

HOW AND WHERE TO FLY THE ANSALDO S.V.A. 5

By FSAviator

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FLYING THE SVA 9

Navigation

The SVA 5 was navigated solely by height keeping above terrain and following line features shown on tourist maps. Rare crossings of the Adriatic sea in poor visibility required a small hand held compass. During overland sorties seek and follow easily recognisable line features on your tourist map of Italy. Pocket watches and pocket compasses were issued to Italian aircrew, not attached to single seat Italian aeroplanes. The aircraft has no means to de ice. Cloud must be avoided. Do not attempt to navigate above cloud in single seat aircraft during WW1. Remain below cloud and in sight of the surface at all times. Delay sorties until this is possible. Abort your sortie rather than fly in or above cloud Obtaining detailed Alpine mesh for use in MSFS is more or less essential to simulate SVA 5 operations.

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Instruments

The SVA 5 had no spirit level and no inclinometer. It was not expected to enter cloud. It also had no ASI. Unusually this aircraft has an altimeter fitted to facilitate photo recce mapping sorties (see below). Each Army HQ had a couple of altimeters which were installed in aircraft only if a sortie really required one. They were self contained units clipped to the panel if required. The other gauges (always fitted) are an oil pressure gauge, a radiator (coolant) temperature gauge, a tachometer and a fuel manometer. There are no trim controls. The starter magneto was hand wound.

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Throttle

The very low revving SPA 6A engine was exceptionally reliable even when running for long periods at full throttle and close to max RPM. It also offered exceptionally low fuel consumption, again probably due to its very low RPM limit. After the SVA 3 was rejected for production as a fighter in the summer of 1917 the redesigned SVA 4 and SVA 5 single seat reconnaissance aircraft relied on full throttle continuous operation to avoid interception. During simulation of SVA 5 operations it is therefore essential that your joystick throttle is correctly calibrated and free from 'jitter' when fully advanced. If necessary recalibrate your throttle before attempting to fly the SVA 5. On hot days full throttle continuous operation may boil the coolant. If necessary retard throttle to keep coolant below 100C.

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RPM limits

During descent do not exceed 1700 RPM. Steep dives with throttle applied may damage the engine. Transient exceedence of 1700 RPM in combat is acceptable, but do not exceed 1850 RPM during combat. Oil pressure may fall too low during prolonged flight below 800 RPM. In flight sustain sufficient RPM to prevent oil pressure collapse below 5 Kg/Cm². During ground handling (see below) apply sufficient RPM to sustain 5 Kg/Cm² oil pressure unless you need to close the throttle fully for deceleration. Do *not* idle the engine with less than 5 Kg/Cm². Both rigging states are designed to allow hands off throttle closed descent without RPM risk at either end of the RPM range.

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Mixture

The real SPA 6A engine required manual mixture adjustment. Unless you have experience of adjusting mixture in real aircraft I recommend that you nevertheless select auto mixture ON in the realism screen. If you decide to adjust mixture manually the only gauge that will assist the process is the tachometer; coolant temperature response is too slow. In real life these aircraft were usually operated with over rich mixture to maximise evaporative cooling.

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Torque

In the real aeroplane torque roll and p factor were countered by the lower wing dihedral and offset upper wing gravity tank. The pilot chose how much fuel to hand pump into the roll trim tank(s). This is not very practical in MSFS and I have placed fuel at CoG so you will not need to hand pump fuel for roll trimming. Post war versions of the SVA 5 had twin gravity tanks, possibly to cater for roll trimming with a variety of engines. These are present in all the FD, but not in the WW1 MDLs. Max fuel did not alter. Since I have done most of the roll trimming for you I encourage you to fly the SVA 5 with torque and p factor set to max in the realism screen. Correct yaw *gently* with rudder.

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Ground handling

This aircraft has no brakes. Hold the stick aft to dig the skid into the surface to slow down. Fish tail left and right with the rudder to scrape the skid (several feet in each direction) across the surface at low speed for maximum braking. During the landing roll on very short fields use a curved rolling path ending parallel to the upwind boundary. To turn tightly at low speed first create propwash by setting 800 RPM then deflect the rudder fully into the propwash whilst holding the stick forward or neutral to unload the skid. The aircraft will 'rudder round' whilst creeping forward very slowly. On a soft surface it will turn tightly. Remember the rudder will be ineffective with inadequate propwash. If you need to turn to avoid an obstacle during the landing roll or at low IAS you may need to create 800 RPM of propwash to generate an adequate turn rate. This aircraft does not belong on hard surfaces. If you need to follow a line feature whilst on the ground in an SVA 5 place it at the edge of forward view from the VC and follow it as above. If you really must use runways and taxiways they should be tracked in this fashion. Practice tight ground turns and general ground handling before flight. The radiator is sufficiently cooled by propwash at low rpm that overheating on the ground is not a problem. You must avoid low oil pressure.

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Rigging

Such aircraft were trimmed by their rigger to match the sortie requirements, sortie by sortie. I have supplied two rigging states. The first is for trans Alpine propaganda operations via the Brenner Pass and for Photo Recce sorties of all kinds. Alpine trim is also used by both varieties of SVA 9 trainer, (see far below). Piave front rigging instead delivers very high speed cruising at low level. Select the correct rigging state for the sortie you intend to fly. All cruise above ultra low level is RPM trimmed (see below).

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Take Off

Runways are irrelevant. This aircraft takes off into wind or down slope. Avoid ploughed land and standing crops. It should be operated directly from open fields on the MSFS mesh situated close to either Bolzano or Venice. Pick a nice Villa located on a line feature and commandeer it for your HQ. Operate from the grounds of the villa. Apply full throttle and full forward stick. After the tail comes fully up relax forward pressure, wait three seconds and then gently rotate. Once airborne apply just enough back pressure to sustain level flight until required back pressure is zero. This takes much longer with Piave front (low level tactical recce) rigging. Since this aircraft has no brakes you can easily take off from any field you manage to land in. Try not to aim at the highest tree. Weave the nose before take off and line up with a gap in any trees

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Climb

All climb is at full throttle in either rigging state. Normal climb is hands off (unless in turbulence) even in the Piave rigging state when climb rate is very low. Alpine front rigging delivers much higher rates of hands off climb. In either rigging state rate of climb may be augmented by back pressure, but this is not normally required except for height keeping during low level recce sorties. Alpine rigging delivers full throttle cruise

above 3000M QNH in ISA conditions. Piave front rigging delivers very fast full throttle cruising at low level in ISA conditions. The risk of interception is much higher over the Piave front.

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Structural failure

The Warren truss around which this aircraft was designed is exceptionally strong. Terminal velocity is less than V_{ne} and to achieve terminal velocity you must over rev the engine to its governor limit. Massively over engineered and probably safe to over 10G positive the only risk is application of substantial negative G at very high IAS, or severe turbulence. Within a simulator you may wish to practice terminal velocity dives as no Albatros with puny sesquiplane wings can withstand the IAS you can sustain, but in real life this ruined the engine. It should last long enough to get you back to base. Leave enough altitude to recover!

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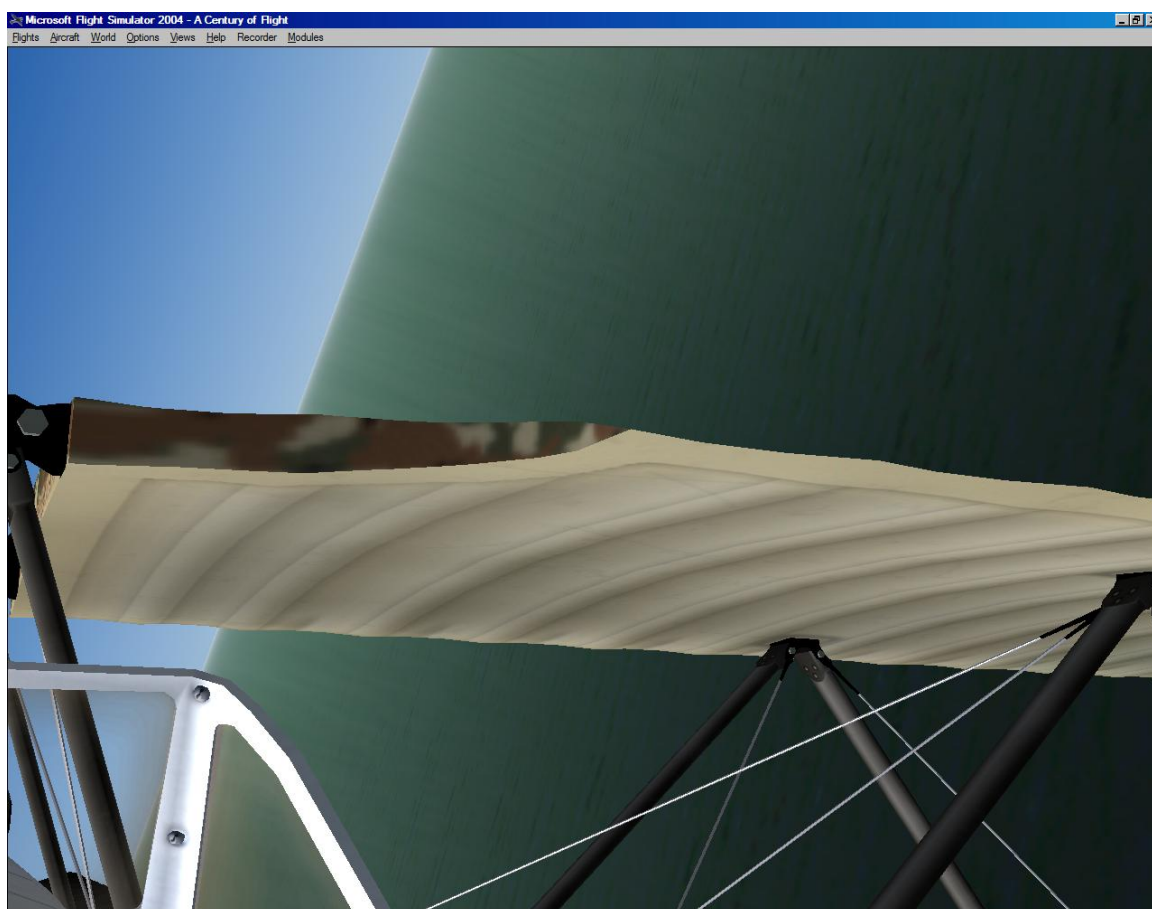
LEVEL TURNS IN WW1 AIRCRAFT

Flying WW1 aircraft is all about developing head up flying skills using parallax relationships from the VC. You must learn to control energy state without gauges. 2D panels are redundant in WW1 aircraft and any gauges present gauges play no part in energy state control. In WW1 aircraft, during normal turns, use of rudder to balance, or even lead, the turn is essential to generate adequate turn rates. The rudder is powerful, especially when subjected to substantial propwash. If you use a twist grip stick to control rudder you may need to apply a larger null zone in the twist/rudder axis to avoid inadvertant application of rudder when rolling. This aircraft has no slip ball. You must sense whether additional rudder is useful by observing rate of turn achieved. In the SVA 5 we normally have full throttle applied for cruise. To fly normal level turns we pitch the (lower inside the turn) top screw of the windshield onto the horizon.



We must use parallax to control our pitch so that we sustain level flight whilst turning. The top windscreen screw is tracked round the horizon to sustain level flight (at any angle of bank). We also use parallax to control bank angle. When the top windscreen screw is on the horizon and the outer edge of the upper wing cut out is also on the horizon we have 35 degrees of bank. We intend to impose and sustain both parallax relationships in a single 'picture' simultaneously. We can sustain a high velocity (high energy state) in that turn state, yet we can acquire targets with an angle off of around 70 degrees out at the edge of our Field of

View (FoV) whilst looking diagonally. With 35 degrees of bank we lose the target as it passes behind the upper wing, but we re-acquire it long before it approaches the boresight. The 'target' may be our landing strip or an enemy position. Practice normal (35 degree bank) turns with substantial rudder applied in both directions. Practice with the windshield frame at the edge of your field of view looking diagonally down from the VC; The 'picture' is a carefully planned pair of parallax relationships. Practice using a hat switch to place the windscreen frame at the edge of FoV rapidly; so that your parallax cue is always visible. The roll into the turn and use upper wing parallax to control bank. Practice turning continuously with 35 degrees of bank, varying rate of turn (and slip) with rudder, noting the effect of rudder.. Practice in both directions. Practice at 100 metres over the Laguna until you are confident that gauges are irrelevant and that head up flight does not require them. A VC simulation control interface is required to allow head up flight. We can of course move our field of view around as we level turn, returning our eyeline every so often to check the two parallax cues. When we need to turn hard at low level to avoid a ground fire threat, or reverse into a second strafing attack, we again use parallax to control energy state. Roll the top screw onto the horizon and bank until the frame almost parallels the horizon. The nose will be above the horizon.



With that parallax picture we achieve your max sustainable turn rate. With full throttle we will sustain better than 65 KIAS and will not sink. If you have difficulty holding the top screw up to track the horizon you are pulling to the wrong side of the drag curve and losing turn rate. Practice max sustained hard turns with nil sink, first at 500M in the cruise, and later practice doing this over the Venice Laguna at 100M to gain confidence in your ability to turn hard continuously at low level keeping IAS and VSI under control using only head up parallax cues. Don't over tighten the turn. Over tightened turns squander turn rate. Sustain the required parallax relationship. Do not turn hard unless you need to. Energy state is harder to control in a tight turn and is reduced. Notice that we acquire targets with much less offset in hard turns and re-acquire them under the top wing later. Now notice that when we use parallax to control pitch we must use objects close to the boresight. With any bank the top windscreen screw will be on the horizon to sustain a level turn. The upper wing cut out horizon intersection varies with roll state. We cannot use it to sustain level turns. It is too far off the boresight. We use wing parallax to control roll state after using the windscreen upper screw to control pitch state. Then we maximise yaw rate with rudder. If we roll beyond 35 degrees we bleed energy quickly and controlling the level turn by keeping the top screw on the horizon demands more and more skill as bank increases beyond 35 degrees. Whilst maintaining situational awareness over enemy territory we do not want to be doing things that demand skillful flying. Modest (but adequate) bank angles and early target / threat acquisition are the correct solution. Develop the confidence to operate the SVA5 via its parallax cues at low level. When flying tactical recce aircraft it is essential to learn how to generate high and / or very high

level turn rates safely at low level without sinking or slipping and without using gauges. The SVA 5 is stronger than you are. You will black out or red out before you break it. You can stall it with gross mishandling, but unless you hold the aeroplane in a wings level stall the outcome is benign at any G load (you cannot apply much G). Since you have no ASI I have made the stall characteristics easier than real life. It will be easy enough to crash on approach if you mishandle. Prolonged unaccelerated stall may cause complete loss of control. If that happens remember you need propwash to augment rudder authority at low IAS.

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Low Level Flying

In Piave trim the SVA 5 is very easy to fly down roads or railway lines below tree top height, but pick supply routes with no telegraph poles to practice your low flying!. Very slight forward pressure at full throttle will sustain level flight at locomotive cab height. Learning the skill of very low level flight is essential. You must present a sudden and fleeting target to enemy ground forces unmasking yourself from behind the local terrain and obstructions only for short intervals as you pass by and note what the enemy has in plain view or has attempted to conceal. Train behind your own lines before attempting sorties behind enemy lines. Learn to use what little fleeting cover may be available from trees and buildings. Maximum density autogen helps us to understand the relevant concepts.

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Cruise (RPM) Trimming

If you intend to cruise above ultra low level for any reason you should select Alpine front rigging before flight or suffer continuous fatigue as you fight the rigging. When flying with Alpine front rigging if you need to sustain an altitude below 4000 metres, to avoid cloud or to maintain contact with the line feature you are following, reduce to 1400 RPM. Watch the nose of the radiator settle. Micro adjust RPM until the point where the gravity fuel pipe enters the engine is just below the infinite horizon. Level flight will ensue. Level flight is not the same thing as zero pitch flight. Level flight means flight without variation of altitude. The pitch required varies with weight and profile drag. However on the Alpine front it is more usual to height keep (hands off) varying throttle to stay below cloud and in sight of the line feature you are following or seeking during pioneer era navigation using a tourist map. Never attempt navigation other than to a line feature or along a line feature. If the weather is perfect allow Alpine trimmed aircraft to self seek 4000M (or more) allowing full throttle cruising whilst following the line feature. Even at this altitude you should be able to outrun an Albatros.

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Endurance and Range

You start with 540 pounds of AVGAS, about three times as much as a typical single seat fighter. During a low level sortie over the Piave front your fuel burn will average around 90 PPH and your dry tank endurance is 6 hours at an average of over 120 KTAS delivering a dry tanks nil wind range of around 720 miles, but range is irrelevant during low level sorties. You will never progress beyond the foothills of the Tyrol. Roam, identify, make notes and sketch what you see. After no more than two hours navigating at low level it is time to head for the Adriatic coast and the Laguna. Many tactical recce sorties were tasked for much shorter duration. The extended range of the SVA 5 was most relevant to infrequent, but much publicised, propaganda sorties which were always flown in low drag Alpine trim at 3000 metres or more. With Alpine rigging mean high level fuel consumption will barely exceed 60 PPH and dry tanks endurance is almost 9 hours. During sorties with Alpine rigging we cruise at lower IAS to extend both endurance and range. Dry tanks nil wind range theoretically exceeds a thousand miles with Alpine rigging. Of course real life is never like that and we must battle a headwind in one direction on such sorties and we must always follow the railway lines or we will quickly become lost. In a straight line it is only 50 miles from Bolzano to Innsbruck and another 220 miles onward to Vienna, but always following the railway lines the round trip is nearer 650 miles and will take around six hours nil wind, and perhaps more than seven in real weather. Do not attempt these long range propaganda sorties until you have experience of both tactical and photo recce sorties in the SVA 5. Spend lots of time learning to intercept and follow line features before attempting long range pioneer navigation. If you use GPS you might as well make all these flights in the default Cessna 182.

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The SVA 5 and its combat use

A handful of SVA 5s reached front line units in May 1918 rising to about 75 at the cease fire which happened earlier on the Southern Front than on the Western Front. By 10th December 1918, two months after the Austrian surrender, Ansaldo had delivered 547 single seat SVAs from the SVA 1 to the SVA 6. It is unlikely that more than 350 of all six types reached the Army during the war. SVA 5 deliveries to the Army are unlikely to have exceeded two hundred. Some were lost in accidents, some were held in reserve, and others

were issued directly to training units far from the front line, one of which was near Milan at what would much later become Malpensa airport. Fifty more SVA 5s served as seaplanes with the Italian Navy, of which 48 had been delivered by 10th December 1918. About a third were held in reserve at any one time. The water rudders seem to have been too small and the view ahead was criticised. They were exceptionally difficult to manoeuvre on the water. Take off run was also criticised as longer than the Sopwith Baby they replaced and again this must have been due to poor float design. The Navy evidently disliked them for those reasons despite their exceptional performance once airborne. The original floats were replaced by the type which Ansaldo had been making under licence from Sopwith, but there was no repeat order from the Italian Navy; or anyone else. Unless you attempt a reconnaissance sortie to the Pula naval base in preparation for an army heavy bombing raid you may consider the Adriatic and southern Slovenia to be a Navy problem. You are directly attached to an Army HQ. The Piave River is the river that enters the Adriatic Sea just north of Venice. Its source is the lake south east of Cortina and about 60 miles north of Venice. During the short 20 week combat career of the SVA 5 in Italy the Austrian Army were being pushed back north eastwards from just west of the Piave River towards the Tyrol. Assume you have been assigned to fly one of the earliest SVA 5s in late May 1918. Treat the front line as following the Piave River and base yourself near Venice. There was little fighting in the high Alps, but some SVA 5s were based near Bolzano south of the Brenner Pass which they used to enter Austria for infrequent propaganda operations. The vast majority of SVA 5 operations were short range low level sorties over what are now the low lying parts of north east Italy.

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Low level Tactical Recce

During tactical reconnaissance sorties behind the Piave front fly at very low level. Below tree level is best. Practice following railway lines below tree level. You must turn yourself into a very fleeting target. Search wooded areas from just above treetop height. As fuel burns off trickle reduce RPM to stay low and hands off. You need both hands to write notes and and sketch what you observe. As you approach the Tyrol apply extra RPM if required for height keeping above mildly rising terrain, but do not attempt to penetrate the Alps. No Albatros can keep up with you below 500 Metres full throttle cruising with Piave rigging. Do not attempt photography. You are too vulnerable to ground fire to overfly positions of high interest. Fly close enough to roads to determine which transports are loaded and which are empty. Make notes or oblique sketches of enemy positions and movements only. These sorties are flown only behind the Piave front. Ideally you wish to fly along every road and railway in the coastal plain during a single sortie noting what is moving on each supply route and in what direction. Make special reports of artillery and any refugees. Any new defensive positions should be sketched and marked on your map. If enemy ground fire is light sketch the position from 500M. Large areas of woodland must be inspected at very low level for hidden troop concentrations, artillery batteries, or new supply depots. The safest way to enter the Austrian rear area is to fly offshore until east of the Piave. Turn north to locate, follow and document traffic on the main supply routes along the coast until reaching the north - south supply routes up through Udine to Carnia. Avoid the flak zones around Gorizia and Trieste. Turn north towards the high ground and roam the coastal plain inland from the coastal routes noting Austrian dispositions. Roam around the area behind the Piave up to the Tyrol and the Slovenian border at low level following the supply routes. Do not overfly major towns. Avoid the Austrian fighter base at Campo Formido. Use a tourist map and learn to recognise every airfield, landmark, and line feature in this low lying coastal plain across which your HQ will soon advance to victory. Skirt around all major airfields, but report activity if possible. Avoid the major enemy fighter concentration at Aviano altogether. After your sortie either return to the coast well east of the Piave, or if you decide to cross the front line always cross the Piave river at right angles and ultra low level to minimise exposure to Austrian Flak. Do not fly along the river below 4000M. Never cross near a bridge. There is always Albatros CAP over the bridges and the Flak is concentrated there. Cross the front only mid way between bridges and then intercept roads you intend to follow beyond where they cross the river. If you become lost behind enemy lines just fly away from the high ground to the Adriatic coast and follow the coast to the Venice Laguna whilst low over the Adriatic. You have a pocket compass, but it is used only during long range sorties across the Adriatic during which you may be out of sight of land. Practice locating the Laguna from your Venice HQ by visual navigation (which should be very easy) and practice finding the villa which houses your HQ visually, starting from the Laguna, before doing anything else with the SVA 5. Locate the line feature your HQ villa near Venice is situated on and follow the line feature to the villa. Downloading superior landclass and detailed mesh for the Friuli Venezia Giulia regions is highly recommended. GPS should be irrelevant. Just look at a tourist map and over the side of the VC. Practice looking where you are going and compare what you see from the VC to a simple tourist map, instead of relying on modern gauges.

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Tyrolean Tactical Recce

These missions depart the Venice area and proceed into (but not across) the high Tyrol near Villach. They cannot be flown in bad weather. They must be flown with Piave rigging. Climb over the sea until near Grado south of Udine then track up the north south highway and railway to Carnia at low level. Subject to fighter opposition in the Tolmezzo / Carnia area observe traffic movements in that area closely and then as closely as possible observe movements on the road and railway from Carnia to Villach in Austria. Document all traffic on the main supply routes in that key valley as you slowly climb eastbound into the Tyrol. Once defeated by cloud or rising terrain turn back and head for the coast at low level. Then recover to Venice over the sea. Do not risk your report of the Tyrol MSR traffic by further delay behind enemy lines. These sorties should always be flown with real or highly variable weather over accurate mesh. Remaining in close contact with the main supply routes into Italy from Villach is very demanding, especially in MSFS since the MSRs tend to wander over mountains. Concentrate on following the valley floor those supply routes should really be following at sufficiently low level to monitor the type of traffic moving in the valley. Do not allow yourself to become trapped within the valley but penetrate as far towards Villach as you can. This sortie demonstrates the limited utility of aircraft in the Alps and Tyrol. They were very restricted by weather and terrain.

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Propaganda raids into Austria and Germany

Never attempt to enter Austria other than via the Brenner Pass. Follow the road through the Brenner Pass visually. The road runs just east of the modern Bolzano airfield. Always achieve 1000M QNH over Bolzano before setting course for the Brenner Pass. Circle inside the valley to gain height before setting course for the Pass. Until you are experienced at Alpine flying do not attempt the Brenner Pass with a cloud base below 4000M. Once through the Brenner Pass continue towards, and identify, Innsbruck. Unless Innsbruck is your propaganda target do not overfly the city. Intercept and follow the Austrian rail network east or west of the city and simply follow the railway lines to your propaganda target using a tourist map whether your target is in Austria (Vienna) or Germany (Freidrichshafen).

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Propaganda raids into Greater Austria

SVA 5 photo recce sorties were flown at high level over the cities of the Austrian provinces of Slovenia and Croatia. The pictures were then published in Italy to demonstrate the capability to bomb those cities. You may wish to take photos from 4000 metres over Trieste, Ljubljana and Zagreb. Use Alpine rigging. From your base near Venice follow the coast to Trieste and then follow roads or railway lines to your propaganda target at high level as usual. The real pilots probably used a tourist map to navigate too.

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Photo Recce - Strategic Mapping

Strategic photo reconnaissance should be undertaken at exactly 4000M QNH and this aircraft has an altimeter solely for that purpose. All PR sorties are flown with Alpine rigging even though they depart the Venice region. You must RPM trim. You will need both hands to operate a manually inserted and extracted glass plate camera without exposing the plates to ambient light in the process. Fly the length of the Piave River at 4000M. Depart from the grounds of any Villa being used by your HQ near Venice. You must climb to 4000M well south and west of the Piave but keeping it in sight. Climbing northwestbound from Venice you cannot fail to see the lake which is the source of the Piave and the starting point for your PR mission. Arrive over the Piave front at the Cortina alpine end over the lake already at 4000M, else you will be very vulnerable to Austrian Flak batteries as you follow the Piave from the lake to the sea. Retreat south west over Italy if threatened by Austrian fighters at the same or higher level. Identify Aviano and constantly monitor for Austrian fighters climbing out of Aviano. Do not attempt to follow every bend of the river, but try to pass directly over each bridge at right angles. Once over the northern end of the lake, heading for the southern end, stick your head over the left hand side the cockpit (CTRL+SHIFT+BACKSPACE) then look down. Stick your head far enough out to see the wing attachment brackets. You must manoeuvre the aircraft as a camera platform so that each bridge passes through the wing attachment gap at right angles. Now locate where the river exits the lake and follow it to the coast. These sorties should always be flown with real weather, including winds aloft to impose variable crosswinds. Carefully track the lower wing cut out over each bridge on the Piave. In between each bridge come head up and update your situational awareness of enemy air activity which will have become critically low. Using any single seat aircraft for PR sorties was not sensible, but SVA 5s were sometimes allocated the task because they could outrun Austrian fighters which might succeed in engaging two seaters. In between bridges monitor altitude and if necessary trim with RPM to sustain 4000M throughout the strategic mapping sortie. These PR sorties are the shortest sorties. On reaching the Adriatic coast check for Austrian fighters below and then begin descent towards the Laguna. From the Laguna locate your HQ Villa, on its line feature, as above. PR sorties against the main Austrian naval base on the coast of the Austrian province of Slovenia may also be attempted. Climb south until you are west abeam Pula and continue climb across the Adriatic to cross Pula at 4000M. If the visibility is low you may need your pocket compass. Flying this sortie in low visibility increases your chances of survival which are otherwise low. Austrian fighter opposition may be encountered over the Pula naval base. Do not attempt to approach Pula down the coast from the north. You will be tracked and Austrian fighters will be waiting above your altitude over Pula. If Austrian fighters are seen at or above your level as you approach from the sea, retreat. If no fighters are seen over Pula descend to 1500M, RPM trim, and photograph the naval base from that altitude. This gives you some chance of surviving the Flak barrage.

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The Approach and Landing - Head out approach

This is the only thing that is difficult about learning to operate an SVA 5, and you may find it very difficult if you are not used to controlling attitude and sink rate with stick and throttle. This is more likely to kill or maim you than enemy action, but of course that was true for any WW1 aeroplane and any WW1 pilot. The view ahead is poor. If you stick your face out of the cockpit on the starboard side your goggles will soon oil up and be covered in soot from the six exhaust stacks. The approach and landing are flown with your head in the same position as was necessary to line up targets during photo recce sorties. Lean out and round the side of the windscreen (CTRL+SHIFT+BACKSPACE), until your eyeline is outside the Vickers gun, and in line with the wing cut out. Now use your hat switch to ensure that the left side of the RPM gauge is in plain view. All circuits will be left hand circuits. This procedure is very unpleasant in rain, as you are sticking your face into almost hurricane force profile drag early in the approach. It was however normal procedure in many flapless aircraft, which could only approach nose up, and in which the pilot was forced to sit far aft of CoG to balance a very heavy cast iron water cooled engine. You must learn to control sink rate without a VSI, and to reduce IAS without an ASI, and without stalling! Once again we do this using parallax. We align parts of the aeroplane with the horizon or the touchdown point. Without an ASI or VSI we use power and attitude to control both IAS and sink rate. The rigging state has no relevance. The first step is to set 1000 RPM approaching the landing field into wind from a diagonal or curved left base with the touchdown zone in sight. Now we use back pressure to raise the Vickers and place its muzzle on the horizon. This delivers level flight at 60 to 70 KIAS. When we reduce RPM below 1000 we sink. When we raise the muzzle of the Vickers above the horizon with 1000 RPM applied we decelerate instead. Too high and we stall. If we set 800 RPM instead of 1000 and pull the muzzle of the Vickers just above the horizon we obtain around 55 KIAS and a modest rate of sink. That is how we fly most of the approach from circuit pattern height down to the final approach. We just judge whether we are under or overshooting our touchdown zone. If we are too low we add RPM to hold the glidepath. If we are too high we must *not* reduce RPM. We are using parallax and minimum RPM to avoid stall. If we are too high we must induce sideslip to add drag by exposing the keel area. We may need to induce large slip angles to lose height quickly. During any sideslip we must hold the muzzle of the Vickers just above the horizon and we must apply 800 RPM to avoid stall, just as though we were not slipping to cause sink. We must vary sink rate with slip, not IAS. We can apply opposite bank and rudder to sideslip down the approach, but we must sustain the same pitch state as during an approach with no slip. Unaccelerated stall is 39 KIAS, but landing speed is higher. The three point landing attitude is not the stalling attitude. This is all about controlling attitude. For most of the approach we control and sustain our pitch target using the muzzle of the Vickers and the visible horizon. Provided we do that we can control our IAS target without an ASI, and our sink rate target, without a VSI, using only RPM and slip. Late in the approach we must transition to a different frame of reference. Look at the bracing wires. Three are visible. Transfer your attention from where the Vickers muzzle is versus the horizon to where the touchdown point is versus the two upper bracing wires. With (at least) 800 RPM applied use back pressure to place the touchdown point mid way between them and left of the belt feed chute. We are 'framing the picture'. This new picture is applied only late in the final approach and it increases pitch a little further. If you allow RPM to reduce below 800 whilst framing the picture you risk IAS decay to stall and you will compromise rudder authority due to propwash. As IAS reduces the rudder is increasingly dependent on propwash for its control authority. Do *not* attempt to lose altitude by diving nose down during an approach to land in flapless aircraft. You must control your energy state by sustaining the target pitch whilst controlling sink with RPM and slip. If you fail to sustain your target pitch you will stall or you will float. Neither is an attribute of the aeroplane; both are simply pilot error. I have made the stall much less vicious than real life, but you will suffer high sink rates if you stall.



The picture depicts the correct eyepoint and eyeline for descent from pattern altitude. The wing cut out is visible, RPM is visible and 800. Vickers muzzle is just above the horizon. Energy state is under control and we can be sure the aircraft is sinking nicely at around 55 KIAS, even though we have no ASI or VSI.

If you find landing WW1 aircraft difficult at first approach a big modern tarmac runway with VASIs to help learn the procedure. If you 'frame the picture' correctly and are at 800 RPM you will be more or less in the landing attitude at a little more than landing IAS. At the last moment yaw and roll off any applied sideslip and just let the aircraft meet the ground. If you did it right it won't bounce and you won't smash the tailskid. Over time finesse this by flaring slightly just before touchdown. However if you flare vigorously you will slam the skid into the ground. Remove all power once you are down. Stick full aft. See fish tailing and ground handling section above. To 'return' your eyepoint inside the cockpit after landing use CTRL+SHIFT+RETURN. With practice, even in nil wind, an 800 foot pasture with no slope will be plenty big enough. Of course we should use real weather and we should land into wind or up slope so that we need much less than 800 feet of pasture. Don't try to land over trees. Landing between gaps in trees is OK. Aim just right of the left hand tree. For your operating base pick a pasture or meadow with a fairly unobstructed approach and a modest slope. Land up hill if possible, but don't land downwind. Turn to parallel the upwind boundary and fish tail to a stop if the meadow is small. After landing always go to chase plane view to see if you smashed the skid and wrote off the rudder. Make sure you know what it looks like before it is broken. Practice landing in lots of different meadows in the mesh until you never think twice about landing in small sloping pastures/meadows without an ASI or a VSI. Flying other aeroplanes head up will be a lot easier forever after and you will discover a world full of new airfields offering interesting challenges. Remember to take off down hill unless that is downwind! If you avoid the temptation to employ inhuman video game zoom factors, impossible eyepoints and other childish cheat modes, the Ansaldo SVA package will deliver a worthwhile appreciation of how flying was before the cockpit became cluttered with gauges and when the forward view from single engined aeroplanes with tractor mounted screws was seriously compromised in real life.

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Combat and History

Flying against Austria the SVA 5 must avoid air to air combat using its superior speed. The Vickers gun is for strafing soft targets of opportunity that you take by surprise far behind the lines. Since it is synchronised, and the reliable SPA engine is very low revving, even at full throttle, the Vickers has a particularly poor rate of fire in the SVA 5. An Albatros will fire five rounds for every two you manage to fire. Some SVA 5s were fitted with spring loaded clamps for a pair of 10Kg bombs outside either side of the cockpit for use during emergency CAS sorties. They must be unclipped, armed, and then hand thrown at four different targets, whilst you fly hands off at very low level in a hail of small arms and machine gun fire. They are far too small to be combat effective hand thrown singly in this way. Using SVA 5s in this way was a waste of trained pilots and it was mercifully rare. A few SVA 5s were fitted with a single clamp on either side of the cockpit holding a 25Kg bomb. These could be released simultaneously from high level by formations of SVA 5s onto a single distant (very large) propaganda target.

The Flight over Vienna was an epic action performed by Italian poet and nationalist patriot Gabriele D'Annunzio on 9th August 1918. With 11 Ansaldo S.V.A. (10 S.V.A.-5 + 1 two seater S.V.A.-9) from his team, the 87a squadriglia (squadron) called "La Serenissima", D'Annunzio and his mates flew more than 620 miles, almost 500 over enemy territory, in a roundtrip to Vienna to drop some thousands of propaganda leaflets. The action was planned the year before but technical problems, such as the fuel capacity of the planes, delayed it. The first trial was attempted on the 2nd August 1918, but the aircraft returned due to heavy fog. The second trial, on 8th August 1918, was cancelled due to strong wind, while the last one, on 9th August, was successful. They flew over Vienna and dropped 50,000 leaflets on a three-colored card (Green-White-Red, colors of the Italian flag). They were written by D'Annunzio himself and were untranslated in German. One read in part, "On the wind of victory that is rising from the rivers of liberty, we only came for the joy of the exploit and in order to demonstrate what we can dare and do when we want, at the time that we choose." It was, in a sense, D'Annunzio's way of saying "Nah nah, nah naah, nah!" to the all-but-defeated Austrians. It also proved once more, of course, that the pen is mightier than the sword. They also dropped 350,000 leaflets of another type invoking the abandon of the alliance between Austria-Hungary and "Prussia". These were instead translated in German.

SVA long range propaganda flights were only made against targets on railway lines that could be followed all the way to the target. To carry out long range bombing missions use the payload menu to increase payload from 165lbs to 277lbs (including 2 x 25Kg bombs). The extra payload should be removed again after reaching the target. If you visit Vienna you should carry only leaflets. However most SVA 5 combat sorties during WW1 were low level tactical recce sorties by solo aircraft roaming behind the Piave front. They monitored and slightly disrupted Austrian troop and supply movements as Austrian forces fell into disarray during the last months of the war. The main supply routes are the line features that you use to navigate. The things you need to note, and the soft targets you may wish to attack are moving along those line features. Italy had hundreds of multi crew aircraft in the front line that were better suited to high/medium altitude photo recce and bombing, but the extreme straight line speed of the SVA 5 made it very suitable for fast deep low level tactical recce sorties to places the two seaters struggled to reach without being intercepted and shot down. Only a few SVA 5s were shot down in air to air combat and as far as I can tell only one victory was credited to an SVA 5 during WW1. The Austrian aircraft shot down was identified as an Aviatik D.I which had intercepted the SVA, though just about every Austrian aeroplane was incorrectly reported as an Aviatik at the time.

The SVA 5 was not deployed to the Macedonian Front. It is possible that most SVA 5 combat sorties were flown after WW1 and elsewhere; especially by Poland against the Ukraine and the Soviet Union, by Georgia against the Soviet Union, perhaps by Latvia against the Soviet Union, by the Soviet Air Force against most republics of the new Soviet Empire, and of course by Italy against 'insurgents' right across their African Empire until the late twenties. Take the SVA5 to Eritrea and Ethiopia and explore the highlands in Alpine rigging. When you deploy to Libya employ Piave rigging. use real wether to experience power loss due to high temperatures. Although not used as a fighter by Italy an SVA 5 was the first aeroplane to obtain an air to air kill in the Americas. Predictably it was against a two seat SVA 9. That was during the Paraguayan Civil War when ex Argentine and Brazilian SVAs were flown by mercenaries from Europe for both sides. Alpine rigging is required for Paraguayan civil war simulation. A S.V.A.-5, piloted by Gold Medal Antonio Locatelli, flew alone across the Andes. On 2nd June 1919 He started off from Buenos Aires in order to reach Valparaiso flying across the "Cordillera", but a strong hurrrycane stopped the trial. He made a second attempt on 30th July and, after a severe flight at a FL 215 (21500ft, without oxigen, -35C) at an average speed of 200Km/h, he landed at Vina del Mar, near Valparaiso.

Italian SVA 5s pioneered several air mail routes within Italy the first of which seems to have been Rome - Pisa - Genoa. Air mail flights in SVA 5s just followed the roads or railways with a different payload. These air mail flights were also rigged with an approximation of Alpine rigging.

Thanks to the strong determination of the pilots, two S.V.A.-9s (the two seater version of the S.V.A.-5) flew from Rome to Tokyo.

Arturo Ferrarin enlisted in the Royal Italian Army air service in 1916 and served with distinction as a fighter pilot during the First World War. Restless after the Armistice, he and Guido Masiero (also a veteran), with, respectively, Gino Cappannini e Roberto Maretti as flight engineers, satisfied their lust for adventure by

embarking on an incredible 18000 km aerial odyssey from Rome to Tokyo in 1920. Both pilots and their crewmen started off from Centocelle's Airport (Rome) on 14th February in two war-vintage planes, only partially revised, they were equipped only with engine instruments (tachometer, water thermometer, oil pressure and a fuel level indicator). They had no navigation instruments and the ONLY magnetic compass was a souvenir "picked" by Ferrarin from a Sopwith Camel in Netherland. The navigation charts were from a...schoolbook. Masiero's weather-beaten aircraft gave up the ghost in China, and he had to complete the trek in a substitute plane. But Ferrarin endured all the way to Japan, where he arrived on 31st May after 112 flight hours at the average speed of 160Km/h. More than 200,000 Japanese greeted the flyers when they reached their destination, and Emperor Yoshihito ordered forty two days of festivities to properly celebrate the Italian achievement. Continually showered with gifts and praise, the young aviators were the guests of honor at countless banquets and receptions. Even the Japanese Empress wished to speak with them, and they were granted an audience at the Imperial Palace, an honor bestowed on very few Japanese and even fewer foreigners. However, their feat did not cause much of a sensation at home. Preoccupied with economic troubles and social unrest, few in post-war Italy seemed to appreciate what the flyers had done, and their return home went practically unnoticed.

Rome - Tokyo steps:

Rome - Gioia del Colle - Valona (Avlona, Albania) - Thessaloniki - Smirne (Izmir, Turkey) - Adalia - Aleppo - Baghdad - Bassorah - Bushir - Bandar Abbas - Ciaubar - Karachi - Delhi - Allahabad - Calcutta - Rangoon - Bangkok - Hanoi - Macau - Canton - Foochow - Shanghai - Tzingtao - Tientsin - Peking - Seoul - Osaka - Tokyo.

In the end the SVA 5's greatest claim to fame is probably that it was the first aeroplane that was faster than a motor cycle. Until an SVA 5 with a more powerful post war and specially tuned engine captured the world speed record no aeroplane could keep up with a really powerful motor cycle. It was an SVA 5 that created the need for a world land speed record and established the superior speed of the aeroplane over surface transport.

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Flying the SVA 9

The SVA 9 is simply the two seat advanced trainer version of the SVA 5. An extra cockpit for an instructor was inserted at CoG so that trim was not disturbed by the presence or absence of an occupant. Fuel tankage was reduced so that max gross was still 2320 lbs. Consequently performance and handling of the two seater hardly differed from flying an SVA 5 single seater with bombs (see above). Some SVA 5s were retroconverted to SVA 9 trainer configuration, but most SVA 9s were built as such. Many SVA 5s were unarmed and issued directly to training establishments with students flying the SVA 5 after going solo on the SVA 9. Since the two seaters had no Vickers gun, during the approach, the panel line which allows your fitter side access to the engine is aligned with the horizon instead. Fly the SVA 9 from the rear cockpit as the front cockpit of the VC has no gauges and the parallax cues are different. The instructor in the front had a hard time telling whether the student in the back seat was performing well. Some SVA 9s were used as basic trainers. These had the 1917 version of the SPA 6 rated at 150hp but actually producing about 165hp in all out flight at low level. These can be simulated by adding a power scalar (see supplied aircraft.cfg). Naturally they have much worse performance and require larger fields, but they were used mostly to teach near runway operations and low level pioneer visual reference navigation methods. You will be trimmed for low level full throttle cruising flight in the basic trainer version, (even though it has Alpine rigging), and of course full throttle will deliver fewer RPM when flying the basic trainer. Everything else is the same. Both varieties of SVA 9 were used by commercial flying training schools in Italy and South America, probably until WW2. Some also passed into private ownership. A few of the advanced trainers were used by private owners based in the United States until the early thirties.

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This exceptional freeware Ansaldo package offers an excellent opportunity to learn the skills of pioneer era flying from basic trainers to the fastest combat aircraft to see service in WW1.