

SUBMISSION
ON
THE REVIEW OF COASTWATCH
BY
KINGFISHER UNMANNED AVIATION SYSTEMS
TO
THE JOINT COMMITTEE OF PUBLIC ACCOUNTS
AND AUDIT OF THE AUSTRALIAN PARLIAMENT
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Introduction

This submission to the Joint Committee of Public Accounts and Audit of the Australian Parliament on its review of Coastwatch is made by the Managing Directors of Kingfisher Unmanned Aviation Systems - Australia (our proposed business name). We are a young developing company at our seed/start-up stage.

Our company plans to introduce, develop and operate Unmanned Aerial Vehicles (UAV's) in Australia, within the commercial, civil and military Airborne Surveillance and Remote Sensing Markets. This submission is derived from on going work as part of our unique market research conducted over the last few years (1998-99). Abstracts from this submission were also given to a presentation conducted by both directors to members of the Coastwatch organisation, Australian Maritime Safety Agency and Australian Search and Rescue (AusSAR), in March of this year.

It is the aim of this submission to discuss new technologies which might improve the performance of Coastwatch (UAV's, satellites, Command, Control, and Communication C3 systems) and to suggest improved effectiveness of Coastwatch's allocation of resources to its tasks.

Summary of our Submission

Australia, as an Island Continent with an extensive coastline (37,000km) and a vast Exclusive Economic Zone (EEZ) of some 11 million sq km, including 12,000 islands has an abiding interest in any activity in through or above its surrounding shores. The vexed question of whether Australia should have a Coastguard is driven by perceived inadequacies in the current system. Australia can not afford another Navy (Coastguard), whilst the Australian Defence Force is struggling to replace ageing military hardware along with recruiting sufficient personnel.

Some of the other submissions are in favour for a Coastguard with a fleet of 30 or more vessels with 4000 personnel as well as fixed wing aircraft. If they (ADF) cannot recruit numbers for all three services, who's to say they will get people to join a coastguard. The ADF is also faced with a huge equipment procurement problem, which in turn is going to effect equipment procurement for a Coastguard. There is little doubt that Australia needs a

means of addressing all aspects of civilian maritime security and surveillance concerns. The current system given its area of operations is justified by achieving a trade off between costs, resources (both human and equipment) and the risk assessment.

The coastwatch of the future has to steer away from being purely a surveillance tool to that of a balanced force of; reconnaissance assets (seek out), command and control (a national network of command ,control, communication and intelligence C3I), surveillance and monitoring assets (to close with and observe), and response assets (enforcement, detain and prosecute).

Such a force would consist of satellites, balloons, UAV's, manned aircraft both fixed wing and rotary backed up by the latest in IT systems. Overall this system would be cost-effective, flexible, deployable and capable of expanding depending upon the perceived threat.

Brief Overview

- Install a national Command, Control, Communications and Intelligence C3I network comprising of secure satellite based communication, microwave Internet and video data and conferencing capability. Manned 24hrs a day in Canberra within the Coastwatch Command Centre (COSWATCOMD).
- This purpose designed facility will be a central point of contact for client agencies, will have national control of Coastwatch Task Forces and have access to Military assets such as the; Jindalee Over the Horizon Radar Network (JOHRN) and the new RAAF Airborne Early Warning and Control aircraft.
- Coastwatch fleet of smaller aircraft to be replaced by Medium Altitude Endurance UAV's, and;
- Coastwatch regional depots established into Task Forces.

UAV's a Brief History

Robot planes first flew as long ago as the first World War, when a flying bomb was designed with a clockwork device that sheared the wings, letting the bomb drop on its target over a set distance. In the Second World War, the Germans built the V1 and V2 flying bombs and in Vietnam, top secret US Air Force Squadrons of Unmanned Recce aircraft flew missions that were too dangerous for pilots. The US Air Force developed the first Unmanned Aerial Vehicle (UAV) specifically intended for the reconnaissance/surveillance mission.

(Picture deleted)

This UAV (pictured) the Ryan 147B was used

operationally for intelligence collection against Cuba and the Soviet Union. The US Air Force also developed a larger version of the Ryan UAV so it could carry a payload of bombs and missiles under a larger wing specially designed, flight trials were successful and the military had plans of raising hundreds of UAV units to attack Soviet targets in response to a nuclear attack.

In 1976 the US Air Force appeared to lose all interest in its UAV program and eliminated all of its UAV organisations. The UAV seemed to be lost for ever, its rebirth was the 1990-91 Gulf War, today UAV's are truly unbelievable and their technology is cutting edge.

Today, UAV's can obtain real-time and near real-time information over a protracted period

of time. They are ideal airborne platforms for missions in support of Customs, Search and Rescue, Law-Enforcement and Military applications. UAV's in support of Coastwatch will be capable of conducting coastal surveillance missions of greater than 24 hrs, obtaining continuous, real time, infrared, electro-optical or Synthetic Aperture Radar (SAR) from hundred of km's away.

UAV's have proven to be more reliable than satellites due to frequent bad weather and cloud coverage in Bosnia where they have been deployed since 1996. Another factor that has proven the UAV's worth is the fact that satellites only offer a window of opportunity as they are constantly orbiting the earth, whereas UAV's can frequent a target as many times as the client requires, and the imagery is of a far better standard.

We recognize that UAV's are not a panacea to Coastwatch, but we feel that what is needed for such an organisation is a force that is well balanced to meet a multitude of possible scenarios, a force made up of a mixture of manned aircraft, a mixture of both the smaller tactical UAV (6hr endurance) and the Medium Altitude Endurance (MAE) UAV's (24hr+), satellites and balloons.

UAV System Overview

As mentioned earlier our company is still at its seed/start-up stage and has expended considerable time and effort in conducting research, both directors are current serving members within the ADF and by the time this has been reviewed will have been discharged from the services, hopefully registered as a company and chasing our dream and spending our life savings. Considerable time has also been spent on deciding the best UAV system to meet Australia's unique climate and conditions, the UAV system we have chosen is considered the best and unfortunately we cannot disclose the system due to confidentiality agreements. However, all UAV systems have common components within all systems so below is an overview of UAV systems in general.

Air Vehicles - there are many different UAV's available depending on the type of mission and roles conducted. Most UAV's are for military applications but are easily converted or adapted for civil and commercial applications by buying off the shelf components. Integral to all UAV's are the airborne data terminals, these terminals contain the communications fit for the vital link between aircraft and the Ground Control Station (GCS). Global Positioning Systems (GPS) help track and monitor the UAV's movements. Onboard sensors help monitor such aspects as the inlet air temperature, pressure, oil temperature and the engines revs per minute (rpm's). Most UAV's have single or twin pusher type engines with a monoplane design. Below are some pictures of UAV's that are currently in use with military forces.

(Pictures deleted)

Above: Pioneer UAV, and below: Heron UAV. Above: Seeker UAV, below: Global Hawk.

(Pictures deleted)

Payloads and Sensor Equipment - payloads are selected and installed in the UAV prior to launch and can be alternated between different sensors during flight for the type of mission conducted. However, most UAV's primary sensor payloads consist of a TV/Video camera for daytime observation and a Forward Looking Infrared (FLIR) camera for night time observation. Larger UAV's are capable of carrying a maritime search radar.

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Ground Control Station/Mission Control - we believe this to be the most important aspect of the entire UAV system, from this station the UAV team plan, fly, observe, disseminate data collected for each mission. Ground Control Stations (GCS) can be fixed stationary as a purpose built Command and Control centre or can be mounted within mobile shelters on board trucks for deployment around the country. It is in the area of GCS that the difference of UAV systems excel, some of the features of our unique GCS system include; side by side consoles, mission planning, risk assessment, payload/sensor control, pre-flight and post-flight, in-flight redirection capability, payload information storage and processing facility, data link management and mission logs.

(Pictures deleted)

Left is a picture of a remote receiving display that is standard equipment in our UAV system, it is our concept to have such displays aboard all Coastwatch marine vessels and fitted to Coastwatch Dash 8 aircraft as part of our C3I network.

Left is a picture from the pilots console within the GCS showing the pilot all necessary information, our system is fully autonomous including takeoff and landing, it can be manually flown and redirected in-flight. And only requires 2 operators - platform operator and a sensor operator. Our concept also allows for a mission commander, a UAV team can control and operate up to two UAV's at the one time.

The Proposal

The primary objective of this proposal is to highlight that a small, mobile, well balanced force that has effective command and control tools can perform just as well, if not better than a large and cumbersome dispersed force. The nucleus of the system is based upon a tiered surveillance approach with dual internal capabilities of detection and enforcement. The current Coastwatch system is purely a detection service with a limited response capability, Australian Customs Vessels (ACV's) do support law enforcement operations, but a big percentage of this task is conducted by Royal Australian Navy patrol boats.

The Tier Approach

Tier 1 - Wide Area Surveillance - This area includes the EEZ and area's assigned to Australia from international maritime agreements and area's of cooperation with regional neighbours. Due to its size this area is to be monitored by remote sensing technology (satellites and the Jindalee Over Horizon Radar Network - JOHRN).

All data obtained will go through the Coastwatch Command Centre (COSWATCOMD) located in Canberra, manned 24hrs a day. At this early stage all targets detected are assigned a threat assessment, and an intelligence picture. It is important that targets within this tier are detected/highlighted at an early stage (2-3 days sailing time) to allow for planning and allocation of resources. When it becomes a threat it is assigned a new priority and is passed onto the next tier.

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Diagram of Tier 1 - Wide Area Surveillance

Characteristics of Tier 1 (Wide Area Surveillance)

- Regional and Strategic Surveillance;

- Has dedicated assets assigned primarily satellites;
- Tier 1 assets capable of working with ADF assets i.e.; Orion and (future) Airborne Early Warning aircraft;
- COSWATCOMD has access to the Military Jindalee Over the Horizon Radar network, and is;
- Capable of detecting at an early stage possible threats and assigns tasks to tier 2 assets.

Tier 2 - Focal Area Surveillance - Tier 2 assets will be based within existing Coastwatch regional bases at Cairns, Darwin and Broome. Tier 2 assets will be arranged into Task Forces that are capable of meeting all of the tasks and objectives assigned from COSWATCOMD.

Equipment assigned to Coastwatch Task Forces

- Dash 8 surveillance aircraft (2 each task force);
- MAE UAV's (2 aircraft, 1 Ground Control Station);
- Rotary wing aircraft (2 each task force, equipped for search and rescue and enforcement tasks);
- Bay Class marine vessels (2 each task force, equipped for SAR and enforcement tasks).

Capability of Task Force

- 24hr day/night all weather surveillance/intelligence/monitoring capability;
- Dash 8 and UAV's capable of providing real-time video data link back to COSWATCOMD;
- Response Force (RESFOR) of 8-10 trained personnel deployed by task force marine vessels or rotary wing assets;
- Operates within its assigned sector, capable of providing mutual support to other Coastwatch task forces and government agencies.

Overview

The issue of Coastal Surveillance is and should be a high priority for any government of the day, we are very fortunate that we live in a country that has vast resources, wide open spaces, a strong economic outlook and a caring society. Unfortunately this makes us an ideal target within such a diversified region that has changed somewhat over the last ten years.

This proposal is by no means perfect or the answer, what we have tried to do is have a serious look at a solution for a Coastwatch of the future. By raising a dedicated Coastal Command network that utilises the latest in IT systems and Remote Sensing applications, that can seek out, study, respond and then channel/link the end product to its client agencies through the Internet medium, will hopefully be an effective and cost-effective solution over the current system where there is the possibility of duplication to many agencies.

The basis of the UAV concept that we have researched is that there is technology available that could replace the existing fleet of Coastwatch smaller manned aircraft (7 in total) that basically can only conduct visual checks by onboard operators with the mark 1 eyeball and are limited to day only. With unmanned aircraft this limited capability could be replaced by an airborne platform that has a 24hr endurance capability, providing real-time, near real-time day/night capabilities. It requires only two operators, data is relayed back to GCS's for immediate action via COSWATCOMD, has the capability to monitor oil spills, conduct search and rescue, communications retrans and also believe it would be an ideal surveillance platform over the Australian Antarctic Territory.

The Task Force concept was developed so that resources could be assigned to the already existing infrastructure that is available from current depots at Cairns, Darwin and Broome. It is based upon that both marine, air and personnel assets are positioned evenly around the Task Forces. These Task Forces under command from their task force commander will be responsible for their assigned tier 2 area of operations. It is envisaged within each task force Area of Operations (AO) commanders will be able to:

(a) Conduct within their assigned AO:

- 24hr surveillance/monitoring by manned and unmanned assets;
- Enforcement missions with a minimum 6hr standby;
- 24hr response capability either by rotary wing or marine assets.

(b) Support within their assigned AO:

- Search and Rescue missions;
- Oil spill response either by aerial delivery means or with marine assets;
- Fisheries and Marine Park assistance,
- Cooperation tasks with state and local authorities within the AO;
- Other Coastwatch Task Forces, and;
- Any other tasks assigned from COSWATCOMD.

Hill. P.R

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Enclosures:

(a) Diagram of Concept.