QUICK GUIDE – CONTROLLING VFR

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1. Introduction

This is a quick guide for airborne VFR operations in Norway on VATSIM, mainly for ATC, however pilots might benefit from it too so feel free to have a read through. The content is based on the EASA and BSL regulations and, with those in mind, what the writer thinks is best practice for increasing efficiency and reducing workload while maintaining safety. The document is designed to be easy to read and understand. **This is a guide, not a regulation**, it might not include all rules out there. See page 15 through 17 for a list of phraseology examples only. Remember, phraseology does not cover 100% of all situations, sometimes you must resort to common English. Always strive for correct, concise, and easy to understand instructions.

If you find errors or want to point out a technique you think is an as good or better alternative to any listed here, please create a post in the Norway subforum <u>here</u>. Phraseology examples in this document are based on those listed in BSL G 5-1, available at <u>Lovdata</u> (collection of online legal resources).

Before reading on, make sure you are up to speed on the following:

- Airspace classifications and what that in practice means for us as ATC, aka which aircraft we need to separate and which we do not in any given class. Norway utilizes classes C, D, and G, plus A in ENOB airspace only. *For details see <u>SkyBrany</u>.*
- Standard separation: In virtually all situations in Norway this means surveillance-based separation requiring 5NM between aircraft, or 3NM within ENBR and ENGM CTR/TMA, or at least 1000ft between aircraft.
- Wake turbulence separation: This is <u>NOT</u> the same as standard separation. We
 must ensure wake separation between aircraft in all applicable departure
 situations, and between IFR arrivals on instrument approaches. VFR arrivals
 and IFR visual approaches allow pilot responsibility. Wake separation is
 normally greater than standard separation, but in all cases <u>the greater of the
 two will apply.</u>

Touch and go / stop & go / low approach always counts as an intermediate departure!

For details see <u>SkyBrary</u>.



2. Visual Flight Rules – VFR

Visual Flight Rules means exactly what it says on the tin; The laws and regulations concerning the flight is based on what you can see out the window, not instruments. While ATC on VATSIM normally is far more used to IFR where we are responsible for keeping aircraft apart from each other, terrain, and airspaces they should stay out of, and pilots monitor this using their instruments, VFR flights are solely responsible for all of that, and for staying clear of terrain, clouds, and traffic they only use their eyes out the window.

Therefore, make sure you do not overcontrol your VFRs. Instructions like "Report in sight" and "maintain visual separation" is unnecessary and/or wrong in **most** VFR situations, because it is the core principle of their flight rules! We **do not** require a given number of miles or feet between VFR aircraft ^{(or VFR and IFR in class D),} any distance perceived safe by both pilots is a good distance, whether it is a few hundred meters or several miles. Our job is to provide **traffic information** to pilots **as soon as it is relevant**, so that they can make well informed decisions and are not surprised by any other airplane. On a radar scope, a safe distance can still look very sketchy to the ATC but viewed out a window it is immediately apparent that the situation is completely safe.

The exception to the above paragraph mostly concerns aircraft crossing the overhead or extended centreline, or being sequenced in for arrival behind aircraft NOT in the pattern (typically instead on an ILS or similar), because these situations usually involves a bit more risk and therefore some more micromanagement.

VFR Charts: As I hope everyone knows, AIP contains charts showing the CTR/TIZ and geographical features for all ATS-provided airports in Norway. Note that VFR routes and reporting points are <u>ATC tools</u>, and/or as routes for pilots to use in case of <u>radio failure</u>. There is no reason for ATC to strictly adhere to these points and routes at all times, they are great tools for when the CTR is busy, but when it is quiet it is better to clear VFR flights in cardinal directions or on own navigation to requested points or destinations.

Similarly, if the CTR is Class D, offer the pilot VFR at the CTR top level and below. Norwegian control zones offer plenty of challenging terrain, keeping your pilots low



for no good reason has no benefit beyond ensuring they have fewer options in a flameout situation. In Class C CTRs (ENVA), keep aircraft 500ft below the max CTR altitude unless you coordinate with APP, as IFR aircraft not on the instrument approach could be flying at 500ft above the CTR without coordination, requiring 1000ft separation from VFR in the CTR.

Radar: While TWR is not a radar position, it is a fact of life for VATSIM ATC that our only tool is a radar scope with a few cheats (like the omnipotent ground view) to substitute looking out a window, unless you are able to invest in a virtual tower setup with multiple monitors. Tower view is now fairly easy to set up for anyone with XP11/FSX/P3D/MSFS2020 but requires more than just a couple of monitors in order to be an *effective* tool. Therefore, let us quickly review some radar terminology and understand how to use them:

Identification: Is literally knowing what aircraft the blip on the screen is. It does not matter if it has a squawk, a Mode-C readout, or is just a primary return, if you know for a fact that a blip is a certain aircraft, it is identified. Identification must be carried out in an approved method, oversimplified in <u>this article</u>.

Validation: Is simply to check that an aircraft sets the correct transponder code and is mostly relevant for departing aircraft or aircraft entering from uncontrolled airspace (in the latter, usually coincides with using squawk for identification).

Verification: Is to check that the transponder's Mode-C (altitude readout) is working correctly. This is why radar controllers want to know the altitude of departing aircraft, and if you as a tower controller want to use the Mode-C readout for traffic information, you too should verify the transponder through a request for the pilot to report their altitude. If the Mode-C readout is different from the pilot's reported altitude by more than +/-30ft, it cannot be trusted. On VATSIM, though, failed transponders are not a thing. If the readout is wrong, it is because the pilot is not on the correct QNH, or on the correct QNH for the METAR but not using real weather so it is wrong for his own weather.



3. The pattern and sequencing

The pattern consists of upwind/departure, crosswind, downwind, base, and final. It is designed to give pilots a standard structure to follow when departing and/or arriving while maintaining visual contact with the field and in most of the pattern keep the runway within gliding distance in case of a flameout. In addition, it provides a reference frame for managing the arrival sequence and calling out and spotting traffic.

As an ATCO on VATSIM, you will often find pilots who have no idea how to fly a pattern. It is okay to PM them with a friendly tone and tell them they will be able to find great short guides/pictures/crib sheets explaining how to perform a correct pattern by web searching <aircraft type> pattern". It is not flown five miles out way beyond gliding distance, nor is it flown so close that it is not possible to turn onto final with two standard turns with a short straight base leg in the middle. Nor is it flown at cruise speed.

When an aircraft is cleared for a portion of the pattern, you will do well to assume it will continue sequentially to the next leg without asking, even in situations where you would say the clearance was only valid for that particular leg. It does not help you being technically right when your C172 just made a 737 go around because you did lazy controlling. If you ever find yourself saying *"I told you to…"* on the frequency, you have probably **dropped the ball**. Good ATC requires proactive controlling and "readback hearback", which means that a large proportion of pilot mistakes can been avoided if ATC is doing the job right. Even if ATC is completely in the clear, yelling at a pilot's mistake is a complete waste of time, fix the issue and keep controlling the traffic!

For ATC, the greatest benefit of the pattern is allowing to sequence arriving aircraft. While VFR flights often means less responsibilities and worries for us, we still need to control the arrival sequence to the airport. The way to do this is to point out to pilots who goes in front of them, so that they can follow them in while being responsible for appropriate distancing.



A few examples...

Aircraft arriving as number two:

"LNABC, number two, follow the Cherokee on left base, report final Runway 35"

Or;

"LNABC, number two, follow the Skyhawk ahead on downwind, report final Runway 35".

Aircraft arriving as number one:

"LNABC, number one, make straight in approach Runway 35"

Or;

"LNABC, cleared to enter controlled airspace, 2000ft or below VFR, join right base Runway 35, report final"

Or;

"LNABC, join right downwind Runway 35, report final"

Sequencing pattern traffic behind aircraft not in the pattern:

"LNABC, number two, follow the 737 on 3 mile final, <u>caution wake turbulence</u>, report final Runway 35"

Or;

"LNABC, number two, follow the A320 on 6 mile final, orbit right as required/make one right hand orbit, <u>caution wake turbulence</u>, report final <i>Runway 35"

(Use caution orbiting aircraft if you have multiple aircraft in the pattern!)

Sequencing arriving VFR not in the pattern:

"LNABC, join left downwind Runway 35 as number two, follow the Skyhawk on left crosswind, report final"

Or;

"LNABC, number two, follow Cherokee on left base Runway 35, report final." Or;

"LNABC, join left downwind Runway 35 as number three, follow the King Air shortly turning left base, report final"



3.1. Busy patterns with IFR Integration

This is a situation where it is easy to go wrong. Aircraft flying patterns have the lowest priority of any aircraft flying. If they are training and decide to do so at a busy commercial airport instead of flying to a suitable smaller field, they **must** expect delays, sometimes severe delays. VFR flights **not** training but flying A to B, or A to A via somewhere, technically has the same priority as IFR A to B, commercial or not, but we still prefer to delay light GA aircraft to airliners for the simple reason of the needs of the many, as well as making controlling much easier.

The main issue is with circuiters is fitting a light touch and go between medium or heavy departures, as we **must** <u>ensure at least 180 seconds</u> (3 minutes) between a medium/heavy rotating followed by a <u>light</u> touch and go rotating for wake turbulence separation. Any runway movement that ends in a planned climb-out needs the same wake separation as if it were an intermediate departure, because we cannot guarantee where rotation occurs. As the IFR departures on ground are higher priority than the circuiters, we orbit the circuiters on downwind or send them to charted VFR points to hold. Alternately we can offer them full stop and taxi-back to integrate in the departure sequence. If you are proactive and the pilots are competent, you can normally fit two orbiting aircraft on each downwind leg, one at the end and one at the beginning. If you are late in your decision making or doubt the pilots, send one of them to a VFR point to hold instead. **Remember traffic information!**

Light aircraft landing does of course not need wake separation from a departing aircraft and are much easier to integrate between bigger IFR departures, keep this in mind when setting up your pattern. If a light aircraft inbound for <u>full stop</u> goes around or balks his landing, we issue a "caution wake turbulence, preceding departure is a 737" and if traffic permits, an early left or right turn to crosswind to get out of the wake path: "... make early left turn to join left downwind runway X" Examples for delaying pattern aircraft, ENBR used as example airport:

"LNABC, orbit right at the end of the downwind leg until advised, due to multiple departures"



Second aircraft arrives:

"LNDEF, you are number two, join left downwind and orbit at the start of the downwind leg until advised, number one is orbiting at the end of the downwind leg, additional traffic is multiple departures runway 35" Note the lack of "follow", as that is not appropriate in this situation

Remember to give departing aircraft:

"SAS123, traffic information Cherokee orbiting on the start of the left downwind leg, wind 330 at 5, runway 35 cleared for take-off"

Information about the aircraft orbiting at the end is normally not required, as he will be well behind SAS before rotation.

If the second pilot is an arrival while the first wants a touch and go, you can always change the order:

"LNABC, route to and hold at Haganes" then "LNDEF, now number one, report final runway 35, traffic information Skyhawk ahead routing to Haganes"

Gauging the correct timing of a touch and go behind a departing heavier wake category can be difficult, and you will not get it right 100% of the time. One good tip is to use altitude for timing, competent pilots will not descend with more than 1000ft/m in the pattern, so an aircraft at 1000ft AGL will use at least one minute until on ground, allowing us to tell him to "join final" once 120 seconds has passed. If it ended up tighter than expected and you now think or know you will bust wake separation, there are two ways out:

- Change the landing to a full stop, or
- issue a go-around preferably with a safe early turn.

Example:

"LNABC, go around, I say again, go around, caution wake turbulence from preceding departing 737, make early left turn, join left downwind runway 35"



If you have no arrivals to affect, but think you are not going to make the required wake separation:

"LNABC, make a full stop landing due to wake turbulence, runway 35 cleared to land, hold on the runway", then when the pilot is stopped: "LNABC, are you happy to depart from present position?"

If yes:

"LNABC, runway 35 cleared for take-off, join left downwind runway 35" If not, or if you want to use the runway for something else, tell the pilot to vacate either when giving the landing clearance or after landing. They can of course then taxi back to depart if they want.

Lastly, remember to provide inbound and outbound IFR aircraft with appropriate traffic information! Any aircraft operating within short distance from an IFR flight will require traffic information calls to both aircraft, including aircraft in the pattern.

"SAS123, traffic information, light aircraft orbiting on left downwind 35".

Also, do not assume IFR traffic have a VFR chart available, so if someone is routing Haganes – Kleppe at 1500ft, tell the IFR on ILS: *"SAS123, traffic information, helicopter routing southbound 3 miles west of the centreline, indicating 1500ft"* Note we are not using the reporting point names. Also note the use of "indicating" which means we have not verified the helicopter's transponder.

Remember to give traffic information about SAS123 to those you just told SAS123 about. If the CTR is Class D, we do not need to "see" any of them from the tower or require pilots to see each other, and no one needs to report anyone in sight. In class C (ENVA), we either need one of the two <u>in order to reduce standard</u> <u>separation down to visual separation</u>, or alternately need to have the VFR aircraft route via charted reporting points which will keep them clear of the instrument approach path.



4. Traffic in the CTR and Crossings

For traffic routing in or through the CTR, life is far easier for ATC. While it still looks small on a radar scope, the CTR is massive as seen through an airplane window, there is tons of room to manoeuvre. If you give traffic information early, you will rarely have to do anything else. You do not *need* to segregate traffic on different routes or different levels, it is even completely legal to clear aircraft on opposite routes with the same general altitude restrictions (*maintain 2000ft or below VFR*), as long as you give correct and concise traffic info early.

"LNABC, cleared to transit control zone routing Horgefjord direct Hjelto, 2000ft or below VFR. Traffic is C172 routing opposite direction 2000ft or below to Horgefjord, currently overhead Kleppe/currently five miles north indicating 1300ft". Pilots concerned about the traffic may initiate a level change or request a different routing. If this fits our overall traffic situation, always allow the change even if you think it is overly cautious. Do not force pilots to do things they are uncomfortable with unnecessarily.

<u>Traffic info is usually a two-step operation, so the next immediate step is:</u> *"LNDEF, traffic is Cherokee shortly overhead Horgefjord/six miles south of you, routing opposite direction indicating 1600ft".*

If you do not give adequate traffic information, this is unsafe.

With the traffic information, it is fine. However, if you are uncomfortable with the situation because both pilots are at the same level, you may use different levels to ensure safety: *"LNABC, maintain 1600ft VFR"* and *"LNDEF, maintain 1100ft VFR"*. Keep cloud conditions in mind, if you think clouds could be an issue, just ask: *"LNABC, are you able to maintain 1600ft VFR?"* then issue the clearance.

Remember, there are no rules to minimum vertical distance if separation is not required, but you might as well give them more than a couple hundred feet if you decide you want to space them vertically. 500ft is a good yard stick. Avoid forcing single engine aircraft too low, it drastically reduces their options in case of a flameout.



4.1. Additional traffic information examples:

4.1.1. Entry and Exit clearances

Generic entry clearance clearance:

"LNABC, cleared to enter control zone, join right base 35, traffic is helicopter just airborne from Flesland leaving to the east"

Then, if necessary, provide traffic information to any flights within the zone that might conflict with the entering flight:

"ALI05 traffic information, Cherokee 1 mile south of Kaland entering the zone to land at Flesland"

Another situation:

"LNABC, traffic information Skyhawk over Haganes routing north, indicating 1500ft, runway 35 cleared for take-off, left turnout direct Horgefjord," then to the aircraft over Haganes: "LNDEF, traffic information Cherokee departing runway 35 routing southwest"

Transiting from northeast to southeast:

"LNABC, cleared to transit control zone to the south 2000ft or below VFR, remain east of the runway centrelines, traffic is continuous IFR arrivals and departures runway 35"

Transit Hjelto – Horgefjord:

"LNABC, cleared to transit control zone direct Horgefjord, 2000ft or below VFR, traffic information two light aircraft in left patterns runway 35, remain west of the pattern"

4.1.2. CTR Crossings:

Crossing an airport in the overhead or an extended centreline should be treated pretty much like a runway crossing on the ground of an airport with taxiways on both sides. You are now bringing aircraft close to each other where at least one of them is in a max workload situation (landing or take-off) and since they are outside the pattern the speeds, levels, and relative angles/positions are less predictable. This is when you want start to append "report in sight" to traffic information calls, for then to issue instructions to cross behind.



For aircraft wanting to cross close to the airport, it is easiest to bring them directly to the airport overhead if the patterns are not too busy. You have a much better overview of the situation, and the crossers will almost always be far above any wake turbulence created. It is easier for aircraft to spot each other, and the speeds and paths are more predictable. If the patterns are busy, either have the crossers route along the centreline to cross clear of them, or if cloud conditions allow have the crosser climb above pattern altitude ^(Small piston props normally fly patterns at 1000ft AGL). To safely clear a crosser to the airport, use either the aerodrome boundary or one or two miles from the airport. VFR reporting points can also be used, but typically puts the aircraft further from the airport, increasing crossing time and making the planning more difficult.

Landing IFR inbound:

"LNABC, route direct Flesland, hold 1 mile east of the airport", then "LNABC, traffic 737 on 2 mile final, report in sight" and finally *"LNABC, behind the landing 737, cross runway 35, behind"*

Busy pattern:

"LNABC, three light aircraft operating in the right pattern 35, maintain VFR between 1500ft and 2000ft, cross runway 35 direct Telavog" (above) Or;

"LNABC, route south, remain east of the centreline and right hand pattern 35" then when clear of pattern traffic: "LNABC, cross runway 35 centreline direct Telavog" (around)

Crossing of centreline further from the airport:

"LNABC, traffic 737 5 miles final, report in sight" then "LNABC, cross the runway 35 centreline behind that traffic, caution wake turbulence".

Do not forget: "SAS123, traffic is light aircraft 3 miles east, crossing centreline behind you, has you in sight"



Another option when aircraft wants to either cross or operate near/on the extended centreline further than 4-5NM from the airport, is to keep them low (if terrain allows).

A 3° glidepath means roughly 300ft per NM, so aircraft on the ILS at 5NM will be approximately 1500ft above airport height. In other words, VFR aircraft can happily operate underneath the glidepath at this distance around many airports, without conflicting with the ILS traffic. Since we are dealing with descending IFR aircraft, provide at least 500ft margin here, a TCAS RA is never fun even if you are technically in the right. **Do not at any point forget to provide traffic information to every aircraft involved!**

"LNABC, cleared to operate in the control zone south of Flesland, no closer than 5 miles south, maintain 1000ft or below VFR. Traffic is continuous IFR arrivals on the ILS 35, caution wake turbulence".

Then to all aircraft checking in on the ILS "SAS123, traffic information light aircraft operating at least 500ft below the glidepath VFR, continue approach/runway 35 cleared to land"



5. Quick reference phraseology examples

5.1. Sequencing:

Aircraft arriving as number two:

"LNABC, number two, follow the Cherokee on left base, report final Runway 35" "LNABC, number two, follow the Skyhawk ahead on downwind, report final Runway 35".

Aircraft arriving as number one:

"LNABC, number one, make straight in approach Runway 35" "LNABC, cleared to enter controlled airspace, 2000ft or below VFR, join right base Runway 35, report final" "LNABC, join right downwind Runway 35, report final"

Sequencing pattern traffic behind aircraft not in the pattern:

"LNABC, number two, follow the 737 on 3 mile final, caution wake turbulence, report final Runway 35"

"LNABC, number two, follow the A320 on 6 mile final, orbit right as required/make one right hand orbit, caution wake turbulence, report final Runway 35" (Use caution orbiting aircraft if you have multiple aircraft in the pattern!)

Sequencing arriving VFR not in the pattern:

"LNABC, join left downwind Runway 35 as number two, follow the Skyhawk on left crosswind, report final"

"LNABC, number two, follow Cherokee on left base Runway 35, report final." "LNABC, join left downwind Runway 35 as number three, follow the King Air shortly turning left base, report final"

Examples for delaying pattern aircraft:

"LNABC, orbit right at the end of the downwind leg until advised, due to multiple departures"

Second aircraft arrives:

"LNDEF, you are number two, join left downwind and orbit at the start of the downwind leg until advised, number one is orbiting at the end of the downwind leg, additional traffic is multiple departures runway 35" (Remember to give departing aircraft "traffic information Cherokee orbiting on the start of the left downwind leg, runway 35 cleared for take-off")

If the second pilot is an arrival while the first wants a touch and go, you can always change the order: *"LNABC, route to and hold at Haganes"* then *"LNDEF, now number one, report final runway 35, traffic information Skyhawk ahead routing to Haganes"*

VFR go around behind heavier wake category departure:

"LNABC, go around, I say again, go around, caution wake turbulence from preceding departing 737, make early left turn, join left downwind 35"



If you are not going to make the required wake separation: "LNABC, make a full stop landing due to wake turbulence, runway 35 cleared to land, hold on the runway", then when the pilot is stopped: "LNABC, are you happy to depart from present position?" If yes, "LNABC, runway 35 cleared for takeoff, join left downwind runway 35". Optionally, vacate.

5.2. Traffic information

General Traffic Informaiton:

"SAS123, traffic information, light aircraft orbiting on left downwind 35" Or; "SAS123, traffic information, helicopter routing southbound 3 miles west of the centreline, indicating 1500ft" Remember to give traffic info to the helicopter.

"LNABC, cleared to transit control zone routing Horgefjord direct Hjelto, 2000ft or below VFR. Traffic is C172 routing opposite direction 2000ft or below to Horgefjord, currently overhead Kleppe/currently five miles north indicating 1300ft" Remember traffic info is a two-step operation: "LNDEF, traffic is Cherokee shortly overhead Horgefjord/six miles south of you, routing opposite direction indicating 1600ft". If you do not give adequate traffic information, this is unsafe.

5.3. Entry/Exit + Traffic Information

"LNABC, cleared to enter control zone, join right base 35, traffic is helicopter just airborne from Flesland leaving to the east"; then "ALI05 traffic information, Cherokee 1 mile south of Kaland entering the zone to land at Flesland"

"LNABC, traffic information Skyhawk over Haganes routing north, indicating 1500ft, runway 35 cleared for takeoff, left turnout direct Horgefjord," then to the aircraft over Haganes: "LNDEF, traffic information Cherokee departing runway 35 routing southwest"

Transiting from northeast to southeast:

"LNABC, cleared to transit control zone to the south 2000ft or below VFR, remain east of the runway centrelines, traffic is continuous IFR arrivals and departures runway 35"

Transit Hjelto – Horgefjord:

"LNABC, cleared to transit control zone direct Horgefjord, 2000ft or below VFR, traffic information two light aircraft in left patterns runway 35, remain west of the pattern"



5.4. **Airport crossings and CTR operations:**

Landing IFR inbound:

"LNABC, route direct Flesland, hold 1 mile east of the airport", then "LNABC, traffic 737 on 2 mile final, report in sight" and finally; *"LNABC, behind the landing 737, cross runway 35, behind"*

Busy pattern:

"LNABC, three light aircraft operating in the right pattern 35, maintain VFR between 1500ft and 2000ft VFR, cross runway 35 direct Telavog"

Or;

"LNABC, route south, remain east of the centreline and right hand pattern 35" then when clear of pattern traffic: "LNABC, cross runway 35 centreline direct Telavog"

Crossing of centreline further from the airport:

"LNABC, traffic 737 5 miles final, report in sight" then "LNABC, cross the runway 35 centreline behind that traffic, caution wake turbulence". Do not forget "SAS123, traffic is light aircraft 3 miles east, crossing centreline behind you, has you in sight"

5.5. **Operating Beneath The Glidepath:**

"LNABC, cleared to operate in the control zone south of Flesland, no closer than 5 miles south, maintain 1000ft or below VFR. Traffic is continuous IFR arrivals on the ILS 35, caution wake turbulence" then to all aircraft checking in on the ILS "SAS123, traffic information light aircraft operating at least 500ft below the glidepath VFR, continue approach/runway 35 cleared to land"

