# VH-MDX Resource Allocation Tool

## Analysis aiding the search for missing aircraft VH-MDX

**2nd Edition, June 2017**
**(1st Edition: June 2015)**

**Glenn Strkalj**

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## Document purpose

The contents of this document are purely intended to clarify accident events to the best of the author's ability to offer a solid base in determining the location of VH-MDX.

**The information and data presented in this document may be inaccurate or subject to interpretation errors so should not be used as evidence in legal matters**

**This document must not be used for any purpose other than to provide guidance in locating VH-MDX**

**This reference paper will be subject to change as new information and data is found or errors are corrected: it is a living document**

# Amendments

**2nd Edition June 2017**

- Reference to MPE, MLE and MPA in their stand alone documents rather than having copies of maps included to simplify the amendment cycle.
- Grammatical improvements.

# Abbreviations

| | |
|---|---|
| AACC | Area Approach Control Centre |
| AM | Amplitude Modulation |
| ACMA | Australian Communications and Media Authority |
| ARC | Aircraft Radio and Control |
| ASIB | Air Safety Investigation Branch |
| ATC | Air Traffic Control |
| ATS | Air Traffic Service(s) |
| AVR | Automatic Voice Recorder |
| BRG | Barrington Research Group |
| BASI | Bureau of Air Safety |
| dB | Decibels |
| dBi | Decibel Isotropic |
| dBm | Decibel milliwatts |
| dBW | Decibel Watts |
| EIRP | Equivalent Isotropically Radiated Power |
| FIS | Flight Information Service |
| FM | Frequency Modulation |
| FS | Flight Service |
| FSC | Flight Service Centre |
| FSU | Flight Service Unit |
| GS | Ground Speed |
| IAS | Indicated Air Speed |
| ITU | International Telecommunication Union |
| kHz | Kilohertz |
| km | Kilometer |
| ºM | Degrees Magnetic |
| NDB | Non-Directional Beacon |
| MHz | Megahertz |
| NM | Nautical Mile |
| PEP | Peak Envelope Power |
| SRTM | Shuttle Radar Topography Mission |
| ºT | Degrees True |
| TAS | True Air Speed |
| UTC | Universal Time Coordinated |
| VHF | Very High Frequency |
| VOR | VHF Omni Directional Range |
| W | Watts |
| WGS | World Geodetic System |

# Table of Contents

# 1. Purpose

Many reports relating to potential VH-MDX:

- sightings in flight at low level
- crash sites (Derived from Google Earth, witnesses on the ground, fires observed whilst in flight etc)
- wreckage
- crash noises;

have been and will be reported to BRG (Barrington Research Group), Emergency Services, media and other agencies.

There is no guide or tool to offer direction as to how probable these reports are in being VH-MDX related.

Additionally, the author has found in present times that allocation of resources by various agencies is conducted on a purely reactionary basis with no solid way of determining the level of resources required and if they should be applied at all.

Such an approach commonly leads to unnecessarily wasted resources that could be applied more effectively elsewhere including to activities outside of VH-MDX.

This guide provides a robust and simple reference that enables commanders and team leaders to make confident decisions regarding resource allocation to VH-MDX reports of potential impact sites.

# 2. Method

The author has defined three geographical areas based on differing parameter tolerance and assumption levels. The smaller the area the more risk there is to the area being redefined in the future as there is increased use of assumptions. Table 1 below describes the features of the three areas.

| Area Number | Name | Development method | Probability of VH-MDX located within | Chance of the area changing |
|---|---|---|---|---|
| Area 1 | Maximum Possible Extent (MPE) | *Maximum* expected tolerances in time, radar position, wind etc. Least amount of assumptions. | Almost definite | Very low |
| Area 2 | Most Likely Extent (MLE) | *Most likely* tolerances experienced. Some assumptions. | Likely | Moderate |
| Area 3 | Most Probable Area (MPA) | *Most probable* parameters. Highest level of assumptions. | *Currently* viewed as the must probable area but VH-MDX may be outside this area. | High |

**Table 1: Three geographical areas of interest and features of the areas.**

As one moves from Area 1 to Area 2 to Area 3:

- The probability of VH-MDX being located within each area is increased *when considering the information, data and interpretations thereof at the time of publishing* but;
- The risk of the area being redefined (and therefore VH-MDX being outside of the area) with time increases.

The areas necessarily have boundaries but should not be treated as ‘hard’ boundaries. If evidence points to an area of interest *just outside* a boundary then one could bias analysis to include the next smallest area.

The dimensional value of ‘just outside’ is determined by the area in question and the theory being applied for the particular analysis. The larger the area the smaller the ‘just outside’ value should be because the larger areas use larger tolerances which increase the chance of VH-MDX being inside the area (albeit a much larger area of interest).

# 3. FAQs

**In a nutshell, what is the three area approach?**
The three-area approach allows movement of the two smaller areas of interest as research opens new doors within an essentially fixed outer boundary.The smallest area can be continually refined while the out area offers an almost stagnant boundary to limit operations with. The middle area offers a reasonably stable area in which increased resources can be applied.

**What does this method practically mean to the commander or team leader?**
Using this method, the commander or team leader can have:

- *Stability* in the long term with an essentially fixed area for basic intelligence, research and small scale search operations
- A reasonably *stable* Area of Operations (AO) to limit large-scale searches and support or quash flight path theories over the long term; and;
- *Flexibility* in a smaller area that is used to define areas for large-scale searches that can move within the more-stable larger areas as research evolves.

**Why bother with three areas: why not have one area?**
Because *key* information and data relating to the VH-MDX accident:

- Is likely to never have been obtained nor obtained adequately nor recorded
- Have not been fully located in archives
- Tolerances of information such as radar fixes are *significant* in dimension when considered with featured topography
- Decades of time passed has eroded the memories of key people involved in the accident;

Producing a single, stable area of interest of small enough size to contact-search is currently not viewed as possible; the smallest area will move as new interpretations or information are incorporated. If highly accurate radar data and other information was recorded in 1981, a small, single area of interest would have been specified and VH-MDX would highly likely have been found by now.

Using the three areas allows a highly stable but large area to limit all operations, a smaller area that may move a little which limits full-scale search activities and a small focus area that is likely to move significantly but defines the current high area of interest.

So, there is always stability but the necessary flexibility is also catered for.

**What type of activities does this document offer guidance for?**
This guide is focused specifically on possible VH-MDX *impact sites* and how to react to these with search resources.

For example, analysing reports relating to crash sites such as possible wreckage, tree damage, observation of a very low-flying aircraft during the accident time etc. Determining the amount of resource to be applied for search operations for these activities.

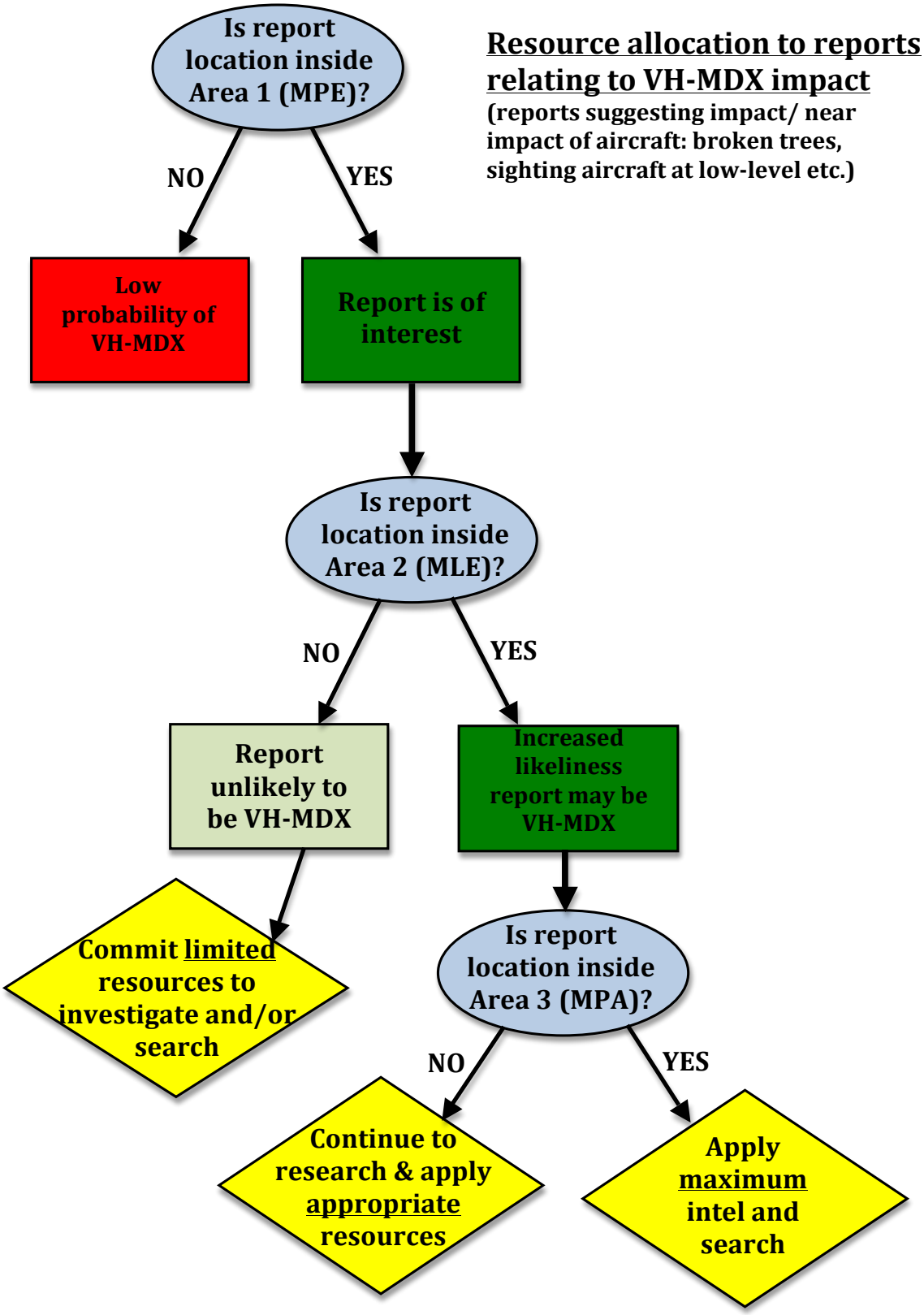
**Where can I see the three areas?**
The areas are depicted on the three individual research papers *VH-MDX Maximum Possible Extent (MPE), VH-MDX Most Likely Extent (MLE)* and the *VH-MDX Most Probable Area (MPA)* by Glenn Strkalj.

These can be found at www.vhmdx.com.au, ‘Research’, 'Search Area Development’.

In each of these papers, a map with basic topographical features and sizeable townships are presented along with a UTM grid overlay for position identification.

**How do I use these three areas?**
Simple. Follow the flow chart on the next page. Basic conclusions are offered to the user to determine VH-MDX location risk level and resource allocation level.

# 4. Research allocation flowchart




**Resource allocation to reports relating to VH-MDX impact**
**(reports suggesting impact/ near impact of aircraft: broken trees, sighting aircraft at low-level etc.)**