FLIGHT TRAINING SUPPLEMENT

1 Introduction

This Flight Training Supplement takes much of its information from the FAA's publication, Airplane Flying Handbook, FAA-H-8083-3a (AFH). There seems to be no reason to "reinvent the wheel." We encourage the pilot or student to obtain a copy and study the Airplane Flying Handbook. You can download the Airplane Flying Handbook from the Internet at http://www.faa.gov/pilots/training/ for free or purchase a copy from your local bookstore.
We reference the Rotax Maintenance Manuals. You can download all of the Rotax manuals and bulletins from www.rotax-owners.com site. We strongly encourage you to download the Rotax service manuals or use the CD that comes with your airplane and print them for your mechanic. Your mechanic will need the Rotax maintenance manuals to service your engine. Be sure the register your engine with Rotax at the same time so you will receive warranty information as well as current service bulletins.
This supplement is tailored to assist you in learning to fly and operate your new TECNAM airplane safely. Since this is a supplement, it is important that you read and study all of the documents and manuals that came with this aircraft as part of your training.

1.1.1 TECNAM History

The brothers L. and G. Pascale whose names are associated with the design and manufacturing of famous light aircraft such as the PARTENAVIA single engine P64 and P66 OSCAR and the twin-engine P68 series founded TECNAM in 1986. The TECNAM factory consists of two industrial plants: one is located near the International Airport in Naples and covers an area of about 12.000 sqm and the second is based beside of the Capua (CE) airport. As well as the different light sport airplanes, its production includes the ATR 42/72 stabilizer and elevators, the panel 56 of the B717 fuselage, component and assemblies of the Aermacchi SF260 as well as minor parts of other aircraft and helicopters. Each phase of the manufacturing process is in accordance with the requirements of the Airworthiness Authorities, thereby guarantees a high standard of workmanship. The industrial organization of the Company includes the Administration, Technical and Production Departments, and a Quality Assurance Service.

1.1.2 Understanding ASTM Requirements

This airplane is an ASTM compliant airplane. Tecnam provides the FAA with a manufacturer's statement of compliance that states that this airplane is in compliance with the specifications of ASTM F 2245.
It is certificated under FAR part 21.190, Issue of a special airworthiness certificate for a light – sport category airplane. The FAA first published Order 8130.2F CHG 1 on April 1, 2005. This order and its subsequent revisions are what dictate how the airworthiness certificate is issued. You can download a copy of this order online free at www.faa.org.
Section 6 of Order 8130.2F CHG 1 defines the requirements of the issuance and continued airworthiness of light sport airworthiness certifications. It is important to understand that the FAA

doesn't issue a type certificate for a light sport airplane. The manufacturer states the airplane complies with the ASTM compliance.
When everything is completed and the airworthiness certificate is issued, along with the airworthiness certificate, there are limitations that are assigned to this airplane. These limitations must be carried in the airplane at all times and must be complied with.

1.1.3 Aircraft Limitations

Your Tecnam airplane is certificated as a Special Light Sport category under part 21.190. In Order 8130.2F the following operating limitations are normally issued:

1. No person may operate this aircraft for any other purpose than that for which the aircraft was certificated. This aircraft must be operated in accordance with applicable air traffic and general operating rules of part 91 and all additional limitations prescribed herein. These operating limitations are a part of Form 8 130-7 and are to be carried in the aircraft at all times and to be available to the pilot in command of the aircraft.
2. The pilot in command of this aircraft must advise the passenger of the special nature of this aircraft and that the aircraft does not meet the certification requirements of a standard certificated aircraft.
3. This aircraft must display the word "light-sport" in accordance with § 45.23(b).
4. This aircraft must contain the placards and markings as required by § 91.9. In addition, the placards and markings must be inspected for legibility and clarity, and the associated systems inspected for easy access and operation, to ensure they function in accordance with the manufacturer's specifications during each condition inspection.
5. Unless appropriately equipped for night and/or instrument flight in accordance with § 91.205, this aircraft is to be operated under VFR, day only.
6. Noncompliance with these operating limitations will render the airworthiness certificate invalid. Any change, alteration, or repair not in accordance with the manufacturer's instruction and approval will render the airworthiness certificate invalid, and the owner of the aircraft must apply for a new airworthiness certificate under the provisions of § 21.191 with appropriate operating limitations before further flight.
7. Application to amend these operating limitations must be made to the geographically responsible FSDO.
8. This aircraft does not meet the requirements of the applicable, comprehensive, and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation. The owner/operator of this aircraft must obtain written permission from another CAA before operating this aircraft in or over that country. That written permission must be carried aboard the aircraft together with the U.S. airworthiness certificate and, upon request, be made available to an ASI or the CAA in the country of operation.

It is important to understand these limitations and what they mean. For instance, number six states that "…Any change, alteration, or repair not in accordance with the manufacturer's instruction and approval will render the airworthiness certificate invalid". There are no STCs for this class of airplane since there is no FAA type certificate. Therefore, any alteration or change must either be approved in the maintenance manual supplied by Tecnam or you will need an authorization letter from Tecnam before you alter your airplane in any way. If this requirement is not complied with, then your

airworthiness certificate is considered invalid and you are not legal to fly it until this has been rectified. Authorization to modify your airplane is not a difficult procedure. Just email us at Tecnam@bellsouth.net and we can get the authorization for you.
Just like any airplane that you fly, it is important to understand the rules that govern. The EAA has a wonderful document that summarizes the new rules. If you go to their website at www.eaa.org and check out the sport pilot page you will find many answers to your questions.

1.1.4 Light Sport Aircraft Definition from the EAA website:

http://www.sportpilot.org/learn/final_rule_synopsis.html

The FAA defines a light-sport aircraft as an aircraft, other than a helicopter or powered-lift that, since its original certification, has continued to meet the following:

- Maximum gross takeoff weight—1,320 lbs, or 1,430 lbs for seaplanes.
- Maximum stall speed—51 mph (45 knots) CAS
- Maximum speed in level flight with maximum continuous power (Vh)—138 mph (120 knots) CAS
- Single or two-seat aircraft only
- Single, reciprocating engine (if powered), including rotary or diesel engines
- Fixed or ground-adjustable propeller
- Unpressurized cabin
- Fixed landing gear, except for an aircraft intended for operation on water or a glider
- Can be manufactured and sold ready-to-fly under a new Special Light-Sport aircraft certification category. Aircraft must meet industry consensus standards. Aircraft under this certification may be used for sport and recreation, flight training, and aircraft rental.
- Can be licensed Experimental Light-Sport Aircraft (E-LSA) if kit- or plans-built. Aircraft under this certification may be used only for sport and recreation and flight instruction for the owner of the aircraft.
- Can be licensed Experimental Light-Sport Aircraft (E-LSA) if the aircraft has previously been operated as an ultralight but does not meet the FAR Part 103 definition of an ultralight vehicle. These aircraft must be transitioned to E-LSA category no later than January 31, 2008.
- Will have FAA registration—N-number.
- Aircraft category and class includes: Airplane (Land/Sea), Gyroplane, Airship, Balloon, Weight-Shift-Control ("Trike" Land/Sea), Glider, and Powered Parachute.
- U.S. or foreign manufacture of light-sport aircraft is authorized.
- Aircraft with a standard airworthiness certificate that meet above specifications may be flown by sport pilots. However, the aircraft must remain in standard category and cannot be changed to light-sport aircraft category. Holders of a sport pilot certificate may fly an aircraft with a standard airworthiness certificate if it meets the definition of a light-sport aircraft.
- May be operated at night if the aircraft is equipped per FAR 91.205, if such operations are allowed by the aircraft's operating limitations and the pilot holds at least a Private Pilot certificate and a minimum of a third-class medical.

1.2 Preflight Planning

Part 14 CFR part 91 requires that before each flight, the pilot shall become familiar with all available information concerning the flight. Although you might be just doing a few touch and goes or taking mom for a $100 hamburger, remember that for all flights the FAA regulations require that you are familiar with runway lengths, and take off and landing distances. See part 91.103 Preflight action.
If you are leaving the vicinity of the airport then the regulations require that you become familiar with the following information:

- Weather reports and forecasts
- Fuel requirements
- Alternate and diversion plans
- Known traffic delays
- Aircraft performance

We recommend that you get a full weather briefing from the FSS or go to www.duats.com.
September 11, 2001, has changed our world forever. It is important to make sure that there are no active TFRs along your route of flight.
Before each flight it is necessary to check weight and balance data for the flight, the required aircraft paperwork is in the aircraft, and visually inspect the airplane.
The certificates and documents that are required to be in the aircraft are:

- Airworthiness Certificate
- Registration Certificate
- Operating Limitations, required placards, and instrument markings
- Pilot Operating Handbook
- Flight Training Supplement
- Weight and Balance data

NOTE
The maintenance manual is a required document but there is no requirement to carry the manual.

1.2.1 Checklists

Checklists have been the foundation of pilot standardization and cockpit safety for years. The checklist is an aid to the memory and helps to ensure that critical items necessary for the safe operation of aircraft are not overlooked or forgotten. However, checklists are of no value if the pilot is not committed to its use.
Without discipline and dedication to using the checklist at the appropriate times, the odds are on the side of error. Pilots who fail to take the checklist seriously become complacent and the only thing they can rely on is memory.
The importance of consistent use of checklists cannot be overstated in pilot training. A major objective in primary flight training is to establish habit patterns that will serve pilots well throughout their entire flying career. The flight instructor must promote a positive attitude toward the use of checklists, and the student pilot must realize its importance. At a minimum, prepared checklists should be used for the following phases of flight. AFM

Preflight Inspection	Cruise
Before Engine Start	Descent
Starting Engine	Before Landing
Before Taxiing	Balked Landing
Taxiing	After Landing
Before Takeoff	Engine Shutdown and Securing
After Takeoff	Post flight Check

1.2.2 IM SAFE

Before every flight, the pilot needs to do a self-assessment "checklist". The acronym IM SAFE is a good way to accomplish this.

I Illness
M Medications
S Stress
A Alcohol
F Fatigue
E Eating

Once you have determined that you, the pilot, is safe to fly, it is time to make sure your airplane is safe as well.

1.2.3 Preflight Inspection

The preflight inspection of the airplane is broken down into the cabin inspection and the exterior inspection. The preflight inspection procedures are located in the Normal Procedures' section of the POH. This checklist should be used on every flight. It is best to follow the same pattern each time you do a preflight inspection.

1.2.4 Cabin Inspection

Make sure that the cabin floor is clean, there is nothing that could affect the control movements, and the general condition of the interior is acceptable. This is in addition to the normal items on the checklist.

1.2.5 External Inspection

Make sure that the parking brake is set or the airplane is chocked before doing the external inspection. Follow the same procedures each time so there is less chance of forgetting something. The idea of an external inspection is not to become a mechanic but to find discrepancies that should be obvious. Leaks, broken parts, safety wire, etc are areas that you are looking for.

Make sure that when you are looking in the engine compartment and on the belly of the airplane that there are no suspicious leaks. Don't forget to check the fluid levels and the exhaust springs. There are four springs on each side.

1.2.6 Before Start

Make sure that the parking brake is set and the area is clear. It is important to follow the checklist items as a checklist and not a do list. Be sure to check oil pressure right away and respect the duty cycle of the starter motor.

1.2.7 Engine Start

When ready to start the engine, the pilot should look in all directions to be sure that nothing is or will be in the vicinity of the propeller. This includes nearby persons and aircraft that could be struck by the propeller blast or the debris it might pick up from the ground. The anti-collision light should be turned on prior to engine start, even during daytime operations. At night, the position (navigation) lights should also be on. The pilot should always call "CLEAR" out of the side window and wait for a response from persons who may be nearby before activating the starter. AFH

Since there are no toe brakes installed, make sure that the parking brake is set before starting the engine.
Starting the Rotax engine is easy if you follow the checklist and a few simple guidelines.
The Rotax engine has a dry sump forced lubrication system. This means that the oil is stored in an oil tank and not on the bottom of the engine. If you haven't started the engine yet today or it is very cold, then it is good practice to turn the engine over with the ignition switches off. Turn the ignition switches on to start the engine when you see oil pressure indicated on the gauge. Make sure that you don't exceed the starter limitations of 10 seconds on, 2 minutes off.
If you are starting the engine in cold conditions, then you may have to use the choke. If you are using the choke, the throttle has to be at idle otherwise the choke won't work.
Respect the starter duty cycle of 10 seconds on followed by 2 minutes of cooling.
Be sure to look around before you start the engine. Make sure that the propeller area is clear. Before hitting that starter switch, yell "clear". Look around. Oh, and did I say, make sure the parking brake is set?
Once the engine is started, make sure that all of the engine parameters are normal before you move the airplane. Warm the engine up at low idle speeds up to 2500 engine RPM. There is enough to do while taxiing!

1.2.8 Before Taxiing

Do as much as you can while parked so you are not distracted while taxiing. Make sure the radios are on, instruments are checked and set and whatever lights are needed are on before you release the brakes. Remember that the internal AC generator is a generator and works best at higher RPMs. Therefore, it is prudent to check the voltage to be sure that the generator is taking the load and not the battery. If the voltage is less than 13 volts, then you are running off the battery and the battery is being discharged.
Have a taxi plan in your mind before releasing the brakes. If you are at an unfamiliar airport, then make sure that you have a taxi diagram available. Review this diagram before calling ground control or taxiing out.

1.2.9 Taxiing

This airplane has direct steering to the nosewheel. So, you do not want to press on the rudder pedals when you are stopped. This will put unnecessary pressure on the linkage. Make sure the propeller RPM is low before releasing the parking brake so the airplane won't lunge forward. Use the left hand throttle while taxiing. This allows you to use your right hand on the brake handle. Make sure that you are controlling taxi speed with the throttle and not just the brakes. Pull the power back so you are not riding the brakes as you taxi. This will extend the life of the brake linings and give you better control of the airplane.

1.2.10 Before Takeoff Checks

Make sure the parking brake is on and you are in a position not to blast anyone or anything while you check your engine. Turn the airplane into the wind. This is better for cooling and stability and becomes increasingly more important as the winds increase in intensity.
Be sure that the ground below you is clear of debris so you do not damage the propeller. Don't get lost inside the airplane! Be sure to look out the window so you are certain that the parking brake is holding.
Before taking the active runway have a takeoff plan. Have you reviewed the emergency procedures? Do you know what heading, altitude, and airspeed you need? How about direction of flight? Reviewing these types of things on the ground will make the flight safer and more enjoyable.

1.2.11 Takeoff and Climb

Do you have a crosswind? Make sure that you apply the correct aileron correction for the current wind conditions. Maintain the wings level with the ailerons and the airplane on the runway centerline with the rudders. If the airplane is drifting left or right on takeoff while still on the ground, make sure that you correct with rudder and not aileron.
As you reach rotation speed, lift the nose to the takeoff attitude. When the nosewheel comes off the ground you will have to use more right rudder to stay straight. Maintain this attitude in the climb until reaching about 300' AGL. Then you can raise the flaps and lower the nose to a climb attitude.
Remember to adjust your climb attitude first, and then check the airspeed indicator to confirm that you are at the correct airspeed. Do not chase the airspeed indicator. Remember that the airplane takes time to accelerate and decelerate. If you maintain a constant pitch attitude, check the airspeed, then fine tune the attitude, you will get much better performance from the airplane and your passenger will be much happier!
Is the ball in the center and you wings level? Remember that the rudders are used to keep the airplane coordinated. They are not just for ground operations. You will find that the flight will be more comfortable and more efficient if you keep the airplane coordinated. If the airplane is slipping or skidding, then you are adding drag. With the cost of fuel today, it is prudent to maintain coordinated flight!

1.2.12 Cruise

Once level, you adjust the power for cruise. If you are using avgas, then it is prudent to cruise at or above 5000 RPM. This helps keep the engine warm and burn off the lead content.
Normally leave both fuel valves on. If necessary, maintain fuel balance by shutting off the fuel selector for the lower tank. Whenever you move a fuel lever, switch on the electric fuel pump and watch your fuel pressure. Once assured that all is well then you can turn off the fuel pump. Use a timer or some other means so you don't forget you are on just one fuel tank.
The airplane should be trimmed for hands off. Light control pressures are usually all that is needed the keep the airplane straight and level. There is no need to lean the engine since it is automatic.

1.2.13 Descent

Plan your descent so you do not have to pull the power all the way off. You don't want to shock cool the engine especially in cold weather.
Check your engine instruments and your fuel balance. Try to get everything done that you can before you get within five miles of your destination airport. Remember that this airplane has a glide ratio of approximately 12:1. Start early! Are you ready to land? Let's go!

1.2.14 Before Landing

It is important to be aware of the correct pitch attitudes as you transition from cruise to slow flight. As you get more proficient with the airplane, you will be able to anticipate the correct pitch attitude quickly refining it for present conditions.
Since the approach speed is slower than you might be used to, it becomes even more important to coordinate with the rudders. On final approach it is a good time to determine how much crosswind you have. It is good procedure that as you descend below approximately 200' AGL that you switch from a crab to a forward slip so that the longitudinal axis is parallel to the centerline of the runway throughout the landing and rollout.

1.2.15 Balked Landing

Attitude control is vital for a successful balked landing. There will be a tendency for the nose to rise since the trim was set for landing. Fly the airplane first, and then proceed with checklist items.

1.2.16 Landing

There is one rule for all tricycle gear airplanes - Land on the main wheels first! There is never a reason to land three point or on the nosewheel! You have a lot of pitch control throughout the landing roll even at slow speeds. Remember, the idea is to land in a consistent landing pitch attitude.
In a crosswind, the upwind main wheel touches first, then the other main gear, and then the nosewheel. It is important to keep in mind, that in any airplane, not just this one, that you continue to correct for the crosswind with increasing amounts of aileron deflection and maintain directional control with rudder.

1.2.17 After Landing

Be sure to turnoff the runway before activating any switches or doing the after landing checklist. It is better to slow down before turning off and not in the turn. This will prevent any possibility of putting excessive sidewise pressure on the landing gear. Do not taxi while performing the after landing checklist. It is best to stop. Remember, you are still "flying" until the aircraft is shut down and chocked.

1.2.18 Engine Shutdown and Securing

Cooling the engine is important and can be done on the taxi in. Make sure that you set the parking brake while you go through your shut down checklist.

1.2.19 Post Flight Check

It takes about a minute or two to cool the engine. Be sure to turn off all radios first before shutting down the engine. The engine shuts down immediately when the ignition switches are turned off. Be sure that the parking brake is set or the airplane is chocked. Once chocked, be sure to release the brakes.

1.3 Flight Maneuvers

There are four fundamental basic flight maneuvers upon which all flying tasks are based: straight-and level flight, turns, climbs, and descents. All controlled flight consists of either one, or a combination or more than one, of these basic maneuvers. If a student pilot is able to perform these maneuvers well, and the student's proficiency is based on accurate "feel" and control analysis rather than mechanical movements, the ability to perform any assigned maneuver will only be a matter of obtaining a clear visual and mental conception of it. The flight instructor must impart a good knowledge of these basic elements to the student, and must combine them and plan their practice so that perfect performance of each is instinctive without conscious effort. The importance of this to the success of flight training cannot be overemphasized. As the student progresses to more complex maneuvers, discounting any difficulties in visualizing the maneuvers, most student difficulties will be caused by a lack of training, practice, or understanding of the principles of one or more of these fundamentals. AFH

1.3.1 Straight and Level Flight

It is impossible to emphasize too strongly the necessity for forming correct habits in flying straight and level. All other flight maneuvers are in essence a deviation from this fundamental flight maneuver. Many flight instructors and students are prone to believe that perfection in straight-and-level flight will come of itself, but such is not the case. It is not uncommon to find a pilot whose basic flying ability consistently falls just short of minimum expected standards, and upon analyzing the reasons for the shortcomings to discover that the cause is the inability to fly straight and level properly.

The pitch attitude for level flight (constant altitude) is usually obtained by selecting some portion of the airplane's nose as a reference point, and then keeping that point in a fixed position relative to the horizon. Using the principles of attitude flying, that position should be cross-checked occasionally against the altimeter to determine whether or not the pitch attitude is correct. If altitude is being gained or lost, the pitch attitude should be readjusted in relation to the horizon and then the altimeter rechecked to determine if altitude is now being maintained. AFH

1.3.2 Turns

The ailerons bank the wings and so determine the rate of turn at any given airspeed. The elevator moves the nose of the airplane up or down in relation to the pilot, and perpendicular to the wings. Doing that, it both sets the pitch attitude in the turn and "pulls" the nose of the airplane around the turn. The throttle provides thrust, which may be used for airspeed to tighten the turn. The rudder offsets any yaw effects developed by the other controls. AFH

In all constant altitude, constant airspeed turns, it is necessary to increase the angle of attack of the wing when rolling into the turn by applying up elevator. This is required because part of the vertical lift has been diverted to horizontal lift. Thus, the total lift must be increased to compensate for this loss. To stop the turn, the wings are returned to level flight by the coordinated use of the ailerons and rudder applied in the opposite direction. AFH

Excellent coordination and timing of all the controls in turning requires much practice. It is essential that this coordination be developed, because it is the very basis of this fundamental flight maneuver. AFH

1.3.3 Climbs

When an airplane enters a climb, it changes its flight-path from level flight to an inclined plane or climb attitude. In a climb, weight no longer acts in a direction perpendicular to the flight path. It acts in a rearward direction. This causes an increase in total drag requiring an increase in thrust (power) to balance the forces. An airplane can only sustain a climb angle when there is sufficient thrust to offset increased drag; therefore, climb is limited by the thrust available. Like other maneuvers, climbs should be performed using outside visual references and flight instruments. It is important that the pilot know the engine power settings and pitch attitudes that will produce the following conditions of climb.

NORMAL CLIMB—Normal climb is performed at an airspeed recommended by the airplane manufacturer. Normal climb speed is generally somewhat higher than the airplane's best rate of climb. The additional airspeed provides better engine cooling, easier control, and better visibility over the nose. Normal climb is sometimes referred to as "cruise climb."

BEST RATE OF CLIMB—Best rate of climb (V_Y) is performed at an airspeed where the most excess power is available over that required for level flight. This condition of climb will produce the most gain in altitude in the least amount of time (maximum rate of climb in feet per minute). The best rate of climb made at full allowable power is a maximum climb. It must be fully understood that attempts to obtain more climb performance than the airplane is capable of by increasing pitch attitude will result in a decrease in the rate of altitude gain.

BEST ANGLE OF CLIMB—Best angle of climb (V_X) is performed at an airspeed that will produce the most altitude gain in a given distance. Best angle-of climb airspeed (V_X) is considerably lower than best rate of climb (V_Y), and is the airspeed where the most excess thrust is available over that required for level flight. The best angle of climb will result in a steeper climb path, although the airplane will take longer to reach the same altitude than it would at best rate of climb. The best angle of climb, therefore, is used in clearing obstacles after takeoff.

It should be noted that, as altitude increases, the speed for best angle of climb increases, and the speed for best rate of climb decreases. The point at which these two speeds meet is the absolute ceiling of the airplane.

A straight climb is entered by gently increasing pitch attitude to a predetermined level using back-elevator pressure, and simultaneously increasing engine power to the climb power setting. Due to an increase in downwash over the horizontal stabilizer as power is applied, the airplane's nose will tend to immediately begin to rise of its own accord to an attitude higher than that at which it would stabilize. The pilot must be prepared for this. As a climb is started, the airspeed will gradually diminish. This reduction in airspeed is gradual because of the initial momentum of the airplane. The thrust required to maintain straight-and-level flight at a given airspeed is not sufficient to maintain the same airspeed in a climb. Climbing flight requires more power than flying level because of the increased drag caused by gravity acting rearward. Therefore, power must be advanced to a higher power setting to offset the increased drag. The propeller effects at climb power are a primary factor. This is because airspeed is significantly slower than at cruising speed, and the airplane's angle of attack is significantly greater. Under these conditions, torque and asymmetrical loading of the propeller will cause the airplane to roll and yaw to the left. To counteract this, the right rudder must be used. AFH

1.3.4 Descents

To enter a glide, the pilot should close the throttle. A constant altitude should be held with backpressure on the elevator control until the airspeed decreases to the recommended glide speed. Due to a decrease in downwash over the horizontal stabilizer as power is reduced, the airplane's nose will tend to immediately begin to lower of its own accord to an attitude lower than that at which it would stabilize. The pilot must be prepared for this. To keep pitch attitude constant after a power change, the pilot must counteract the immediate trim change. If the pitch attitude is allowed to decrease during glide entry, excess speed will be carried into the glide and retard the attainment of the correct glide angle and airspeed. Speed should be allowed to dissipate before the pitch attitude is decreased. This point is particularly important in so-called clean airplanes as they are very slow to lose their speed and any slight deviation of the nose downwards results in an immediate increase in airspeed. Once the airspeed has dissipated to normal or best glide speed, the pitch attitude should be allowed to decrease to maintain that speed. This should be done with reference to the horizon. When the speed has stabilized, the airplane should be re-trimmed for "hands off" flight. When the approximate gliding pitch attitude is established, the airspeed indicator should be checked. If the airspeed is higher than the recommended speed, the pitch attitude is too low, and if the airspeed is less than recommended, the pitch attitude is too high; therefore, the pitch attitude should be readjusted accordingly referencing the horizon. After the adjustment has been made, the airplane should be re-trimmed so that it will maintain this attitude without the need to hold pressure on the elevator control. The principles of attitude flying require that the proper flight attitude be established using outside visual references first, then using the flight instruments as a secondary check. It is a good practice to always re-trim the airplane after each pitch adjustment.

A stabilized power-off descent at the best glide speed is often referred to as a normal glide. The flight instructor should demonstrate a normal glide, and direct the student pilot to memorize the airplane's angle and speed by visually checking the airplane's attitude with reference to the horizon, and noting the pitch of the sound made by the air passing over the structure, the pressure on the controls, and the feel of the airplane. Due to lack of experience, the beginning student may be unable to recognize slight variations of speed and angle of bank immediately by vision or by the pressure required on the controls. Hearing will probably be the indicator that will be the most easily used at first. The instructor should, therefore, be certain that the student understands that an increase in the pitch of sound denotes increasing speed, while a decrease in pitch denotes less speed. When such an indication is received, the student should consciously apply the other two means of perception so as to establish the proper relationship. The student pilot must use all three elements consciously until they become habits, and must be alert when attention is diverted from the attitude of the airplane and be responsive to any warning given by a variation in the feel of the airplane or controls, or by a change in the pitch of the sound. After a good comprehension of the normal glide is attained, the student pilot should be instructed in the differences in the results of normal and "abnormal" glides. Abnormal glides being those conducted at speeds other than the normal best glide speed. Pilots who do not acquire an understanding and appreciation of these differences will experience difficulties with accuracy landings, which are comparatively simple if the fundamentals of the glide are thoroughly understood. Too fast a glide during the approach for landing invariably results in floating over the ground for varying distances, or even overshooting, while too slow a glide causes undershooting, flat approaches, and hard touchdowns. A pilot without the ability to recognize a normal glide will not be able to judge where the airplane will go, or can be made to go, in an emergency. Whereas, in a normal glide, the *flight-path may be sighted to the spot on the ground on which the airplane will land. This cannot be done in any abnormal glide. AFH*

1.3.5 Stalls

14 CFR part 61 requires that a student pilot receive and log flight training in stalls and stall recoveries prior to solo flight. During this training, the flight instructor should emphasize that the direct cause of every stall is an excessive angle of attack. The student pilot should fully understand that there are a number of flight maneuvers, which may produce an increase in the wing's angle of attack, but the stall does not occur until the angle of attack becomes excessive. This "critical" angle of attack varies from 16 to 20° depending on the airplane design.
The flight instructor must emphasize that low speed is not necessary to produce a stall. The wing can be brought to an excessive angle of attack at any speed. High pitch attitude is not an absolute indication of proximity to a stall. Some airplanes are capable of vertical flight with a corresponding low angle of attack. Most airplanes are quite capable of stalling at a level or near level pitch attitude. The key to stall awareness is the pilot's ability to visualize the wing's angle of attack in any particular circumstance, and thereby be able to estimate his/her margin of safety above stall. This is a learned skill that must be acquired early in flight training and carried through the pilot's entire flying career. The pilot must understand and appreciate factors such as airspeed, pitch attitude, load factor, relative wind, power setting, and aircraft configuration in order to develop a reasonably accurate mental picture of the wing's angle of attack at any particular time. It is essential to flight safety that a pilot takes into consideration this visualization of the wing's angle of attack prior to entering any flight maneuver. AFH
These aircraft have normal stall characteristics. There are no surprises. You will get ample warning and, if coordinated, the airplane has little tendency to break to the left or right. There is little need to "push" the stick forward. Releasing the backpressure to reduce the angle of attack will get the airplane flying again. Prompt application of power will minimize altitude loss.
Remember, recovery from a stall is accomplished by reducing the angle of attack. Power is used to minimize altitude lost. One of the main purposes for practicing stalls is to prevent ground contact. This is why the stalls are named such as approach stalls. Energy management is paramount. Therefore, as you practice stalls note the altitude loss.

1.3.6 Slow Flight

Slow flight could be thought of, by some, as a speed that is less than cruise. In pilot training and testing, however, slow flight is broken down into two distinct elements: (1) the establishment, maintenance of, and maneuvering of the airplane at airspeeds and in configurations appropriate to takeoffs, climbs, descents, landing approaches and go-arounds, and, (2) maneuvering at the slowest airspeed at which the airplane is capable of maintaining controlled flight without indications of a stall—usually 3 to 5 knots above stalling speed. AFH
Maneuvering during slow flight demonstrates the flight characteristics and degree of controllability of an airplane at less than cruise speeds. The ability to determine the characteristic control responses at the lower airspeeds appropriate to takeoffs, departures, and landing approaches is a critical factor in stall awareness.
As airspeed decreases, control effectiveness decreases disproportionately. For instance, there may be a certain loss of effectiveness when the airspeed is reduced from 30 to 20 M.P.H. above the stalling speed, but there will normally be a much greater loss as the airspeed is further reduced to 10 M.P.H.

above stalling. The objective of maneuvering during slow flight is to develop the pilot's sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers that require slow airspeeds.
Maneuvering during slow flight should be performed using both instrument indications and outside visual reference. Slow flight should be practiced from straight glides, straight-and-level flight, and from medium banked gliding and level flight turns. Slow flight at approach speeds should include slowing the airplane smoothly and promptly from cruising to approach speeds without changes in altitude or heading, and determining and using appropriate power and trim settings. Slow flight at approach speed should also include configuration changes, such as landing gear and flaps, while maintaining heading and altitude. AFH

1.3.7 Flight at minimum controllable airspeed

This maneuver demonstrates the flight characteristics and degree of controllability of the airplane at its minimum flying speed. By definition, the term "flight at minimum controllable airspeed" means a speed at which any further increase in angle of attack or load factor, or reduction in power will cause an immediate stall. Instruction in flight at minimum controllable airspeed should be introduced at reduced power settings, with the airspeed sufficiently above the stall to permit maneuvering, but close enough to the stall to sense the characteristics of flight at very low airspeed—which are sloppy controls, ragged response to control inputs, and difficulty maintaining altitude. Maneuvering at minimum controllable airspeed should be performed using both instrument indications and outside visual reference. It is important that pilots form the habit of frequent reference to the flight instruments, especially the airspeed indicator, while flying at very low airspeeds. However, a "feel" for the airplane at very low airspeeds must be developed to avoid inadvertent stalls and to operate the airplane with precision.
To begin the maneuver, the throttle is gradually reduced from cruising position. While the airspeed is decreasing, the position of the nose in relation to the horizon should be noted and should be raised as necessary to maintain altitude.
When the airspeed reaches the maximum allowable for landing gear operation, the landing gear (if equipped with retractable gear) should be extended and all gear down checks performed. As the airspeed reaches the maximum allowable for flap operation, full flaps should be lowered and the pitch attitude adjusted to maintain altitude. Additional power will be required as the speed further decreases to maintain the airspeed just above a stall. As the speed decreases further, the pilot should note the feel of the flight controls, especially the elevator. The pilot should also note the sound of the airflow as it falls off in tone level.
As airspeed is reduced, the flight controls become less effective and the normal nose down tendency is reduced. The elevators become less responsive and coarse control movements become necessary to retain control of the airplane. The slipstream effect produces a strong yaw so the application of rudder is required to maintain coordinated flight. The secondary effect of applied rudder is to induce a roll, so aileron is required to keep the wings level. This can result in flying with crossed controls. During these changing flight conditions, it is important to retrim the airplane as often as necessary to compensate for changes in control pressures. If the airplane has been trimmed for cruising speed, heavy aft control pressure will be needed on the elevators, making precise control impossible. If too much speed is lost, or too little power is used, further backpressure on the elevator control may result in a loss of altitude or a stall. When the desired pitch attitude and minimum control airspeed have been established, it is

important to continually cross-check the attitude indicator, altimeter, and airspeed indicator, as well as outside references to ensure that accurate control is being maintained.

The pilot should understand that when flying more slowly than minimum drag speed (LD/MAX) the airplane will exhibit a characteristic known as "speed instability." If the airplane is disturbed by even the slightest turbulence, the airspeed will decrease. As airspeed decreases, the total drag also increases resulting in a further loss in airspeed. The total drag continues to rise and the speed continues to fall. Unless more power is applied and/or the nose is lowered, the speed will continue to decay right down to the stall. This is an extremely important factor in the performance of slow flight. The pilot must understand that, at speed less than minimum drag speed, the airspeed is unstable and will continue to decay if allowed to do so.

When the attitude, airspeed, and power have been stabilized in straight flight, turns should be practiced to determine the airplane's controllability characteristics at this minimum speed. During the turns, power and pitch attitude may need to be increased to maintain the airspeed and altitude. The objective is to acquaint the pilot with the lack of maneuverability at minimum speeds, the danger of incipient stalls, and the tendency of the airplane to stall as the bank is increased. A stall may also occur as a result of abrupt or rough control movements when flying at this critical airspeed.

Abruptly raising the flaps while at minimum controllable airspeed will result in lift suddenly being lost, causing the airplane to lose altitude or perhaps stall.

Once flight at minimum controllable airspeed is set up properly for level flight, a descent or climb at minimum controllable airspeed can be established by adjusting the power as necessary to establish the desired rate of descent or climb. The beginning pilot should note the increased yawing tendency at minimum control airspeed at high power settings with flaps fully extended. In some airplanes, an attempt to climb at such a slow airspeed may result in a loss of altitude, even with maximum power applied.

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During these changing flight conditions, it is important to re-trim the airplane as often as necessary to compensate for changes in control pressures. If the airplane has been trimmed for cruising speed, heavy aft control pressure will be needed on the elevators, making precise control impossible. If too much speed is lost, or too little power is used, further back pressure on the elevator control may result in a loss of altitude or a stall. When the desired pitch attitude and minimum control airspeed have been established, it is important to continually cross-check the attitude indicator, altimeter, and airspeed indicator, as well as outside references to ensure that accurate control is being maintained.

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The TECNAM line of airplanes performs extremely well at low speeds. Confidence in the low speed range should be practiced.

1.4 Performance Maneuver

1.4.1 Steep Turns

Steep turns are those resulting from a degree of bank (45° or more) at which the "over banking tendency" of an airplane overcomes stability, and the bank increases unless aileron is applied to prevent it. AFH

The visibility in this airplane is very good. This is a VFR maneuver! You will have greater success if you spend most of you time looking outside the aircraft checking the altimeter and the airspeed indicator as a check that you are holding the right amount of pitch. If you begin to descent, reduce the angle of bank first, then raise your pitch attitude them resume you steep bank.

1.5 Emergency Procedures

The emergency procedures are covered in the Aircraft Operating Instructions so they don't need to be gone over in this manual. Do remember that the airplane's systems are basic by design. Memorize the checklists in the POH. Preparation and practice will assist you in any emergency.

If you practice coordination and make it a regular habit there is little chance of entering into a spin. If, in the unlikely event, that you do enter a spin remember Throttle, Rudder, Stick! Reduce the throttle to idle, then check the direction of rotation and apply opposite rudder until rotation stops. Relax the control stick and rudder and recover from the stall. Smoothly apply back stick pressure and pull out of the dive without exceeding the redline airspeed.

Engine failures are very rare but they do occur. Anytime that you are flying you should be looking at available landing sites while enjoying the beautiful scenery. There is no reason to land anywhere else than on a runway while in the traffic pattern except on climb out where you may have to land straight ahead. Plan your traffic pattern so that no matter where you are, you can still make it to the runway and land safely. Don't fall prey to the common error of being low and slow with lots of drag on final.

Feedback Form

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