See the answer to Question 9 above.

12. Describe the coordination arrangements AAAA has with:

- the National Aerial Firefighting Centre (NAFC) for the procurement of aerial capability each season;**
 - State/Territory Governments and/or State Air Desks concerning the availability and deployment of aerial firefighting resources;**
 - State/Territory Governments and/or NAFC concerning technologies to facilitate communication between critical personnel, such as ground crew and air desks.**
- AAAA has no formal coordination arrangements with NAFC or the agencies and is not involved in any of the processes listed.
 - AAAA has encouraged NAFC to establish a national consultative mechanism to facilitate engagement between industry peak bodies, NAFC and the constituent State/Territory agencies and this has resulted in two meetings last year where AAAA was able to discuss a range of issues, including the principles espoused in the AAAA National Aerial Firefighting Policy. A planned NAFC/industry National Aerial Firefighting Forum was forced to be postponed firstly due to the early fire season and then COVID19 limitations.
 - AAAA has previously engaged with RFS NSW in a series of consultative meetings to make improvements to both consultation arrangements as well as operational issues. This was a key outcome of the Conroy Report into aerial firefighting arrangements and management by RFS NSW. It appears that these meetings have now ceased following the withdrawal of the Australian Helicopter Industry Association from the meetings following RFS NSW’s decision to continue building its own fleet rather than working with industry.
 - AAAA has no other consultative arrangements in place with any fire agency, although informal contact is made from time to time.

- Fire agency personnel are invited to relevant AAAA events such as State conferences or National Aerial Firefighting Conferences which are run by AAAA. NAFC has also attended and spoken at *Rotortech*, the national rotary wing convention held every two years by AHIA, where AAAA has also participated.

13. Describe how effective the National Aerial Firefighting Centre (NAFC) has been in coordinating aerial assets.

- Following the 'Nairn Report' (Commonwealth House of Representatives Committee Inquiry) into the catastrophic fires of 2002 and 2003, NAFC was established to improve the funding and sharing of aerial firefighting resources across the country. It has been successful in this role in terms of centralising and standardising the contract process, but can clearly improve its performance as identified in previous answers.
- NAFC is of course hamstrung in many ways by the sovereignty of the States/Territories and the need for all arrangements to be negotiated sensitively. While a genuinely national agency charged with improving aerial firefighting is an admirable aspiration, it would be quickly undone by constitutional reality – with the States/Territories retaining the primary role of delivering emergency services within their jurisdictions. Consequently, a national partnership approach through NAFC/AFAC and building on the capacity of the States/Territories is a pragmatic and achievable way forward. Obviously, the Commonwealth can and should play a coordinating role and if combined with significant funding for aerial firefighting, may be able to rapidly improve the various systems in play.
- The potential of NAFC to further improve aerial firefighting in Australia is significant and recent steps to improve consultation and cooperation with industry is extremely welcome, if overdue.
- Similarly, the potential for NAFC to extend its role into that of national standardisation across all agencies – including in terms of operational use of aircraft and best practice - is significant. This would be further bolstered by coordinating this role for NAFC with the AAAA proposed National Centre for Excellence for Aerial Firefighting which should be run by industry and funded by the Commonwealth.
- A key challenge for NAFC, and in turn State/Territory agencies and industry, has been the complete lack of a national industry-government partnership and aerial firefighting strategy to engage in continuous improvement of the aerial firefighting landscape. AAAA is hopeful that recent initiatives will lead to a stronger relationship between NAFC, its constituent agencies and industry to empower rapid improvements across a wide range of issues as identified by AAAA in its submission to the Commission.
- Of specific concern is the need for a national approach to funding an appropriately sized aerial firefighting fleet based on more full availability contracts through NAFC – with the ability to move aircraft to where they are needed.
- The Australian industry offers the most cost-effective, skilled and efficacious means of delivering a long-term Australian based capacity to support fire agencies and put fires out.

14. In relation to the use of alternative technologies, such as drones:

- specify what experience (if any) AAAA has had with the deployment of alternative technology, such as drones;**
 - identify whether AAAA is aware of any safety concerns associated with the use of these technologies, and if so, describe what are those concerns;**
 - describe the interactions (if any) AAAA has had with industry concerning the use of this technology.**
- AAAA has been working with the drone/RPAS/UAS sector for years in the agricultural space. A copy of the AAAA UAS Policy for agricultural use is available from our website. See <https://aaaa.org.au/policies/>
 - The central safety risk with the introduction of UAS into the same airspace as manned aircraft remains uncontrolled – namely the risk of collision due to a loss of separation. This is clearly a 'high consequence' risk likely to lead to the death of a manned aircraft pilot. CASA has continually refused to address the issue despite significant concerns expressed in submissions by AAAA. Until this risk is addressed, UAS in general use will remain a significant safety threat to aviation. This threat will actually increase now that CASA is enabling 'beyond visual line of sight' operations by drones.

- Firegrounds are still being shut down to aerial firefighting due to incursions by illegal drone operations. ATSB would have some data, but State agencies would be in a better place to quantify the issue.
- Fireground shut-downs due to UAS incursions have a number of significant downstream effects including loss of a significant capacity on a fireground – sometimes at a critical juncture – with potential additional fire damage likely, economic loss to the operator and pilot from an unplanned stand-down, and uncertainty as to re-tasking / recommencement of bombing due to the unknown nature and unpredictability of the threat. AAAA has long proposed more significant fines for such transgressions – in the tens of thousands of dollars - commensurate with the impacts of the UAS incursion, community expectations and the likely deterrence impact.
- In terms of specific use of drones in a controlled environment by professional contractors on a fireground, AAAA has no issues as long as any other aircraft working on the fireground are aware of the operation and/or clear procedures are in place to ensure the safety of manned aircraft pilots.

15. To the best of your knowledge, identify whether any AAAA member was involved in any aerial taskings to protect or preserve flora or fauna of significant ecological importance (including, without limitation, the Wollemi Pines, corroboree frogs or Sphagnum bogs), and if so, provide any details of those aerial operations.

- AAAA members operate across all jurisdictions in environmentally important areas, including National Parks. It is highly likely that AAAA member operations would have had a positive influence in protecting at least some of the flora and fauna identified.
- However, AAAA is not aware of any specific examples the Commission is seeking due to AAAA not having access to any information on actual operations conducted due both to a lack of quality assurance feedback systems and because of the various confidentiality agreements placed on members by NAFC and State/Territory agency contracts. There is seldom any context, target result or overall outcome feedback provided to pilots – hence AAAA calls for a national quality assurance system for aerial firefighting that would improve feedback to pilots and operators on this issue and many others.

16. Having regard to the Commission's Terms of Reference, described (in summary terms) any other matters which you consider relevant to your responses to the above questions, or to the Commissioners' inquiries regarding bushfire risk mitigation within Australia.

- Nothing further.