

	SAAA CONTROLLED DOCUMENT	
	Reference / Name	<b>IPM FO 003-003 NVFR &amp; IFR considerations</b>
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## Information Paper

# NVFR and IFR considerations

*This information paper provides guidance about airframe, engine and propeller choices, with regards to CASR Part 91 Approvals for NVFR and IFR*

### 1. Introduction:

There are some basic aspects to flying an Experimental amateur-built aircraft under Night Visual Flight Rules (NVFR) or under Instrument Flight Rules (IFR). Firstly, the aircraft must be suitably equipped with the required instrumentation and lighting, and secondly the aircraft must have a NVFR or IFR Maintenance Release issued.

Next is an **operational approval** which is now under CASR 91.875 - Experimental Aircraft Operating Requirements, specifically, CASR 91.875(2)(e) – to operate *other than* by day and under VFR. This approval is available from CASA or an Authorised Person (AP). SAAA has a number of Authorised Persons holding the CASA Instrument of Appointment to issue the approvals.

The approval for an Amateur-Built Experimental aircraft to fly NVFR or IFR even when properly equipped is not automatic, it must be sought, generally, ideally at the time of issue of a Phase 2 (ongoing operations) experimental certificate, or any time later. A fee is payable to SAAA for this, for an SAAA Authorised Person to be able to receive and consider an application, leading to possible issue. It is never a “*you buy it - you get it*” proposition.

NVFR and IFR approvals can be issued either within an Experimental Certificate issued, or later via a separate letter.

For IFR aircraft (at the very least) there is also another operational authorisation required, to be able to fly over populous areas, often during departure or approach phases of flight. It is just not feasible to fly IFR “*not over populous areas*”, the IFR flight paths are already set. That approval is also under CASR 91.875(2)(f), and detailed for SAAA members in SAAA Info Paper IPM FO 001 – Flight Over Populous areas.

This information paper is somewhat of an ongoing work in progress, more will be added when discovered. Promises of useful information from some Avionics LAMEs has thus far not come to much fruition for us.



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## 2. Equipment and lighting requirements:

Where do you find the requirements? It is now in the CASR Part 91 Manual of Standards Chapter 26 Equipment (also called Division 26). *Manual of Standards* specify the technical detail required to comply with a base CASR regulation. Being a **very** complex document, we are not going to try to replicate it here in this information paper, but we can point you towards some relevant sections of it:

26.07 Aeroplane VFR flight by night – aircraft must have an approved GNSS, and other instrumentation

26.08 Aeroplane IFR flight – aircraft must have an approved GNSS, and other instruments

26.11 and 12 cover rotorcraft NVFR & IFR (not really ever seen in SAAA aircraft)

26.14 VFR & IFR flight requirements do not apply to certain experimental aeroplanes. This one is very interesting. Our aircraft are indeed the relevant aeroplanes mentioned, having a CASR 21.191(g) Amateur-Built Experimental Certificate. What it says reasonably clearly is that aircraft do not need the equipment specified in 26.07 / .08 above, “...*if the aeroplane is fitted with other equipment which provides the pilot with the same flight and navigation information.*” So it is the information you require for flight, the source of the information is up to you. Conventional instruments (steam gauges), home-made instruments, EFIS (whether certified or not), or something else that you have invented.

Now of course, most people will be using proper commercially available products, Certified or Experimental versions - which in some cases, are exactly the same thing, one with paperwork, the other without. Other than the approved GNSS, they do not have to be certified. They will however have to meet the performance specifications to be assessed by an Avionics LAME.

We strongly advise that you should talk with an avionics workshop to ensure that you obtain all of the correct equipment for IFR flight.

26.17 Electronic Flight Information Systems – battery backup requirements

26.21 Cockpit and cabin lighting requirements

26.22 Anti-Collision lights

26.23 Landing Lights

26.24 Navigation lights

26.25 Altitude alerting system and assigned altitude indicator – IFR flights



### 3. TSO'd equipment requirement – or not?

TSO = Technical Standard Orders

[https://www.faa.gov/aircraft/air\\_cert/design\\_approvals/tso/](https://www.faa.gov/aircraft/air_cert/design_approvals/tso/)

*A TSO is a minimum performance standard for specified materials, parts, and appliances used on civil aircraft. When authorized to manufacture a material, part, or appliances to a TSO standard, this is referred to as TSO authorization. Receiving a TSO authorization is both design and production approval.*

*Receiving a TSO Authorization is not an approval to install and use the article in the aircraft. It means that the article meets the specific TSO and the applicant is authorized to manufacture it.*

The question comes up all the time – “Do Experimental Aircraft have to have all TSO'd equipment?” Other than for the approved GNSS, **no** is clearly the answer as seen at MOS 26.14. If anyone tells you that “all equipment must be TSO'd for IFR flight”, just point them to MOS 26.14. It's all there in black and white for everyone to see. Rightly or wrongly, it is what it is.

Other questions remaining to us are:

*“Is TSO status readily apparent to the prospective buyer of a particular item of equipment?”*

*“Does TSO also mean certified, or is that different?”*

### 4. SAAA Information Paper – Flight over populous areas

SAAA members desiring NVFR or IFR operational capability must also realise that airframe, engine and propeller choices **will** play a big part in whether they can be approved for flight over populous areas, and then also NVFR or IFR operations, with **best case scenarios** being well proven aircraft designs, fitted with a certified engine and propeller combination.

With any other aircraft, or engine/prop combo, there is no guarantee that NVFR or IFR approval will be given. Each aircraft will be assessed on its own merits by the Authorised Person.

Auto engine conversions and some others are extremely unlikely to get the approval. CASA requires all APs (not just ours in SAAA) to consider the risks involved – and that is, not the risks to you as pilot, but the risks to all others one ground or water below you, and other airspace users.

The information paper should be consulted by members as it describes various things taken into consideration by an Authorised Person when authorising flight over populous areas.

NVFR and IFR approvals are considered and presumed to automatically include the populous areas approval but you will not find that in CASA information anywhere. We presume it to be the case, simply because, taking IFR as the easy example, one cannot restrict flight operations



to non populous areas only while at the same time following the prescribed instrument departure or arrival procedure. NVFR flight *might* also be unable to restrict their operations to non populous areas.

It is not feasible for an Authorised Person to issue a conditional approval which would allow some NVFR or IFR flights to occur and others not. Unlike day VFR flight over populous areas where a condition can be included about when, where and how, for IFR approval it is a **yes** or **no** proposition, there's no possibility of a **yes, but....**

## 5. IFR equipment and avionics maintenance to be performed by LAMEs only.

Unlike our capacity to maintain most of our Day VFR aircraft aspects ourselves, the CASA issued maintenance approval document, **CASA Instrument (*current version*) – Maintenance (*certain amateur-built, kit built and light sport aircraft*)** says (at the time of writing this) the following about IFR operations (condensed a little for clarity):

***“A person who is not the holder of an AEL (aircraft engineering licence) in category B2 must not carry out maintenance on aircraft instruments or equipment that are specifically required by the civil aviation legislation for IFR operations.”***

So this means, absolutely, with no ifs or buts, that IFR capable aircraft **must** have all of the IFR equipment and avionics maintained by an avionics LAME at the required intervals. You cannot do it yourself – even if you had access to the required workshop test gear.

## 6. What gets tested on the ground?

For new installations, the avionics LAME will conduct ground based checks using specialised test equipment. The following is just a sample list:

- Mode S Transponder (via ramp test set.)
- Flight ID
- 24 bit address (as assigned by CASA in aircraft registration)
- ADS-B OUT – setting of correct SIL value. (whatever that is...)
- Pitot/static system
- Airspeed indicator
- Altimeter
- VOR
- LLZ
- G/S
- ILS



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## 7. What should you be testing in flight?

First, a quick discussion about WHY we flight test. Our Experimental aircraft are all one-off unique aircraft. No two are the same. The airframe may be the same as many others, but your flight and navigation equipment instrument panel will likely have been designed by you the builder. The equipment chosen, the location it is installed, the layout of the panel, switching, circuit breakers, redundancies etc – all unique to your aircraft. You had the freedom to build it as you liked.

The factory built IFR capable Cessna 182 – they are all the same, built, equipped and tested to work as specified from the outset. All the same, nothing more to see here, move along.....

Your Experimental aircraft? It's a one-off, unique. You must therefore flight test it to make sure that everything that seemed to work properly on the ground does actually work properly and intuitively and harmoniously in the air. You do all that in nice VFR conditions – in case something does not work as it should – you are in no danger.

The avionics LAME may also require some in-flight set-up or testing to check for accuracy, function and integration of the various systems. That testing can/should be readily and safely performed by day under VFR, and may require the carriage of either a safety pilot or a dedicated avionics fiddler (one person flying, one person doing the fiddling, conducting the equipment set-up.) All this can generally be done without the IFR approval, by day, in VMC.

This list is just a guide and is not exhaustive. Your installation may have additional things to test.

- Autopilot engage and disengage,
- Audible alarms and warnings etc.
- Autopilot integration with navigator
- Navigator function
- Altitude capture and hold
- Climb, descent, speed management
- ILS (yes, this **can** be done VFR in VMC with prior ATC approval)
- RNAV approaches
- HOLD function
- Interference and compatibility with other systems
- User interface – exercise all user inputs



# APPLICATION TO AUTHORISED PERSON

for CASR 91.875(2)(e)(ii) approval for NVFR or IFR operations

## Applicant details:

Name	
Address	
Phone	
Email	
SAAA Membership No.	Approval sought (tick): NVFR      IFR

## Aircraft Details:

Registration	VH -	First flown (year)	
Type		Serial No.	
Engine type		Certified type? Y / N	
Propeller type		Certified type? Y / N	
Airframe hours		Engine hours	
		Propeller hours	
Aircraft based at			

## Information to be provided with this application form:

Item	tick
Receipt from SAAA for AP Service – NVFR and/or IFR application consideration	
Copy of the Information Paper – Flight over populous areas application	
Copy of current Experimental Certificate	
Photographs of aircraft, exterior and interior – at least one of each	
Aircraft Maintainer – if LAME, name or organisation:	
Aircraft Maintainer – if self: Copy of SAAA Maintenance Procedures Course Certificate	
Maintenance Schedule name	
Copy of current maintenance release	
Copy of past two maintenance releases (if available)	
Copy of maintenance logbook pages going back 3 years (if available)	
Electrical Load Analysis documentation	
Accident damage (if any)	
Significant modifications made since first flight (if any)	
List of designer (kit or plan) service bulletins addressed, with results.	
Any additional supporting documentation	
<b>Additional for IFR applications:</b>	
Name of Avionics maintenance organisation	
Avionics LAME logbook entries that all aspects of Part 91 MOS have been met.	
Avionics LAME logbook entries that in-flight setup/testing has been completed.	
Flight Manual or Pilot Operating Handbook IFR notes/information.	

As each aircraft is unique and must be considered on its own merits, there may be additional information requested or required by the Authorised Person. **Issue of any approval is not assured. Submission of this application is an acknowledgment that the application might result in no approval being able to be issued.**

Applicant signature: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_