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AUSTRALIAN AERIAL FIRE FIGHTING SYSTEMS.

(Patent Applied

Submission No.446

THE CONCEPT

(a) To design and locally manufacture an aerial fire fighting system of international standard suitable for both outer urban and regional fire fighting at a national level.

(b) The system to have the ability to be operated on a 24 hour basis that would cover all types of geographical terrain.

(c) That the design of the system and it's operation allow for the re-deployment of front line fire fighters into populated areas so as to protect both property and people.

(d) That the design be based on the utilisation of currently available capital equipment where the only financial expenditure would be for the system itself and the capital works required to construct the water supply lines to the appropriate airfields for the refilling of the tankers.

(e) That the design take into account and meet all of the submissions and recommendations of the N.S.W. Joint Select Committee on Bush fires - 2002.

THE DEVELOPMENT OF THE DESIGN.

The design of this system is based on the use of the R.A.A.F.'s Lockheed C-130 Hercules aircraft consisting of 12 H model aircraft from 36 Squadron and 12 J model aircraft from 37 Squadron that are currently based at Richmond Air Force in N.S.W.

The design of the System allows for the tanks to be of a roll on / roll off construction and as the two discharge pipes are fully retractable within the aircraft for take off and landing no modification is required to the aircraft to install the units.

The design has taken into account all submissions and recommendations of the N.S.W. Joint Select Committee on Bush fires- 2002 and in fact exceeds the submissions in that the N.S.W. Rural Fire Service claim that aerial fire fighting is useless where the fire temperature exceeds 3,500kw per square metre because of evaporation. With the Australian made additive used with the system evaporation does not take place and therefore can be used successfully against any type of fire regardless of generated heat. The Additive used is also the only retardent available on the international market certified for use in water catchment areas where historically the majority of bush fires in Australia occur.

When operational the aircraft are controlled from a central command vehicle staffed by R.A.A.F. air traffic controllers and the relevant fire authorities so as to enable total co-ordination of the operation both from the aircraft in use and the fire fighters on the ground.

The operation would be co-ordinated by the manager of the aerial unit thus eliminating the current problems that exist within the fire fighting authorities on the differing views on how to best utilise both the use of aircraft and the ground fire fighters available.

MAIN CRITERIA

(a) The System is not designed to replace a fire fighter. Aerial fire fighting will never be able to completely extinguish bush fires what it will do is knock down the intensity of the fire to a level where the safety risk to the individual fire fighter and the risk to property loss is at an absolute minimum.

(b) The System is designed to operate 24 hours in all types of terrain. Unlike the Sky Cranes being currently used which are limited to daylight operations only. The use of this System would certainly have solved the problems experienced in the Snowy Mountains areas in the 2002 - 03 fire season where accessibility to the fire for ground fire fighters created serious problems to the extent that the fire was allowed to burn without being suppressed.

(c) The design implements effective integration of heavy aircraft into fire management with dedicated personnel combining to the task

(d) With the water refilling points (Ref. Attachment 1) aircraft turn around times are kept to an absolute minimum particularly in both N.S.W. and the A.C.T. the main areas of fire concern are within short distances from refilling points.

Unlike previous aerial fire fighting trials involving similar aircraft (Refer, Victorian Dept. of Conservation and Environment - Fire Management Branch - Project MAAFS / Hercules - 1982.) this System does not require the use of expensive and time consuming retardent mixing stations as the additive used is in liquid form and is added whilst the tank is filling. Likewise, so as to keep the design technically simplistic the use of compressed air and the setting up of compressors to supply the air to enable the discharge of the MAAFS system are not required as the release of the water / additive relies only on gravity.

(e) Actual operating costs are kept to a minimum where with this design no costs are applicable unless the aircraft are actually operating. Unlike the current arrangements with the hire of very expensive overseas units that come with very high transport costs, very high daily stand by charges and similar flying time charges. The cost of having this System on stand by at an airfield is nil.

(f) The System is designed in Australia, it is built in Australia, it is operated by Australians, to protect Australians.

THE TANK

The actual tank used in the design is a singular rectangular modular unit constructed from a composite material, constructed to comply with all Military Specifications for use within the aircraft, with a total carrying capacity of 23,500 litres. With trials conducted with the N.S.W. National Parks it was said that one bambi bucket containing the additive was equivalent to five buckets without the additive using this a a multiplication factor of five that equates to 117,500 litres per aircraft, per drop. Combined with the tare weight of the unit the total gross weight is 25,000kg's which is the all up payload for the Hercules aircraft.

The tank itself is secured to the cargo bay floor in the aircraft by means of webbing straps so as the actual installation time to install the tank is kept to the absolute minimum. The use of the cargo straps and their restraint capability will meet all standards as set by the R.A.A.F. for use within the aircraft

The tank whilst in flight is totally sealed and fitted with a ventilation system which is only opened during filling or on discharge. For stability during flight the tank is fitted with internal circular baffles so any surge during the flight is minimal.

FILLING.

The tank is filled through the rear side door of the aircraft via a cam lock fitted fill pipe from the door way into the top of the tank So as to eliminate any spillage within the aircraft a second pipe is fitted in parallel to the fill pipe and used as an overflow outlet.

Filling of the units is carried out by a ground crew using portable pumping units with the capability of filling an aircraft in approx. 8 - 10 minutes. It would be suggested that static pumps and associated pipe lines be set up as a permanent fixture at the capital city refilling sites each with a capability of refilling four aircraft at a time. For regional areas the portable pumping units could be used to both pump water from any source into road tankers and then driven to the nearest airfield where another pumping unit is used to fill the aircraft.

DISCHARGE

Discharge of the load is carried out by the aircraft's load master from the rear of the cargo bay on the command of the co - pilot. The load is discharged through two circular 24" pipes from both sides of the cargo ramp at the rear of the aircraft. The discharge flow rate is controlled by the load master using electrically controlled, hydraulically operated butter fly valves allowing a variable discharge rate dependent on the type of fire being controlled.

The two discharge pipes are designed to spread the discharge of the load over a wider area than a one pipe system thus utilising the spread to contain the wind movement of embers which were the main cause of the devastation in the recent Canberra fires. The discharge pipes are hydraulically retracted within the aircraft for both take off and landing and then lowered into position when the cargo ramp of the aircraft is lowered during flight.

PORTABLE PUMPING UNITS

For fire fighting operations outside of the capital city areas small diesel trucks, with airlift capability, would be used. These trucks would be fitted with two diesel driven high flow pumping units capable of refilling the aircraft in the same time as the permanently fixed units in the city refilling points. They would have the capability of filling both road transport tankers and the aircraft units where a water supply point is not available within the area of the air field.

SECONDARY USE OF THE SYSTEMS TANKS.

When under operational conditions there is a surplus of tanks to aircraft availability the discharge pipes can be removed and a flange fitted to the discharge vale with outlets on the flange compatible to fit to Fire Authorities tankers and the tank be then used, mounted on road transport, to refill the fire fighting tankers on site where required. This operation would include the use of the portable pumping units to maintain the versatility of the total system.

NATIONAL AERIAL WATER REFILLING POINTS.

SYDNEY

Kingsford Smith Airport - Mascot, Botany Bay.
Bankstown Airport, Georges River.
Richmond Air Force Base, Hawkesbury River, Rickaby's Creek.

NEWCASTLE.

Newcastle Airport, Blacksmith's, Lake Macquarie.

JERVIS BAY.

H.M.A.S. Cresswell- Naval Air Station, Jervis Bay.

MELBOURNE.

R.A.A.F. Base - Point Cook, Port Phillip Bay.
Avalon Airfield, Port Phillip Bay.
Tullamarine Airport, Maribrynong River.

ADELAIDE.

Adelaide Airport, Boat Harbour.

BRISBANE.

Brisbane Airport, Serpentine Creek Diversion.

PERTH.

Perth Airport, Swan River.

CANBERRA.

Canberra Airport, Molonglo River.
Fairbairn Air Force Base, Molonglo River

These water refilling points cover capital cities and in the case of N.S.W. / A.C.T. the southern,central and near north coastal regions as well as the Blue Mountains and Snowy Mountain areas. Further investigation would have to be carried out in the States regional areas as to the availability of water within close proximity to suitable airfields capable of handling the Hercules aircraft.