

Flying a 'New Generation' Gyrocopter

A guide for converting pilots!



Phil Harwood

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- Sample Questions.....175

Preface

The 'New Generation' Gyrocopter Revolution

I believe that, in August 2006, the Gyrocopter¹ industry in the UK began to revolutionise. On this date, the first factory built two seat Gyrocopter, the MT-03 was approved in the UK by the CAA. I call this a 'New Generation' Gyrocopter. So, what does this mean?

Up until then, the only way to own and fly a new Gyrocopter was to build one. This meant that the majority of pilots had to spend literally hundreds of hours building, before they could take to the skies. Sure, there were some machines available on the second-hand market but these were few and far between, getting older and spares were becoming increasingly scarce. In addition, the process of renewing permits for individual machines was time consuming, as each machine would have its own idiosyncrasies.

Having a factory built Gyrocopter means that you can **buy** one off the shelf ready to fly. You can get your training, buy a machine and take to the skies. Two seats mean that you can take your family and friends, and with an endurance of around 4 hours, you can do some serious touring.

This means that the type of person who flies Gyrocopters now and in the future will, in my opinion, be a different type of person from those pilots who have flown in the past. It is my experience that currently about 70% of all new Gyrocopter student pilots are people who already have some form of pilots licence; converting from either fixed wing, microlight or helicopter. You may well be reading this now because you fall into that category.

¹ Also known as Autogyro or Gyroplane (see chapter 1)

This book is designed primarily for converting students and provides all the information that I give in my extended briefings. It does not go into the fundamentals of flight or the detailed theory of rotor aerodynamics. What it does do is give you a practical approach to what you need to learn to become a Gyrocopter pilot.

The MT-03 from Rotorsport UK is the Gyrocopter that I refer to throughout this book when dealing with specific facts and figures. It is this model of Gyrocopter that I, and the majority of instructors in the UK, use for training. I expect the principles will apply to all 2-seat tandem (one in front, one behind) Gyrocopters that come into the UK market in the coming years. If you are learning to fly a different model of Gyrocopter then please do **always** use the figures and facts that come from your machine's manufacturer or your instructor.

This book is in no way a substitute for training. It is illegal and downright stupid to try and fly a Gyrocopter without proper professional training. The machine may control in a similar way to a fixed wing but you must **think** like a Gyrocopter pilot in order to fly safely.

Currently, there are not many instructors in the UK and we are all booked well in advance, so I have written this book to help reduce the time that your instructor has to spend with you on the ground and maximise your time in the air.

This book does **NOT** replace briefings from your instructor, it simply acts as a source of reference that you can study in advance of your training so that you can better understand what your instructor is saying to you first time; and also provides a set of notes that you can revise and refer to many times throughout your training.

Go on, enjoy the "Gyrocopter Experience".

Phil Harwood

Chapter 1 Introduction

This book has been written specifically for people who currently hold a pilot's licence and who have decided to venture into the exciting world of Gyrocopters. It is also useful for those of you who don't hold a pilot licence but perhaps want to find out more about how these machines fly, or if you are embarking on a course of training.

If you are a pilot licence holder, it does not matter which type of licence you hold; it may be for Class A fixed wing aircraft, microlight aircraft (either flex wing or 3-axis) or a helicopter licence. What is important is that you currently know "how to fly", and now you want to learn "how to fly a Gyrocopter".

If you are new to flying and don't hold a licence, then I am sure that you will still find this book very helpful when you are learning to fly; however all the non-Gyrocopter specific fundamentals are missing from this text. If you pick up any of the flying books designed for microlights or fixed wing aircraft then it will soon fill your knowledge gaps. It is my intention, as soon as this book is finished to write an extended version specifically designed for those whose first taste of flying is to become a Gyrocopter pilot. Watch this space!

In this book therefore, I am only going to describe the **differences** between flying a Gyrocopter and flying other types of flying machines. I have previously held a PPL(H) and a PPL(A) and, having been through the entire training syllabus of these licences myself, I am able to highlight the differences in flying these types of aircraft and Gyrocopters.

I operate from a microlight airfield near York, England and work alongside both flex wing and 3-axis microlight instructors. When I did my ground school course to train to become a Gyrocopter Assistant Flying Instructor (AFI), I did it alongside budding microlight AFIs; this gave me the perfect opportunity to find out the differences between flying microlights and Gyrocopters.

My original flying training was done with gliders. In my view, gliding teaches you more about “raw” flying, than any of the other machines I have encountered.

I have no instructional experience of any other type of flying machine. I have only flown in a balloon as part of a pleasure flight in Florida and I have never flown in powered parachutes or the like. I am therefore unable to comment on any similarities or differences on this type of flying.

I have purposefully tried to keep this text simple, straightforward and relevant. I have not included any of the basic elements of flying that you will have learned in your previous flying instruction and therefore I will use words and phrases that you should have come across in the past without further explanation.

If you have any questions or comments relating to this book, or about Gyrocopters in general, then please contact me via email at

phil.harwood@theGyrocopterExperience.co.uk

or through the Gyrocopter Experience website

www.theGyrocopterExperience.co.uk

If you register on the website then you will be kept in touch with everything that I know relating to the Gyrocopter community in the UK.

Licensing and training requirements

To fly a Gyrocopter in the UK, you require a specific licence, called a PPL(G). This is a separate licence and not a “type” of any other licence. At the time of printing this book, a converting fixed wing or flex wing qualified pilot is required to have a minimum of 15 hours of dual instruction and up to 15 hours of supervised solo before applying for a General Flying Test (GFT). There must be at least 30 hours of supervised training in total.

A qualified helicopter pilot is required to have a minimum of 20 hours of instruction, split between dual and supervised solo as appropriate.

An “ab initio” student (someone who is learning to fly for the first time and does not already hold any flying licence) must complete a minimum of 20 hours of dual instruction, 10 hours minimum of solo work and a minimum of 40 hours in total.

There are ground exams in the following subjects:

- Air Law (specific to Gyroplanes)
- Meteorology
- Navigation
- Human Performance and Limitations
- Gyroplane Technical

If you hold a PPL(A), PPL(H) or NPPL licence, or hold a Microlight licence then you do NOT need to repeat any of the common ground exams. You only have to complete the Gyroplane Technical exam (written) and be able to prove (verbally) to the FI(E), the CAA appointed examiner who does your GFT, that you know the differences in Gyrocopter air law and understand any details which are specific to the type of machine that you are flying.

You will have to complete two cross country exercises as part of your solo work before you can apply for the licence. These can be done either before, or after your GFT.

The medical requirements are the same as the NPPL.

Complete information on all the legal stuff can be found on the CAA website (www.caa.co.uk) or in LASORS. This information is updated on a regular basis.

The structure of this book

This book is structured along the lines of the “Extended Briefings” that I offer to my own students as part of the PPL(G) syllabus.

- **Chapter 2** starts by asking and answering the common questions that I am asked time and time again about Gyrocopters. It then describes the basics of a Gyrocopter. It is not complicated, but by explaining the key buzz words and components of a Gyrocopter it makes the descriptions and terminology clearer when talking with your own instructor and throughout the remainder of this text.
- **Chapter 3** is titled “Getting In, Getting started and Getting going!”. Everyone is keen to start flying. This chapter includes the safety briefing that you will be given and the basics of the essential checks that must be made before you go flying. These checks must become habitual every time you fly, so let’s get

them right at the start. The startup procedure assumes that you are learning to fly in an MT-03 Gyrocopter supplied by Rotorsport UK Ltd. At the time of printing, the MT-03 is the only factory built Gyrocopter currently certified in the UK. This chapter also includes the basics of taxiing.

- **Chapter 4** covers where you actually go flying and includes the briefing for all your upper air work. You will find flying a Gyrocopter very similar to flying other aircraft but there are key differences, some quite subtle and it is important that you understand them. When you have completed your upper air work training (which if you already hold a licence is likely to take around 3 to 5 hours), you may be wondering why you need to do 15 hours of dual training - all will be explained.

It is quite normal to follow upper air work with circuits and landings. However I am going to deviate from that theory and include rotor management, wheel balancing and low hops next. Recently, I was unable to train in the circuit due to poor visibility, but I could see the length of the runway easily and therefore I taught a couple of students according to the single seat Gyrocopter syllabus (it is the same content – just a different order). Both of these students found this a revelation and the “penny dropped” as to the fundamental differences between a Gyrocopter and an aeroplane. They each thoroughly enjoyed spending over a couple of hours running up and down the runway controlling the rotors and working on the finesse of wheel balancing and settling the Gyrocopter down on the ground from a low hop.

The very next time they went flying, both students immediately mastered take-offs (often the hardest part of Gyrocopter flying) and their general flying and landings were vastly improved.

I am now changing my own instructional technique and timings to include these ground exercises much earlier in the training, especially for existing pilots, who have found that with this approach it all falls into place.

- **Chapter 5** “Rotor management” sounds uninteresting. This part of the course is done without leaving the runway, or at best flying no more than 6 feet above the runway but it is here that you will truly learn about rotors. In many ways, this is the most hazardous part of the training, not hazardous to your well being, but hazardous in terms of potential damage to your very valuable rotor blades. Therefore these exercises should be done in short bursts of no more than 45 minutes at a time. The consequence of having the stick in the wrong position at the wrong time, especially in high winds can be quite expensive. If you are like my previous students, you will actually find these exercises the most exhilarating. If you do well in this section, you will have learned how to take off correctly.

- **Chapter 6** builds upon rotor management and explains the take-off technique. Unlike a fixed wing, whose technique is often described as “apply full power and hang on”, the Gyrocopter take-off is more complicated as it requires time to build up the momentum in the rotors to start them autorotating.
- **Chapter 7** is all to do with landings. The landing technique for Gyrocopters is different from the landing techniques for other aircraft. The most noticeable being that the descent angle is normally around 30 deg, compared to a standard 3 deg glide slope of a fixed wing! Spectacular! This chapter also introduces the Gyrocopter specific circuit terminology.

At this point in your training you will have mastered all that is required to take-off, fly around and land a Gyrocopter but before going solo it is essential that you understand about the emergency procedures for a Gyrocopter. **The basic reaction required of a Gyrocopter pilot is VERY DIFFERENT to the basic reaction of a fixed wing pilot.** This is where you are taught to “think” like a Gyrocopter pilot.

- **Chapter 8** covers the basics of the emergency and advanced procedures. This covers engine-off emergencies and advanced techniques such as hovering.
- **Chapter 9** is the pre-solo brief and where aspects of general Gyrocopter flying are discussed. There are a number of “gotchas” that catch out even experienced Gyrocopter pilots when their concentration lapses, even for a moment. They are presented as forewarned is often forearmed.
- **Chapter 10** contains the theory that you require for the Gyrocopter Technical exam. This exam is not highly mathematical based like some of the PPL and JAR exams, but tests your practical understanding of Gyrocopters.
- **Appendix A** Contains an illustration of how the training for a typical conversion student is split between flying time and ground school.
- **Appendix B** Contains a summary of the PPL(G) syllabus and cross references the exercises to the appropriate chapters in this book.
- **Appendix C** provides some sample questions, similar to those used in the Gyrocopter Technical exam

Autogyro, Gyroplane or Gyrocopter?

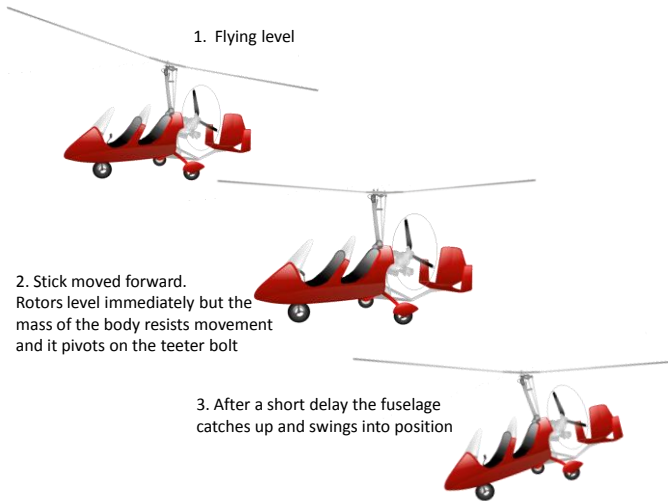
You will notice that I always use the term Gyrocopter. You may be more used to the terms Autogyro or Gyroplane. "What's the difference?" is the first question that I am commonly asked. In today's society the terms are used synonymously; there is no difference. Historically there is a difference, which is to do with trademarks; however I will leave you to research this on your own as it makes no difference to flying.

I was told that the most popular terminology was Gyroplane, however I know for a fact that, in the UK between November 2007 and March 2008, the word Gyrocopter was searched for in Google over seven times as often as the word Gyroplane. The word Autogyro was more popular than Gyroplane but still a long way behind Gyrocopter.

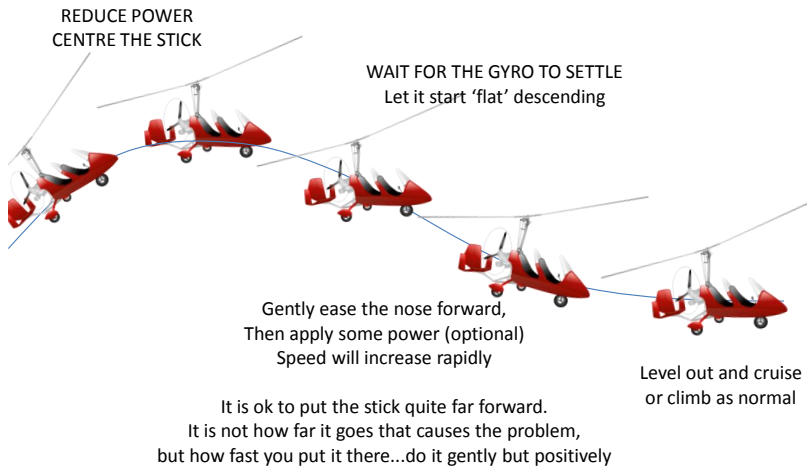
I use the word Gyrocopter, just because I think it sounds cooler.

This book has 181 pages of **instructional** text. It includes 102 full colour diagrams, a sample of which is given below.

“The Pendulum Effect” (page 45)



Recovery from unusual attitudes (page 117)



This is the **only** book available which provides you with a complete guide to flying a “**New Generation**” Gyrocopter and prepares you for the PPL(G) Technical Exam.

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www.theGyrocopterExperience.co.uk

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This book costs less than 25 minutes of flying training.

People who read this book progress quicker though their training, have less time in the classroom, understand their instruction easier...

.... and they get their licence sooner

Flying a 'New Generation' Gyrocopter

Autogyros, Gyroplanes or Gyrocopters? Whatever you want to call them; they used to look basic, were flown by enthusiasts who hand built them and they had a poor reputation for safety. In the past would-be pilots, however intrigued, chose alternative forms of aviation.

In August 2006, this all changed in the UK. The first *factory built* Gyrocopter, the MT-03, was approved in the UK to BCAR Section T, the stringent CAA standard for Gyroplanes. This, together with changes to licensing and training requirements, meant that the UK was ready to safely join the world wide explosion in the popularity of these machines. No longer do you have to build one yourself; you can now buy one ready built, train for your license and fly. With over 4 hours endurance and 2 seats, it has become the ultimate fun touring flying machine and demand is huge. The MT-03 is the first of what I call 'New Generation' Gyrocopters. They look great, are inherently more stable and are quite simply great fun.

Many microlight, fixed wing and light helicopter pilots have now decided to go for the Gyrocopter experience and learn to fly these machines. But be warned: a Gyrocopter may control like a conventional aircraft, but to fly safely you **MUST** think like a Gyronaut. There are many differences, some very subtle, that can be *critical* in times of emergency or pressure.

This book is particularly designed for people who already know *how to fly*, and want to learn to *fly a Gyrocopter*. It is a book of "differences" and omits many of the common concepts that transcend most forms of flying. It is direct and concise with the odd touch of humour. In short, this book will help you to understand how to *think* like a Gyrocopter pilot. If used correctly this book will prepare you for your training and shorten your learning curve. Even if you don't plan to learn to fly, this book will let you into the secrets of Gyrocopter flying and these 'New Generation' machines. Enjoy! ☺

About the author

Phil Harwood is a full time Gyrocopter Instructor, and the founder of *the Gyrocopter Academy*; a Gyrocopter flying school which is dedicated to professional training of the PPL(G) in the UK.

He also runs *the Gyrocopter Experience* which is dedicated to getting as many people as possible in the UK to experience the joy of these fascinating machines.



The 'Gyrocopter Grin'™ is the trademark of the Gyrocopter Experience and symbolises the huge smile that people get when flying in a Gyrocopter

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