The Pilot RT Training App

Introduction

UK airspace is among the most crowded and complex in the world, and consequently a good competence in Radio Telephony (RT) is an essential and demanded skill of any trainee pilot. Unfortunately, it is an acknowledge fact that many students experience more difficulty with this than with any other single aspect of their flying training, and even many qualified pilots would rather devise a tortuous route to fly from A to B, rather than a more direct route which would cross controlled airspace, just to avoid the need to communicate with en-route Air Traffic Control (ATC).

UK Flight Training

All prospective civilian pilots, regardless of their ultimate aspirations, start their flying careers by obtaining their Private Pilot's Licence (PPL). To achieve this, the trainee is required to complete a minimum number of hours of actual flight training, and also pass nine (9) written exams covering all aspects of flying, from Air Law to Meteorology and the Principles of Flight. One other written exam is Communications, in which the candidate is required to demonstrate a knowledge of RT terminology, as defined (in the UK) by the CAA reference document CAP413.

In addition, there are two quite demanding practical tests. One is the final 'Skills' flight test, which takes place at the very end of training, and for which the candidate must demonstrate a high level of competence in all of the skills learned. The other is a classroom-based oral RT examination, simulating a flight from one airfield to another, where the student takes the part of a pilot and the examiner the various Air Traffic Control Officers (ATCO's) along the chosen route. The student must plan the route, then both initiate and respond to the various RT calls along the way, to enable a safe flight to be achieved via the most direct route, which invariably will involve crossing controlled airspace. In addition, various simulated emergency situations, such as a rough running engine, may be introduced at any time, and the student must demonstrate an ability to communicate clearly with ATC, even in a high stress, potentially life-threatening, scenario.

It is preparation for this exam that I provide one-to-one RT training, which is usually carried out remotely via Zoom. I believe that this is helpful but is

inevitably limited in what can be achieved within the allocated training periods. Remember also that, in real life, the student would also be flying the aeroplane and navigating at the same time.   Hence the workload, for a novice pilot, is enormous. This level of multitasking can only be achieved by constant practice and repetition.

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Ideally, then, some form of home revision app is required which will enable the student to practice his verbal RT skills within the privacy of his own home.

There are various commercial Apps available, which certainly assist the student in learning the theory but, in my opinion, do little to help them gain the necessary verbal skills that are required. One such commercial app is called 'Readability5', a review of which can be found at https://www.flymac.co.uk/review-readability5/.

This software will play pre-recorded selections of Air Traffic Control RT at the appropriate times, and also detect that the student has pressed the onscreen PTT (push-to-talk) button in response, but has no inherent intelligence to determine whether or not the pilot's RT response is correct (or, indeed, whether anything has been said at all).

What is required is software that will both artificially create the spoken RT calls of the appropriate en-route Air Traffic Control Officers (ATCO's), and also analyse the content of the student pilot's verbal responses or initial calls to ensure that these contains certain required key words and phrases. The software should allow for other unexpected words (such as 'errs') and phrases to be embedded, and also allow for the key words and phrases to be spoken in the wrong order, possibly with mispronunciations. Depending on the severity of any errors or omissions, the ATCO's response should range from 'Negative, say again, ...' for a complete repeat to 'Acknowledge XYZ' for a partial omission.

To the best of my knowledge, no such software exists, and consequently I have written my own, using a combination of Microsoft PowerPoint and Visual Basic, together with screenshots from Microsoft Flight Simulator to provide a degree of realism.   This uses Windows speech recognition to convert the verbal transmission into text, which is then analysed for accuracy, and the

appropriate response created and spoken by one or more of the Microsoft 'Voices'.   A demonstration YouTube video can be found here .

This software is not portable – it only works on a Windows PC, ideally running Windows 11, and with a modern version of Microsoft Office installed. Neither is it sufficiently flexible to permit creation of different routes and operating scenarios (for example, different types of aircraft).   However, it has permitted me to experiment, and thereby understand what features are most desirable in the ideal Pilot RT App.

One of these is that the software should be sufficiently flexible to allow for the easy creation of additional routes, by experienced RT instructors such as myself, but who have not necessarily got any specialised IT knowledge or expertise. This implies both a high degree of modularity in the design of the software, and a relatively simple instructor-user interface.

One other aspect relates to the visual appearance of the App. As mentioned earlier, my demonstration software utilises screenshots of the interior of a Cessna 152 training aircraft taken from Microsoft Flight Simulator. This possibly infringes copyright law and is, in fact, neither necessary nor even desirable in the finished product.   For the PPL oral RT exam, the student is only provided with the examiner's chosen route a few minutes prior to the start of the exam, then given a few minutes to draw this on an aeronautical chart and plan out the positions and times of the required RT calls.

For the Pilot RT App software, it is suggested that what is required is a representation of the aeronautical chart with the specified route already drawn on it, possibly with a moving icon to indicate the current position of the aircraft at any given time.

<u>The ideal RT Pilot App</u> (not necessarily in order of importance)
- Recognise and interpret the Phonetic Alphabet and numbers.
- Recognise aircraft callsigns and create abbreviated versions when appropriate.
- Recognise key words & phrases, possibly given in wrong order and/or mispronounced.
- Be of modular design with sufficient module variables to permit easy creation of additional routes and scenarios by experienced RT (but necessarily IT literate) instructors.

- Contain a degree of randomness so that replaying the same section of the route results in different outcomes, e.g., random weather, runway in use, other traffic, etc.
- Be readily portable between different operating systems.
- Not require specialist 3rd party software to be installed or, if unavoidable, include installation of this software as part of the App initialization.
- Have fast response without undue speech synthesis / recognition or other processing delays.
- Feature a PTT (push to talk) button (e.g., space bar) to activate and deactivate the pilot's microphone.