LEGISLATIVE ASSEMBLY
FOR THE AUSTRALIAN CAPITAL TERRITORY

STANDING COMMITTEE ON ENVIRONMENT, CLIMATE CHANGE AND BIODIVERSITY
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Submission Cover Sheet

Inquiry into ACT environment's Bushfire preparedness

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Pano AI, Pty Ltd

Submission to the ACT Environment's Bushfire Preparedness Inquiry

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02 February 2024

To the Standing Committee on Environment, Climate Change and Biodiversity,

On behalf of Pano AI (Pano), I am pleased to provide this response to the Committee's Inquiry into the ACT Environment's Bushfire Preparedness. Although bushfire has forever been part of the Australian landscape, the worsening effect of climate change is increasing the frequency and severity of fires. The Australian Capital Territory (ACT) has experienced more than its fair share of devastating fires in the last few decades, and whilst it has adapted its resources and response mechanisms, there is much to be gained from further evaluation and amendment of the extant response system.

Pano AI would like to address the ACT's ability to augment its existing resources through the adoption of technologies that can significantly improve outcomes in the face of a catastrophic bushfire threat.

While Pano AI's submission touches on a range of the Terms of Reference, this submission deliberately addresses the following Terms of Reference for the Committee's Inquiry:

A. *The environmental factors contributing to bushfires in the ACT and surrounding areas, including any role of weather, drought, climate change, fuel loads and human activity;*
B. The impact of bushfires on climate emissions, climate adaption, and biodiversity
D. Management of bushfire risks and bushfire preparedness of ACT parks, reserves and other open spaces, including:
   i. preparation and planning by government, the community and other entities;
F. *Coordination between environmental agencies and other government agencies in relation to bushfire risk and management;* and
G. *Cross-border risks and issues, particularly engagement with New South Wales and the Commonwealth*.

As private companies and government agencies across the ACT develop strategies to manage worsening bushfires, a central component of any plan must be to quickly respond to fire

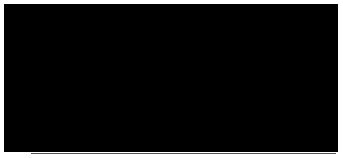
ignitions, particularly those occurring in high-risk areas and during record heat, drought, and extreme wind events. Recent research by the Australian Bushfire Cooperative Research Centre in South Australia found that by implementing a policy of Rapid Initial Attack the mean area size of a bushfire could be reduced by 95%. This study demonstrates that the outcome of potential megafires can be altered greatly by gaining early warning of not only ignition, but also the specific location and progression of the fire.

The goal of Pano AI is to enable early, automated detection and informed rapid initial attack as an essential tactic for mitigating bushfire danger. Led by an experienced team of passionate business leaders, product designers, technologists and operations experts, we have established a long track record of success in delivering such a solution: *Pano Rapid Detect*.

Pano Rapid Detect enables first responders to *detect, confirm, pinpoint, and disseminate* early bushfire intelligence – ensuring their own safety as well as the safety of first responders and communities in impacted regions.

As a specialist in the early detection of bushfires, Pano AI recommends the assessment of early bushfire detection systems – noting many similar systems are still in early research and trial phases. Pano AI would be pleased to brief the Committee on early, automated detection and informed rapid initial attack, as well as the content in this submission, in more detail.

Thank you,



Andrew Prolov
Director of Australia, Pano AI Pty Ltd

Submission to Inquiry into the ACT environment's bushfire preparedness

Pano AI

Australia's worsening bushfire conditions

As the impacts of climate change escalate, the occurrence of certain severe natural disasters has also increased. In the past ten years, there has been a notable rise in devastating fires across regions spanning North America, Europe, North Africa, and North Asia. Australia, despite its distance, has not escaped this alarming trend. In the 2019-2020 period, the nation faced its most severe bushfire season in decades. The toll was staggering: 33 fatalities directly from the fires (and almost 450 more killed from smoke inhalation), over 24 million hectares of land burnt, 3 billion animals impacted, and an estimated AUD $100 billion in economic losses.

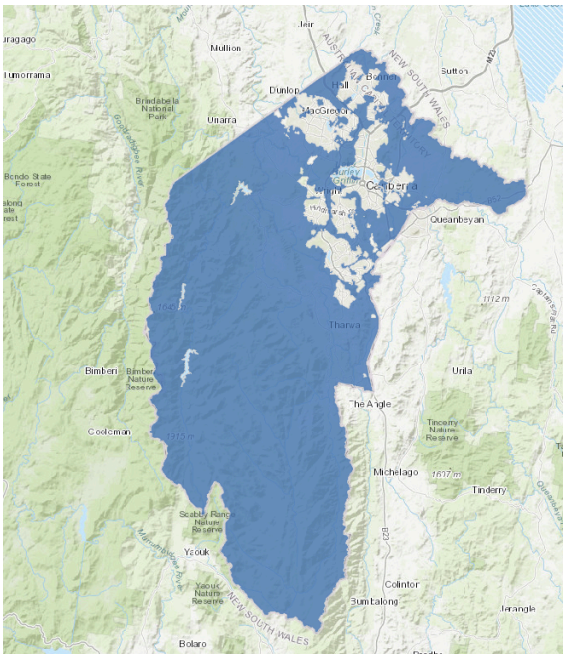
A study published by the CSIRO in Nature, one of the world's preeminent peer-reviewed science journals, found that:

- the annual area burned by fire across Australia's forests has been increasing by about 48,000 ha per year over the last three decades;
- three out of four extreme forest fire years since states started keeping records 90 years ago have occurred since 2002; and
- the fire season is growing, moving out of spring and summer into autumn and winter.

The CSIRO has confirmed the trends are 'almost certainly' a result of Australia's increasingly severe fire weather, and are consistent with predicted human induced climate change. The Royal Commission into National Natural Disaster Arrangements (RCNNDA), established in 2020 after the Black Summer bushfires, highlighted similar findings. According to the RCNNDA, natural disasters have changed, extreme weather has already become more frequent and intense because of climate change, further global warming over the next 20 to 30 years is inevitable, and Australia will have more hot days and fewer cool ones.

ACT Specific

As the “Bush Capital”, the ACT faces unique challenges regarding bushfire preparedness. With a population that lives in heavily vegetated areas, the ACT Rural Fire Service has a significant task in managing risk, with limited resources. Maintaining constant watch over the region, via a limited number of manned towers, is expensive and usually only occurs during specific fire conditions.



Declared Bushfire Prone Areas: 2016

By lowering the burden associated with constant vigilance, the ACT would be able to improve response time to bushfire ignitions, while freeing up existing resources (i.e., personnel) to respond to and reduce the spread of bushfires. The 2003 Canberra bushfires were initially ignited by lightning and the response and containment of these fires was widely criticised. Prior to 2003, and up to today, manned fire towers are tasked with spotting fires. Whilst some attempts have been made to integrate camera stations, the requirement for manned towers remains.

Technology in the fight against bushfires

As the threat posed by fires continues to grow, there is a requirement to change how countries prepare, manage and respond to them. As the RCNNDA clearly articulates, catastrophic fire conditions may render traditional bushfire prediction models and firefighting techniques less effective, which means Australia’s disaster management arrangements must adapt. Global interest in innovative solutions to combat worsening natural disasters like fires have increased

exponentially. A preliminary review (below) of the current landscape highlights how technology is being used innovatively in disaster mitigation, preparation, response, and recovery.

The following represents a limited sample of the types of roles technology can play across the stages of emergency response:

MITIGATION PHASE

- **Climate aware hazard reduction:** using solutions like the FireBox, which facilitate safer, environmentally friendly disposal of forest debris, especially in backburning scenarios.
- **Fuel load monitoring:** using imagery from satellites and leveraging the computational power of artificial intelligence to monitor the location and levels of fuel loads in the landscape (e.g., Geoneon)

PREPARATION PHASE

- **Advanced early warning:** leveraging real-time data from satellites, sensors, and monitoring stations to precisely forecast the initiation of crises such as cyclones, earthquakes, floods, and bushfires.
- **Individual and group capability generation:** through the use of simulation and virtual training environments, where decision makers and other stakeholders can create, rigorously test, refine, and validate standard operating procedures and practice disaster response scenarios in risk-free settings (e.g., Bohemia Interactive Simulations).

RESPONSE PHASE

- **Proactive emergency response:** utilising technologies such as Artificial Intelligence (AI) integrated with real-time surveillance systems, which offer real-time detection of threats and furnish instant, actionable intelligence to emergency responders for early detection to enable informed decisions on rapid early containment efforts and lifesaving results (e.g., Pano AI).
- **Enhanced situational awareness:** utilising technologies such as Geographic Information Systems (GIS), uncrewed systems (e.g., drones), real-time data fusion and monitoring platforms, comprehensive communication channels, and unified coordination and operational systems.

RECOVERY PHASE

- **Critical inputs/components production:** employing technologies like 3D printers to craft replacement components for damaged infrastructure, construct temporary shelters, and produce necessary equipment within disaster-affected regions.

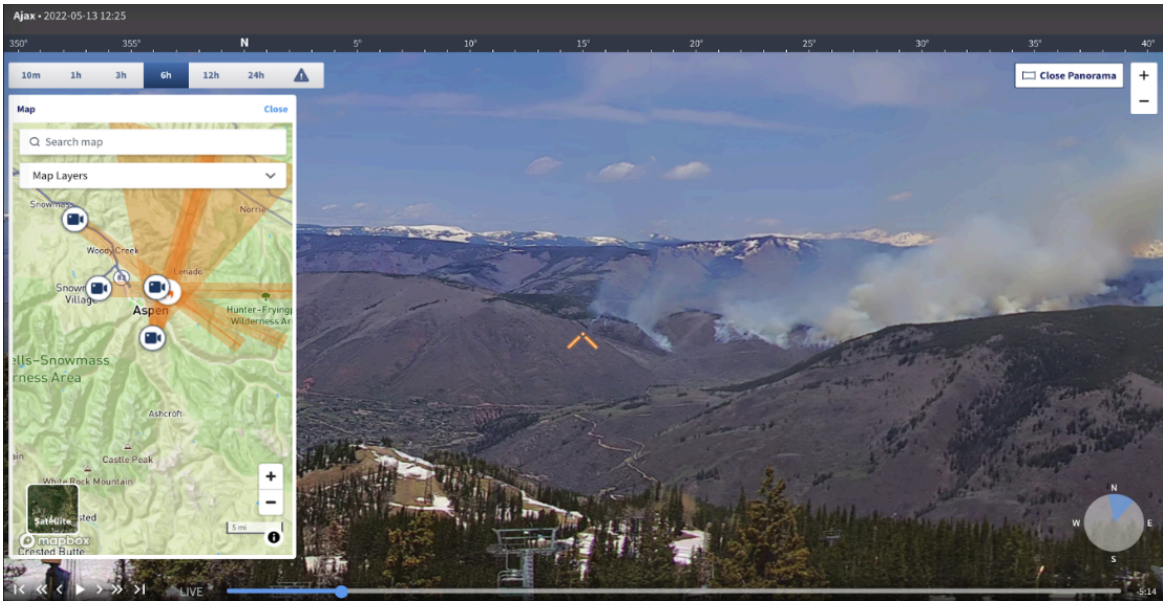
- **Grid resilience:** employing smart grid technologies to bolster the durability of energy infrastructure during recovery. This includes real-time monitoring, control, and optimization of energy distribution networks.
- **Post-incident damage assessments:** leveraging satellite imagery, radar, and remote sensing for thorough evaluations of building and infrastructure damage, thereby minimising risks to personnel.

The power of early bushfire detection for the ACT

Of these particular technologies, the ability to detect ignitions early and allow for continued monitoring offers the most significant benefits to the ACT, and as a solution addresses Terms of Reference **A**, **B**, **F** and **G** as outlined by the Committee.

Environmental factors

Early bushfire detection technology can play a large role in managing fuel loads for the ACT region. It is well established that managing fuel loads is a difficult task, with it often being challenging to establish the efficacy of a hazard reduction burn (the primary method of reducing fuel loads) after the event. Additionally, hazard reduction burns can be significantly restricted, due to the inability of fire crews to adequately understand the behaviour of these burns. Through the utilisation of detection technology, fire crews and managers can better understand the behaviour and effectiveness of hazard reduction burns, leading to better data and greater confidence in conducting fuel load control exercises.



Pano technology actively monitoring a Hazard Reduction Burn

Climate emissions, climate adaption, and biodiversity

Early bushfire detection technology can play a key role in reducing climate emissions, adapting to climate change, and protecting Australia's biodiversity. Through early detection and reduced response times, the amount of carbon and biodiversity loss can be curbed. Additionally, through a decrease in catastrophic fire, more time is created to implement other adaptations to the increasing bushfire risk.

The "Summer of Crisis" report from the Australian Climate Council estimated that the Black Summer fires released over 900 million tonnes of carbon into the atmosphere. Early bushfire detection plays a critical role in "heading off" carbon loss, by minimising fire spread.

In the 2019/20 Black Summer fires, "more than 500 plant and animal species had the entire area they are known to inhabit burnt out [...] at least 100 threatened species had more than 50 per cent of their range burnt". Reducing the spread of catastrophic fire can have a significant impact on biodiversity, in particular early detection systems can be installed in niche areas of biodiversity, permitting swift action in locations of high biodiversity value.

Coordination between environmental agencies and other government agencies in relation to bushfire risk and management

The coordination of resources between government agencies, across all tiers of government, is critical in reducing the spread of bushfire. Early bushfire detection systems allow for appropriate resourcing of fire response across agencies, by giving decision-makers access to real time data without the costs and delays of aircraft. By allowing real-time visual assessment and tracking of fire threats, better inter-agency coordination and communication can be achieved. Through better data, agencies can reduce system wastage and can maximise the efficacy of responses.

Cross-border risks and issues, particularly engagement with New South Wales and the Commonwealth

Due to the nature of Australia's emergency response framework, events like bushfires in border areas present significant challenges for agencies, as they seek to coordinate with their counterparts. The ACT is in an unenviable position regarding its borders, as a self-governing territory encompassed by another state in a high-risk bushfire area. The 2003 Canberra bushfires were in part exacerbated by communication breakdowns between cross-border agencies. By aligning early bushfire detection systems with New South Wales, ignition

detections can be instantly shared, regardless of boundaries, reducing the risk of miscommunication and allowing for interagency collaboration.

Examples of technology exploration and adoption in the Australian context

In Australia, state and territory governments, along with emergency service bodies, are showing a growing inclination toward technology-driven solutions to challenges like bushfires, as outlined below.

- **Fire Behaviour Simulators:** CSIRO, in conjunction with the AFAC, has engineered a fire behaviour simulator (Spark Operational) that allows users to assess uncertainty in weather forecasts and analyse potential scenarios.
- **Artificial Intelligence:** several states (NSW and VIC), state agencies (Forestry Corporation of NSW), local councils (Noosa Council) and private sector entities (Green Triangle Forest Industries Hub, VIC and SA) are actively adopting AI's potential for disaster response. This focuses on early detection of bushfire threats to enable rapid response and minimise damage to assets and communities.
- **Public Fire Simulation Game:** The Northern Territory Fire and Rescue Service (NTFRS) has embraced a digital program developed by Charles Darwin University. This interactive game enables users to simulate fire development in diverse conditions, including wind speed, fuel type, and load. Made accessible to the public, this initiative aims to bolster community resilience and has been hailed as a transformative tool.
- **Uncrewed Aerial Vehicles:** various emergency service bodies are incorporating drones into their disaster response strategies. These UAVs conduct swift damage assessments of critical infrastructure such as dams, bridges, water treatment facilities, and roads following floods or fires.

Pano AI case studies

German Flat, South Australia

Through a collaborative approach from both the Victorian and South Australian governments, and the Forestry Industry, 14 Pano AI Rapid Detect stations have been installed in the Green Triangle Forestry Zone. When installed, the key stakeholders across industry and government were trained on the use of the system, and standard operating procedures and methodologies were implemented to ensure coordinated use of the capability.

On Wednesday, 17th January 2024, the Pano Rapid Detect system alerted the on-duty officer of an ignition at German Flat. In windy and dry conditions, the officer deployed resources to contain the ignition. The next call did not get made for another 20 minutes. This time, along with the subsequent delays in deploying resources and locating the fire, would have likely allowed for the fire to spread from the haystack – where it started – to nearby pine plantations and renewable energy zones:

> *"I received the PANO alert, determined the location to Hookings Rd, and called the CFS emergency services to send out the page. With PANO I was able to notify the emergency services to attend. I was very impressed that the PANO camera was first to capture it and hence why I called the emergency services as nothing had been reported by people locally." - Clinton Sim (Green Triangle Forestry Hub)*

Kutch Fire, McMinnville, Oregon, USA

On 8 July 2023, at 11:07 am, Scott Law, Division Chief for the McMinnville Fire Department, was sent an alert via the Pano Rapid Detect system about a fire in his area of responsibility. Scott was able to instantly deploy resources and contain the wildfire:

> *"I got the alert at 11:07. The first 911 call came in at 11:21:16 and the details were not that specific. More specific calls started coming in at 11:26:47" - Scott Law (McMinnville Fire Department)*

The alert enabled Scott to pinpoint the location of the fire and monitor its progress, allowing him to understand how and where to allocate resources. Following the fire, the area could be continually monitored without having to deploy additional resources.

About Pano - Rapid Detect

Pano AI is a US based emergency management technology solutions provider that leverages AI and computer vision to automatically detect, verify and classify bushfire events in real time. Pano AI's full-service solution, Pano Rapid Detect, speeds up response time by empowering fire authorities and landowners with networks of detection systems that utilise AI to provide early detection and location of bushfires well before they are reported by the public.

Firefighting specialists are given immediate notification and oversight of the fire as a response is coordinated — as well as the ability to share everything in real-time with their extended team. Altogether, this makes it possible to rapidly identify and contain devastating bushfires, protecting lives, property, and our forests.

The Pano Rapid Detect capability is the result of extensive research & development across all aspects of hardware, software and artificial intelligence. The team has spent thousands of hours testing both individual components, as well as the end-to-end integration of the solution overall, to ensure it meets the strict standards of regulators, and most importantly the needs of our customers.

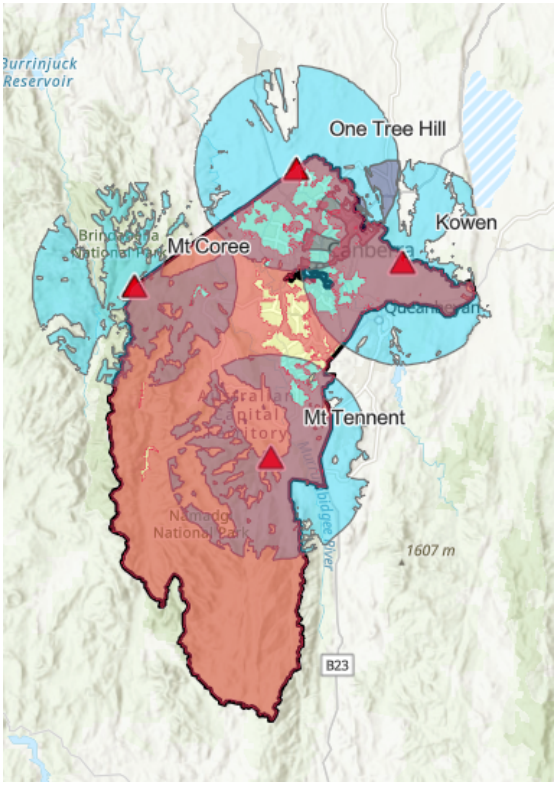
Pano AI's system is currently in use across 8 State in the U.S., 5 States in Australia and one province in Australia.

How Rapid Detect can support the ACT bushfire planning and response

Pano's Rapid Detect solution could be effectively deployed in the ACT with as few as 4 sites. Installation is managed by Pano, and once established, the ACT could be monitored 24 hours a day by its automated alert system. Pano's Rapid Detect system could be deployed in targeted sites to provide coverage across the ACT's High Danger Zones, maximising the scope of the capability while minimising government expenditure.

On 27 January 2020, the Orroral Valley fire swept through Namadgi, burning about 80% of Namadgi National Park (82,700 hectares), 22% of Tidbinbilla Nature Reserve (1,444 hectares) and 3350 hectares of rural land. This fire provides an example of how the Pano Rapid Detect system could reduce the impact of similar events in the future.

Given the remote location of the Orroral Valley ignition site, strategically placed Pano Stations would have been able to detect and triangulate the fire within minutes of ignition. The Pano stations can detect fire within 16km of the camera locations, and optical zoom allows for immediate interrogation of the ignition site. Not only would the Pano station alert local fire crews, but alerts could also be sent to the Emergency Services Agency (and Federal agencies – if required). Alerts could also be sent to local stakeholders, including power and water utilities and local landowners.



Pano's cameras provide significant reach across the region. With additional installations the entire risk area can be covered and triangulation of fire locations can be accurately determined.