MSC Glider & Cockpit Familiarization During Pandemic

To All:

The primary goal of this document [**Checkout.PDF**] is to guide pilots through a review of the cockpit environment of the glider to be flown. **This document is a supplement to, and is not a replacement for, a thorough ground-training review (conducted by a Certificated Glider Flight Instructor) of all those topics required to act competently as Pilot In Command (PIC) of a glider**.

This document has four sections.

The first section encourages study and understanding of the glider and its operating limitations as described in the relevant Pilot Operating Handbook (POH) of the glider type to be flown. Knowledge of these limits **helps to prevent mental errors by the PIC.**

The second section provides a guide to cockpit orientation. Review of, and familiarity with, the cockpit and all of its controls and levers and handles and such **helps to prevent physical errors by the PIC.**

The third section is provided for pilots performing First Flight in a single seat glider. Single seaters are quicker in response to control inputs than are most two-seat gliders, and often present more complex cockpit environments and additional flight controls, as well as retractable gear and water ballast issues.

The fourth section provides a guide for the supervising CFIG and the First Flight Candidate to visualize and review all aspects of a successful First Flight.

Let's get started!

Section 1: Glider Worksheet / P.O.H. Review

Assembly and positive control check

What components of the glider should be lubricated before assembly?_____
Which wing - left wing or right wing - is mounted on the fuselage first when assembling?_____
Do the aileron controls connect automatically upon assembly? Yes/No.
If not automatically connected, how are the aileron controls connected?_____
How are they safetied?_____
Do the airbrakes connect automatically on assembly? Yes/No.
If not, how are they connected?_____ How are they safetied?_____
Do the flaps connect automatically on assembly? Yes/No.
If not, how are they connected?_____ How are they safetied?_____
How do the wings attach to the fuselage?_____ How are they safetied?_____
How does the horizontal stabilizer attach to the glider?_____ How is it safetied?_____
How does the elevator attach to the glider?_____ How is it safetied?_____
What type of towring (Schweizer, Tost) is recommended?_____
Do the water ballast wing fittings connect automatically to the fuselage? Yes/No.

Performance airspeeds

What is the stall speed?_____ What is the minimum sink airspeed?_____
What thermaling airspeed is recommended when circling with 30 degrees of bank?_____ (Hint: it's the wings-level minimum sink airspeed multiplied by 1.1)
What thermaling airspeed is recommended when thermaling with 45 degrees of bank?_____ (Hint: it's the wings-level minimum sink airspeed multiplied by 1.2)
What thermaling airspeed is recommended when thermaling with 60 degrees of bank?_____ (it's the wings-level minimum sink airspeed multiplied by 1.4)
What is the best L/D airspeed?_____ What is the L/D at this speed?_____
What is maneuvering speed?_____ What is rough air speed?_____
What is redline speed?_____ What is maximum permitted aerotow airspeed?_____
What is the maximum permitted airspeed for flap deployment?_____
What is the maximum permitted airspeed for airbrake deployment?_____
What is the optimum speed to fly when cruising through an airmass that is subsiding at 500 feet per minute?_____
What is the optimum speed to fly when cruising through an airmass that is subsiding at 1,000 feet per minute?_____
Imagine you will have a headwind, on final approach, of:
10 knots, gusting to 15. What airspeed should you fly?_____ Why?
15 knots, gusting to 22. What airspeed should you fly?_____ Why?
20 knots, gusting to 25. What airspeed should you fly?_____ Why?

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Load factors; weight and balance

What is the maximum permitted positive load factor?_____Gs.
What is the maximum permitted negative load factor?_____Gs.
What is the empty weight?_____
What is the maximum gross weight?_____
What is the minimum acceptable pilot weight (CG at aft limit)?_____
What is the maximum permitted pilot weight?_____
If removable ballast is to be installed for CG purposes, how does the pilot operating handbook recommend installing and securing ballast?_____
Does your body weight exceed the minimum acceptable pilot weight (CG near aft limit)? Yes/No. If so by how much?_____
Is your body weight less than the maximum acceptable pilot weight? Yes/No. If so by how much?_____

Control handles

Where is the tow release handle located?_____
What color is the tow release handle?_____
Where is the towhook located (bellyhook, nosehook, or in between)?_____
What color is the airbrake handle?_____
What type of locking mechanism is provided for the airbrake handle?_____
Where is the landing gear retract handle if equipped?_____
Does the landing gear retract handle placard show gear-up/gear-down positions?_____
Where is the wheelbrake operating handle?_____
Where is the seat back adjustment mechanism?_____
What type of lock is provided for the seat back adjustment mechanism?_____
Are the rudder pedals adjustable? Yes/No. If yes, how are the rudder pedals adjusted?_____
Where are the cockpit air vent controls?_____
Where is the elevator trim control handle?_____
Where is the canopy latch?_____
How is the canopy closed and locked before takeoff?_____
Where is the canopy emergency jettison handle?_____
What color is the canopy emergency jettison handle?_____
Where is the water ballast dump valve control?_____

Assembly & Positive Control Check (PCC)

Accident prevention

The assembly of gliders before flight introduces the possibility of incomplete assembly. This in turn raises the specter of serious accident, injury, or even death, should the glider take to the air without elevator control, aileron control, airbrake control, flap control, or other discontinuity. If you learn nothing else from this document, make sure that you learn the habit of careful assembly using the manufacturer's written checklist as your guide. Then, make sure you acquire the habit of performing a positive control check before flight! Proper assembly, followed by a positive control check, is your guarantee of control authority.

Assembly

Assemble the glider in accordance with the manufacturer's written assembly checklist as provided in P.O.H. Lubricate components properly and use appropriate tools. If mating surfaces are clean and lubricated, the glider will assemble without pounding or hammering. Handle components carefully. Do not apply pressure to any surfaces that are not designed for handling. Use particular care when handling fragile (and expensive) components such as the canopy or wing fairings.

Positive Control Check (P-C-C)

Performing a positive control check requires two people. One person operates from the cockpit, and moves control handles - stick for ailerons and elevator, pedals for the rudder, and handles for flaps and for airbrakes. The second person moves around the aircraft, placing hands on the appropriate controls, and checks that each control surface moves in the correct direction, against resistance applied, through its full range of motion. It is important to apply resistance as the positive control check is performed. Wiggling the stick and seeing the control surfaces move is not good enough! You must confirm that *each flight control responds to full travel control inputs in both directions against resistance applied on the control surface itself.* Applying resistance will check the integrity of each control circuit in tension and in compression - that is, whether the cockpit control is pulling or pushing on a control surface.

Critical Assembly Check (C-A-C)

The C-A-C concept is simple. Another pilot with experience in the type of glider that you want to fly will inspect your glider's flight-critical assemblies and connections and safeties *prior to your flight in the glider*. The purpose of the critical assembly check is to ensure that all critical assembly operations have been completed.

Section 2: In The Cockpit

An excellent way to prepare yourself for flight in the glider is to take a leisurely ten minutes or more and sit in the cockpit. It is best to do this somewhere away from the flight line, so that you will not be distracted by flight line events or hounded by well-meaning onlookers who will distract you from your mission of becoming comfortable in the cockpit and familiarizing yourself with the features of the glider.

Cockpit familiarization

Study of the pilot operating handbook has familiarized you with the location and function of all handles and controls. Remove any control locks or chocks from the exterior and interior of the glider. Time to climb in! If a parachute will be part of your equipment during your flight, make sure that you have one when you sit in the glider. Take your time and enjoy the feeling of excitement that always comes with the prospect of flying. Adjust the seat back control and rudder pedal adjustment so that you are comfortable. Ensure they are locked into position. Ensure that you are well forward in the cockpit. This ensures that you can easily reach the full forward control stick position and also helps a bit to place the CG of the occupied glider more forward. Forward CG position generally enhances the pitch stability of the glider, and stability is what you want in your first flights.

Seating position

Make sure that your line of vision over the nose is adequate. **Make sure also that it is possible to move the control stick to the full forward position without straining. And, assure that you can comfortably reach the towrope release handle.**

Belts and harnesses

Buckle the seat belt and shoulder harness and tighten until they are comfortably snug. Note the difference in feel and position of the parachute harness buckles, contrasted with the seat belt and shoulder harness buckles. In the highly unlikely event you should ever decide to bail out of a glider, it's nice to know when you exit that you have unbuckled yourself from the *glider*, not from your *parachute!*

Canopy

When you are familiar with the belts and harnesses, close the canopy. Do you have adequate headroom? If not, exit the glider and rearrange the seat as necessary. When you are satisfied about headroom, latch the canopy and familiarize yourself with the latch handle. You want to be sure that the canopy is closed and *locked* each time you fly the glider.

Primary flight controls

Familiarize yourself with the feel of the flight controls. Move the control stick around and discover the limits of motion of the stick. Adjust the rudder pedals until comfortable, making sure that you can reach full rudder deflection without difficulty. Assure that the rudder pedal cluster is **locked in the desired position**.

Elevator trim handle

Adjust the elevator trim so that the trim handle is in the center of its range of travel. Does the glider have an elevator trim tab? If so, does the trim tab move easily through its entire range of motion? Is the trim control simply a spring-tensioning device that applies pressure to the elevator to trim the glider? Generally, trim tab-equipped gliders tend to have trimmers that are more powerful in effect than spring-tension trimmers. Whichever type your glider has, you need to know how to move the trim handle and where to set the trim handle in preparation for takeoff. Consult your pilot operating handbook and your glider flight instructor for more information.

Airbrake handle

Operate the airbrakes. Pay particular attention to the type of locking mechanism fitted to prevent the airbrakes from opening inadvertently. The locking mechanism may be a friction type of lock, an over-the-center type of lock, or a rotation of the airbrake operating lever with subsequent engagement of a detente for the airbrake handle or shaft. Whatever the mechanism, make sure when you close the airbrakes that you also know how to *lock* the airbrakes to prevent inadvertent deployment, such as might occur during aerotow in rough air.

Flap handle

If the glider has flaps, operate the flap handle through its entire range. Discover the recommended flap setting for thermaling and for landing approach. Make sure you know how to lock flaps in the various positions required, including zero flap setting for takeoff. Further, make sure that you are so familiar with the airbrake handle and the flap handle that you will never confuse the two. This is important because many gliders have an airbrake handle and a flap handle which look and feel roughly similar, but which have substantially different aerodynamic effect on the lift and the drag produced by the wings. Confusing the flap handle and the airbrake handle during approach to landing could result in an incident or accident.

Tow release handle

The tow release should be very easy for you to reach and operate. Make sure that you know where it is and that you can reach it quickly and easily even when the belts and harness are snug and the canopy is closed and locked. Do not

confuse the tow release handle with the rudder pedal adjustment handle. On many European gliders these handles are similar in size and shape. You may someday need to pull the tow release handle in an emergency situation or to abort a takeoff roll. Practice reaching and pulling the tow release handle until you can quickly find it and pull it.

Landing gear handle (if retractable gear is installed)

The landing gear position should be clearly marked and easy to read as you sit in the cockpit. You need to know how to confirm that the landing gear is down and *locked* before landing. **Do NOT cycle the landing gear while still on the ground!**

Cockpit review

Check to **see if you can you easily reach all of the following items** and move them through their full range of travel:

- ◆ Stick full forward and full aft
- ◆ Stick full left and full right
- ◆ Airbrakes full open and closed and locked
- ◆ Flaps full down, full up, and locked
- ◆ Elevator trim full forward to full aft
- ◆ Canopy closed and latched and opened again
- ◆ Towrope release handle
- ◆ Seat back adjustment set and locked
- ◆ Rudder pedal adjustment handle and rudder pedal cluster.

The Instrument Panel

Airspeed indicator

Familiarize yourself with the airspeed indicator. Note the position of the indicator needle associated with stall airspeed and with your selected pattern airspeed. Note also the indicator needle position for maneuvering speed and rough air speed. Note the indicator needle position for redline airspeed.

Altimeter

Check the altimeter operation. Dial in the current altimeter setting and see if the altimeter indicates field elevation (or close to it). Can you reach the altimeter to set it even with the seat belt and shoulder harness fastened?

Variometer

Take a look at the variometer. There may be more than one variometer installed. If so, ask a pilot with experience in the glider to tell you which one is easiest to use.

If there is lift on the day you fly your first flights, thermaling will give you some extra time to discover the "feel" of the glider and familiarize yourself with it before you fly your first pattern and landing in the new type. But don't worry too much about this - you can assure yourself of some familiarization flight time by the simple expedient of taking a fairly high altitude aerotow on your first flight, which will give you lots of time to feel out the glider even in the absence of useable lift.

Yaw string

Make sure a yaw string is taped into position.

Compass

Note the location of the compass. It should be easy to read. The compass is most reliable when the aircraft is in a wings-level glide and airspeed is constant.

Radio

If the glider is radio equipped and you would like to be able to use the radio during your early flights, familiarize yourself with the operation of the radio including the microphone, speaker, tuning, volume, frequency, and power supply. But a note of warning: **Your primary obligation during flight is to FLY THE GLIDER!** Do not let radio operation distract you from flying the glider safely and well.

Section 3: For Single Seat Glider 'First Flight'

Single seat gliders are a little different in feel and control from two seat gliders. Let's look at some of the reasons why this is true, so that you won't have any unpleasant surprises during your initial flights.

Single seat gliders contrasted with two seat gliders

Two seat gliders are usually pretty big. They have more structure, more mass, and often larger wingspans than single seat gliders have. Because of these differences two seaters are a bit sluggish in control response when contrasted with their smaller, lighter single seat cousins. Think of the two seat glider as a family sedan automobile, and think of the single seat glider as a sports car, and you will have a pretty good idea what to expect during your early flights. Let's take a closer look.

Mass, inertia, and momentum

The empty weight of a two seat glider is at least six hundred pounds. Some two seaters have an empty weight of more than half a ton! That's a lot of glider. All that mass has inertia, when it is at rest, and momentum, when it is in motion. It takes the towplane longer to reach flying speed when launching a two seater than

it does with most single seat gliders because the two seat glider is heavier - sometimes many hundreds of pounds heavier - than the single seat glider. So, as the takeoff roll begins, you will probably notice that the acceleration of the single seat glider is quicker than you would experience when flying a two seat glider. Kind of like a sports car: quicker off the line than a sedan usually is. Most everything happens a little quicker when launching a single seat glider because the single seater has less inertia for the towplane to overcome. The increased acceleration means that it will take fewer seconds, other things being equal, for the single seat glider to reach flying speed and lift off. Expect it; don't be surprised by it; just fly the glider.

Control response

Once airborne, expect the single seat glider to be very responsive to control pressures. Single seat gliders respond quickly to control inputs because they have less mass, and therefore less inertia, than two seat gliders. In fact it is easy to over-control a single seat glider, just as it is easy for the sedan driver to over-control a nimble sports car. How do we deal with this? Anticipate that the single seat glider will be more responsive to control inputs when in flight, and adjust your motion of the flight controls (particularly the stick/elevator combination) accordingly.

Size

So far we have concentrated on the difference in mass that distinguishes two seaters from single seaters. But what about the difference in size? Well, the single seat glider is usually smaller than the two seater. Shorter, more slender wings and a shorter fuselage length make for quicker roll control and quicker pitch response once flying airspeed is attained. On the other hand, modern single seat racing gliders are generally designed to exhibit optimum performance at comparatively high airspeeds, and in these gliders you may find that roll control is rather poor until considerable speed has been gained in the takeoff run. This is because high performance single seat gliders have rather small ailerons when compared to most two seat gliders. Take a look and see for yourself. Kind of dinky little ailerons, aren't they? So don't be too surprised if it takes a few seconds of acceleration before the ailerons really begin to deliver good control authority.

Aerodynamic damping

The single seat glider is usually much shorter in fuselage length than two seat gliders. Other things being equal, this means that the single seat glider responds more quickly in pitch. It possesses less aerodynamic damping than larger gliders possess. Accordingly, most single seat gliders require only slight changes in control pressure on the stick/elevator to accomplish considerable change in pitch attitude.

It is highly desirable to keep fore and aft stick motions quite small during your transition to single seat gliders. Concentrate on applying slight *pressure* on the stick, rather than making gross control *motions* fore and aft with the stick. The single seat glider responds rather like a sports car to control inputs. Make the inputs only as large as is necessary to get the response you seek.

Section 4: Making A Successful First Flight

You have already reviewed the cockpit environment with the assistance of the duty instructor. The next step is for you to visualize this upcoming flight and then explain it to him/her, checking and reinforcing your plan to fly solo with necessary input from the duty instructor.

So, let's begin. Take several minutes to visualize this flight from the moment you stand beside the cockpit until you stop rolling after landing. The details that follow are the highlights of the flight that can guide this mindful, solo flight and you might have additions. This list is just a starting point. Of course, be prepared to describe it to the duty instructor before you go.

Airport Situation: IMSAFE. Observes towplane operation, activity of airplanes, wind and common pattern.

Ground Handling: Observes extent and quality of help, surface winds and turf condition.

Takeoff Checklist: Reads and executes the takeoff checklist. Ensures that there are no gaps between decision points in the emergency plan.

Radio Communications to Takeoff: Sets CTAF on the radio screen with appropriate volume and squelch. Calls the tow plane to announce intent, and direction of the tow. Hears the towpilot's response to affirm communication.

Takeoff: Uses radio if self-launching and sets the ailerons to lift the low wing. Signals the wing runner to level wings and initiate the ground roll. Levels wings and aligns behind the towplane. Positions the left hand for an emergency release, and announces to self each emergency decision point.

Tow Release: Clears the tow plane to the left. Clears the glider to the right, releases and sees the tow rope spring away, then executes the turn to the right. Calls tow pilot with "Piper five-seven-niner" on radio immediately after release to confirm being off tow. Maintains awareness of the towplane's position. Monitors CTAF for local traffic.

Turns: Clear all turns. Practices steep banked turns. Monitors CTAF for traffic.

Stalls: Executes a stall noting each of six signs of a stall. Monitors CTAF for traffic.

Radio Communication to Land: Advises local traffic on CTAF of intent to enter the 45 and turn to base. Monitors CTAF for traffic.

Pattern: Accomplishes traffic spacing. Completes appropriate landing checklist. Maintains good angles and altitude and adjusts for any crosswind. Selects appropriate target airspeed for windy / gusty / turbulent conditions.

Landing: Adjusts for crosswind. Selects a distant point to see for a smooth and timely roundout and touchdown. Touches down smoothly with longitudinal axis aligned with the desired landing path, and stops within 200 feet of a designated point.

Instructor's Discretion: Abnormal Occurrences on Takeoff, Boxing the Wake, Slack line Recovery, Off Field Landing, Abnormal Occurrences at the airport, Slip to Landing.
