VFR
Moving Map Devices

VFR 'MOVING MAP' DEVICES

The use of VFR 'Moving Map' devices is now commonplace in General Aviation. Supported by the Global Navigation Satellite Systems (GNSS), these devices have considerably enhanced the process of flight planning and execution for GA pilots. Moving Maps encompass a range of electronic navigation solutions, including portable VFR GNSS devices and applications running on smart phones or tablets.

Viewing the aircraft's position in real time mitigates a variety of risks compared to the sole use of traditional VFR navigation techniques. However, like any technology or device, additional hazards may be generated if they are not used correctly.

There are too many different devices and applications available for TM-CAD to offer detailed advice on individual platforms. The purpose of this document is therefore to identify minimum levels of proficiency you should have when operating Moving Map devices and advise on some of the associated risks and issues.

IMPORTANT NOTE

Devices may be used during hour build up flights but may not be used during Skill tests

Oct 2024

What do we mean by 'Moving Map' device?

'VFR Moving Map' means either a device, or software for use on a device, which may be used for the planning and/or execution of a VFR flight. The key feature is that it displays the aircraft's position in real time on a map format that includes relevant aeronautical information for VFR flight.

*These devices normally fall into three categories:*

1. **Panel mounted devices**

    The benefit for VFR flight varies a lot depending on the age and characteristics of the installation.

2. **Portable GNSS systems**

    Dedicated portable GNSS systems provide the benefits of a platform designed for use in the aviation environment but may not provide regulated aeronautical information such as weather and NOTAM.

3. **Tablet or smartphone devices**

    Experience has shown that consumer tablet or smart phone devices can be a safe and effective platform for applications that provide Moving Map functionality and integration of aeronautical data. Tablet-based devices with suitable applications are likely to provide the most

    versatile and cost-effective solution for the average GA pilot flying under VFR.
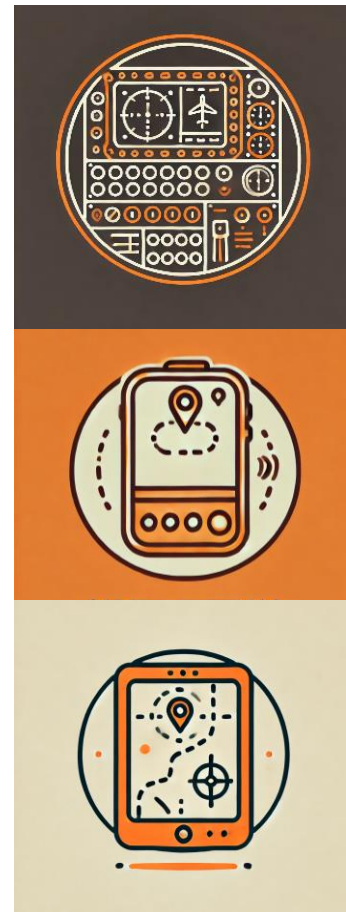
Benefits

Situational Awareness

VFR Moving Maps, when used correctly, provide a significant enhancement to situational awareness.

Enhanced Planning

Moving Map devices and software applications also aid the process of flight planning and allow routes to be built taking into account the airspace environment to be navigated.

Other Features

When used effectively, these tools can assist pre-flight preparation and give more time to focus on studying the route.

Understanding your device

Different Features

A large proportion of GA pilots who fly with a Moving Map are not familiar with the use of all features or capabilities the device has – taking time to understand the more complex functions will enhance the device's utility. You should review the applicable manuals and user guides. Familiarise yourself with the device on the ground. Consider practising on simple flights away from significant airspace hazards and accompanied by another pilot.

Layers of Information

Be aware of information being hidden in layers. Sometimes to establish the altitude, the depiction must be selected to review detailed information on the site. Other hidden information may include radio frequencies and the vertical extent of an ATZ or other regulated airspace.

Training courses

Several Flight Training Organisations also offer training sessions/courses in the use of VFR Moving Maps; not only is this an ideal opportunity to learn their functionality from an expert but it might offer a refresher in flight planning techniques.

When proficient you will be able to:

- Update the software and applicable aeronautical database of the device;

- Manage downloadable data to the device, such as weather, NOTAM and other live data;

- Plan a route and identify airspace features and hazards on that route, including information such as altitudes or hours of operation that may be hidden within layers;

- Mount the device (if applicable) in a secure location so that it is visible and accessible but does not obstruct the aircraft controls or visual look out;

- Configure and use the device in the most effective manner for a particular flight, for example setting appropriate altitude layers for the information displayed and any applicable airspace warning parameters;

- Navigate seamlessly throughout the software of the device, including altering key parameters such as map zoom, panning of the map and selecting information on the route as quickly and accurately as possible; and Use the device effectively in any abnormal situation, for example having to replan a route or divert due to weather.

Also consider:

- Will the screen be visible in all light conditions?

- Is the device prone to overheating when exposed to the sun?

- How long is the battery life under constant use?

- If there is provision for inflight charging, how reliable is this?

- Is an external aerial or receiver needed for consistent GNSS signal?

Your primary task must be flying the aircraft. Do not allow the device to become a distraction from core tasks such as maintaining an effective visual lookout. Being proficient with the device will help this since you will minimise the time needed to interact with it when executing different functions.

Using your device

Preflight

You should develop a routine with the device that suits your flying and provides a solid foundation for effective use while in flight. This must include ensuring the aeronautical data on the device is up to date. Download weather and NOTAM data as appropriate.

Inflight

Once airborne and away from the aerodrome traffic circuit, do a sense check against the surrounding environment – does the indicated position make sense and are you travelling in the intended direction?

Eyes outside

During flight around 80% of the time you should be looking outside the aircraft. Under VFR, the aircraft's approximate flight attitude should be set visually by external reference rather than by the instruments in the cockpit.

Position Awareness

Keep orientation relative to ground features, but periodically check the Moving Map display to confirm position.

Prioritise

When rerouting due to weather or other threats, focus on the most important task first.

Contingencies

Like all technology, Moving Map devices can suffer errors or even fail. You must consider contingency arrangements for this.

Paper Back-Up

TM-CAD recommends that a paper chart be carried which is accessible, marked and folded for the relevant route or area of operation.

Traditional Skills

There is a risk that paper chart reading skills suffer decay if not used over time. It may be useful to include periodic refresher flights using conventional navigation techniques.

Common issues

The incorrect or incomplete use of a VFR Moving Map device can be as significant as not using one. When using a Moving Map it is essential to apply effective Threat and Error Management (TEM). TEM is about mitigating relevant threats and preventing errors such that safe flight is maintained.

The following is a non-exhaustive list of Threats and Errors associated with the use of VFR Moving Maps and some example mitigations for them:

Software updates   Review your planned route

Care of device: Prevent a failure   Appropriate use and operation   Device Position

- **Software:** Is the software/data current?
- **Planning:** Review your planned route.
- **Care of device**: Prevent a failure.
- **Operation:** Appropriate use and operation
- **Device Position:** Where is the best place for it to be when in use?

Electronic Conspicuity

As well as Moving Map devices, there are a variety of 'electronic conspicuity' (EC) devices available that receive and/or broadcast information on the position of your aircraft and other traffic in the sky.

TM-CAD encourages the use of EC devices, but the capabilities, limitations and optimal techniques for use must be understood.

See and Avoid

The visual look-out should remain the number one priority for conflict identification and mitigation.

Data Integrity

It is important that users are aware of the integrity of the information that they receive from 3rd Party Service Providers.

Pilots should be aware that the depiction of aeronautical information on VFR Moving Maps may not be complete and will likely be different from Aeronautical Information products.

It is highly recommended that all organisations or individuals that process information sourced from Aeronautical Information products apply best practices to ensure integrity, timely delivery and a form suitable for users.

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Find Out More

This leaflet does not address the airworthiness requirements for fitting or mounting devices in aircraft. When installing a device in an aircraft or mounting a portable device all applicable airworthiness requirements must be complied with – please take advice from a licensed engineer or the appropriate organisation responsible for the airworthiness of the aircraft.

Further reading is available at the European General Aviation Safety Team safety promotion leaflet and UK CAA Safety Sense Leaflet SS29 – VFR MOVING MAP DEVICES