INN – Föhn - LOWI

Best Practices
Guidelines for Pilots

Developed by the
Föhn Working Group

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1 Log of Revision

Revision Nr.	Date of Revision	Changed Pages	Comments
1	10.04.2020	4, 10, 11, 13	Names updated, ATIS updated
2	12.10.2026	3,4,6,7,10,11,12,13,16	Updates of: working group, graphics, RNP-V, sample metreports, cx of app. outside contr. airspace, cx. early rt dep.
3			
4			
5			

1.1 Revisions

This document will be revised every 3 years. All changes will be processed by the Safety Manager of TFG and must be approved by the working group.

1.2 Distribution and publication

The guide is an electronic manual and distributed via/to

- Note in AIP
- Homepage Airport INN *(section Business & Aviation / Aviation)*
- Directly to interested persons or companies

1.3 What is this document about?

This guide tries to explain to pilots the Föhn-procedures LOWI in detail, in many variants and under various aspects. It serves to make all the available experience concerning Föhn-LOWI accessible to the public.

This document is an additional information to the general airport briefing of LOWI. It never replaces the airport briefing.

Target Groups

- Pilots of Airlines
- Pilots of Business Jets, classic General Aviation, Air Taxi
- Pilots of small aircraft up to 5,7t
  (Pilots of gliders, hang-gliders and paragliders are not amongst the target group)

1.4 Föhn-LOWI Working Group

An industry working group 'Föhn' was set up spontaneously from voluntary individuals to develop a common framework for „Föhn-LOWI best practices, guidelines for pilots ".

The working group consists mainly of pilots, experts, ATC experts and safety practitioners. It aims to provide a pragmatic output for a real-life setting and application for all classes of aircraft flying in INN.

Active Working group members

- Daniel Angerer — Pilot, F900, SEP
- Jürgen Beiler — Pilot, DHC8, A320
- Christian Fischer — Pilot, C650, Safety Manager, TJS
- Martin Fleidl — Pilot, Safety Manager
- Daniel Folie — Pilot, Safety Manager. TAA
- Mario Karner — Pilot, M/SEP, Safety Manager
- Thomas Kumpfmüller — Met Center Vienna, ACG
- Harald Lazar — Pilot, Manager Flight Operations, TAA
- Christoph Moritz — Safety Manager, TFG
- Artur Praxmarer — Pilot, G100, M/SEP, TAA, authorised Expert
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- Dominik Stifter — ATM-Manager Operations LOWI, ACG
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Founding members at start of the working group, no longer active at the moment:

- Karl Koidl — Pilot, GLEX

1.5 Disclosure

We have exercised due care in the performance of our work. However, since the possibility that errors or irregularities may have occurred and have remained undetected can never be fully eliminated, we cannot guarantee that this document is free of errors or irregularities.

We shall not be held responsible or liable for any consequence arising from matters, on which information was misrepresented or misinterpreted.

Furthermore, the Föhn working group cannot be held accountable for any incompleteness or inaccuracy in the following guide and excludes any liability for analyses derived from faulty or incomplete information or interpretation.

The applied flight procedures and performance limitations remain the final responsibility of the individual PIC (pilot in command), considering the severity of the Föhn situation, experience, aircraft type and performance.

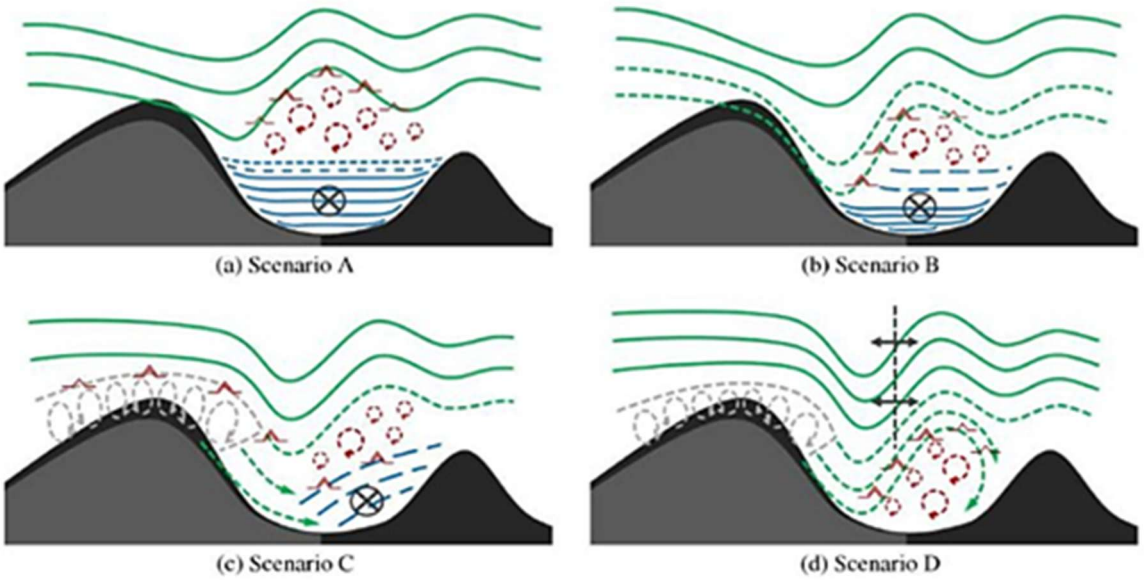
2 Föhn in General

Föhn is a typical weather phenomenon in alpine regions and describes a warm, dry windstorm on the leeward side of a mountain range.

As Innsbruck is located on the northern side of the alps, the most significant type is “South Föhn” which emerges with southern and south-western upper winds.

Basic ingredients for these weather conditions are a low-pressure area in western Europe like France or the British Islands and a high-pressure area over eastern Europe like the Balkan peninsula.

Air congestion on the south, windward side and dropping air pressure north of the alps cause a pressure gradient up to 15hPa across the mountain range, resulting in strong winds that increase up to hurricane force when the wind is channelled over the ridges or through gaps like the Brenner Pass south of Innsbruck.



Typical process of a full Föhn situation, shown in a north-south cross-section across the Inn valley with the alpine main ridge outlined on the left and the Nordkette to the right.

The phenomenon starts with turbulences in upper air and mountainwaves (a), stronger winds spreading along downslopes (b), turbulent interaction of downslope flow and along-valley flow (c) and finally establishment of a mountain wave rotor (d).

Note that not every Föhn situation reaches the final stadium, depending on pressure gradient and thermal mixing!

green	Streamlines
red triangles	turbulent regions
red circles	vortexes and recirculating airflow
blue lines	cold air under an inversion

* Taken from L. Strauss et al. 2015

* Strauss, L., S. Serafin, and V. Grubi˘si´c, 2015a: Atmospheric rotors and severe turbulence in a long deep valley. *J. Atmos. Sci.*, in press.

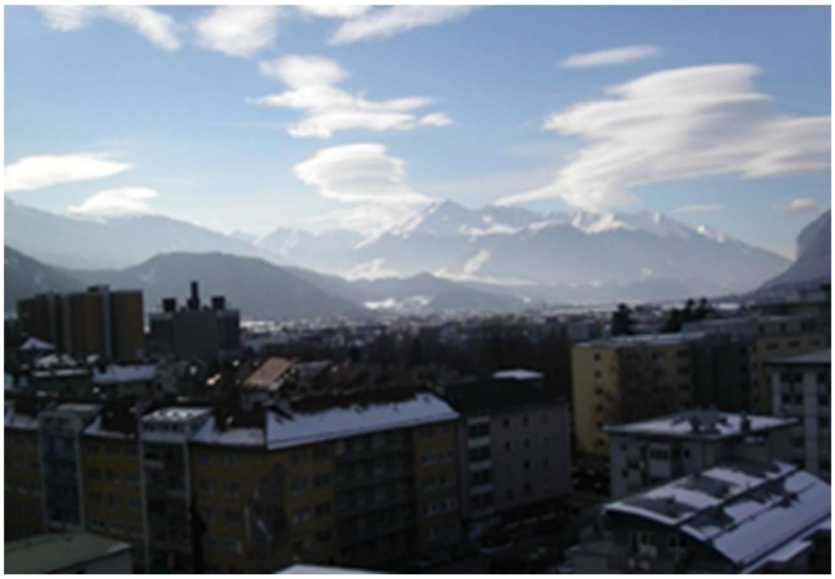
During a Föhn situation, moderate to severe turbulences along the ridges have to be expected and can be quite uncomfortable for passengers and crew. As the wind spreads down into the valley, moderate to strong wind shear can appear at the temperature inversion with westerly wind in the valley and strong southerly wind above.

For arrivals from the east, Föhn procedures take advantage of the fact that the least turbulence can be expected along the Nordkette (northern mountain range).

For arrivals from all directions a good option is a visual approach from the West (or initially RNP approach) along the western- (so-called upper-) part of the Inn valley straight-in to RWY 08.



Altocumulus Lenticularis over the “Serles”, a mountain peak south of Innsbruck. A clear indication of established mountain waves and strong upper winds with significant up- and downwind components. (picture by F. Welzenbach)



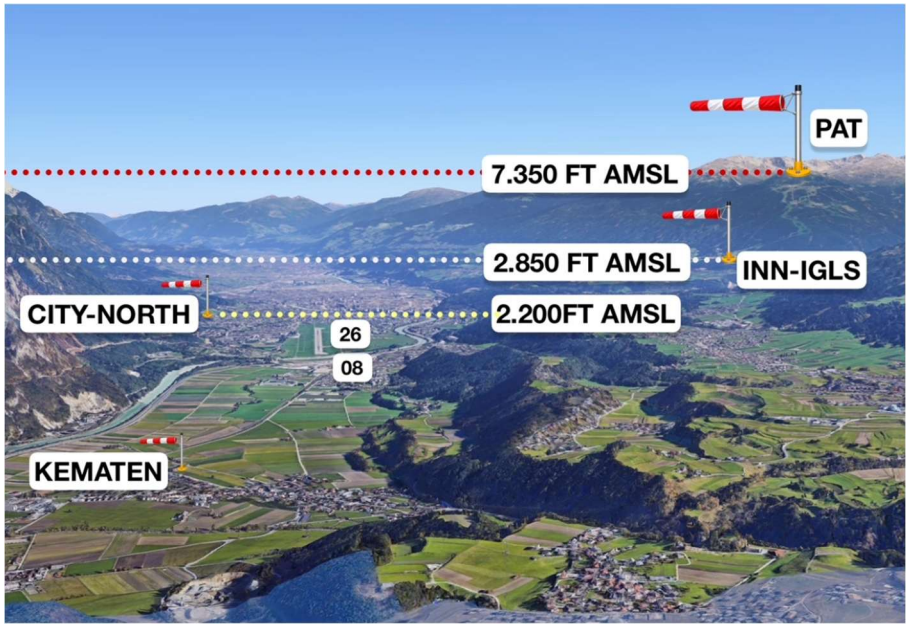
Typical cloud formation during Föhn conditions, view from INN city-center

2.1 Wind readings and indications

2.1.1 Wind readings

Wind readings from TWR/APP may be obtained for

- **Patscherkofel** / DME PAT / 7.400ft MSL
- **Igls** / INN / nearly NDB INN / 2.850 ft MSL
- **City North** / 1 NM east THR 26 / 2.200ft MSL
- **Kematen** / 2 NMs west of LOWI / 2.000ft MSL
- **Threshold 26**
- **Threshold 08**

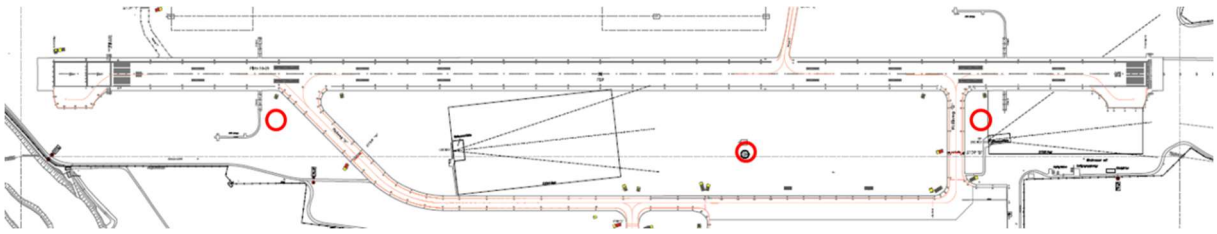


During conditions of Föhn and when establishing first contact with INN APP/TWR the Pilot automatically will receive the wind readings from **Patscherkofel** and the **Thresholds.** At a beginning Föhn situation also the Wind of **Igls** will be transmitted to the pilot to have a good indication about the turbulence to be expected overhead the city.

2.1.2 Windsocks

3 windsocks are available at INN airport:

- the main windsock is south of the RWY at midpoint and
- 2 additional windsocks are located south of the RWY beside each touch down point.

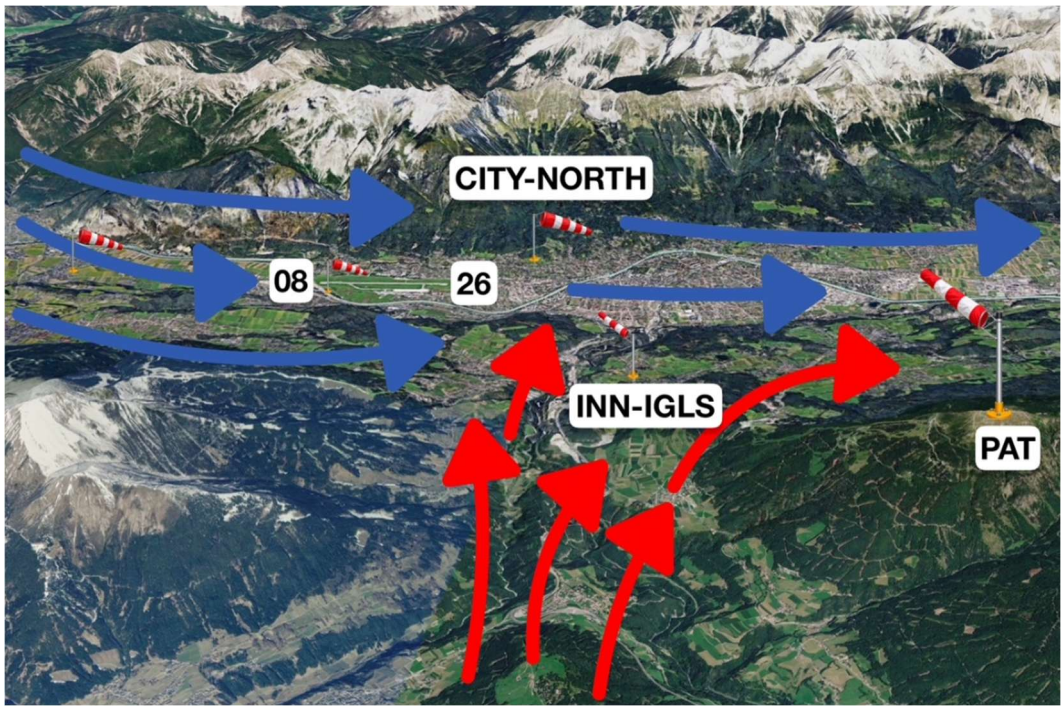


2.2 Scenarios

2.2.1 Typical beginning Föhn situation

Föhn has not yet descended to the airport. Reported winds e.g.

- **Patscherkofel** 160/65
- **Igls / INN** 180/37
- **City North** 150/28
- **Threshold** 26 240/12
- **Threshold** 08 240/10



Wind direction before Föhn is swelling up

At the beginning of a Föhn situation the wind on the RWY might favour RWY 26, e.g. 250° - 270° / less than 10 knots, but the wind down to 500-300 feet is from 120° - 150° at approximately 20 knots.

Basically, the RWY selection is up to the pilot!

Despite the tailwind condition on RWY 08, it might be the better decision to land on RWY 08 with tailwinds up to 10 kts *(resp. limit acc. Type-AFM)*, resulting in less turbulence on final. As the wind condition is likely to change to a straight Föhn situation with turbulent winds from SE on the runway, it improves the chance for a normal landing.

If in this situation RWY 26 is accepted for landing or even required because of westerly winds of more than 10 knots *(resp. above limit acc. Type-AFM)*, you must expect very strong turbulence over the city and down to 500ft AAL on final RWY 26, also with the initial impression of not being able to land. But if you continue through this very turbulent area the approach to RWY 26 you finally will find a stable westerly wind condition below 500ft on short final with acceptable turbulences.

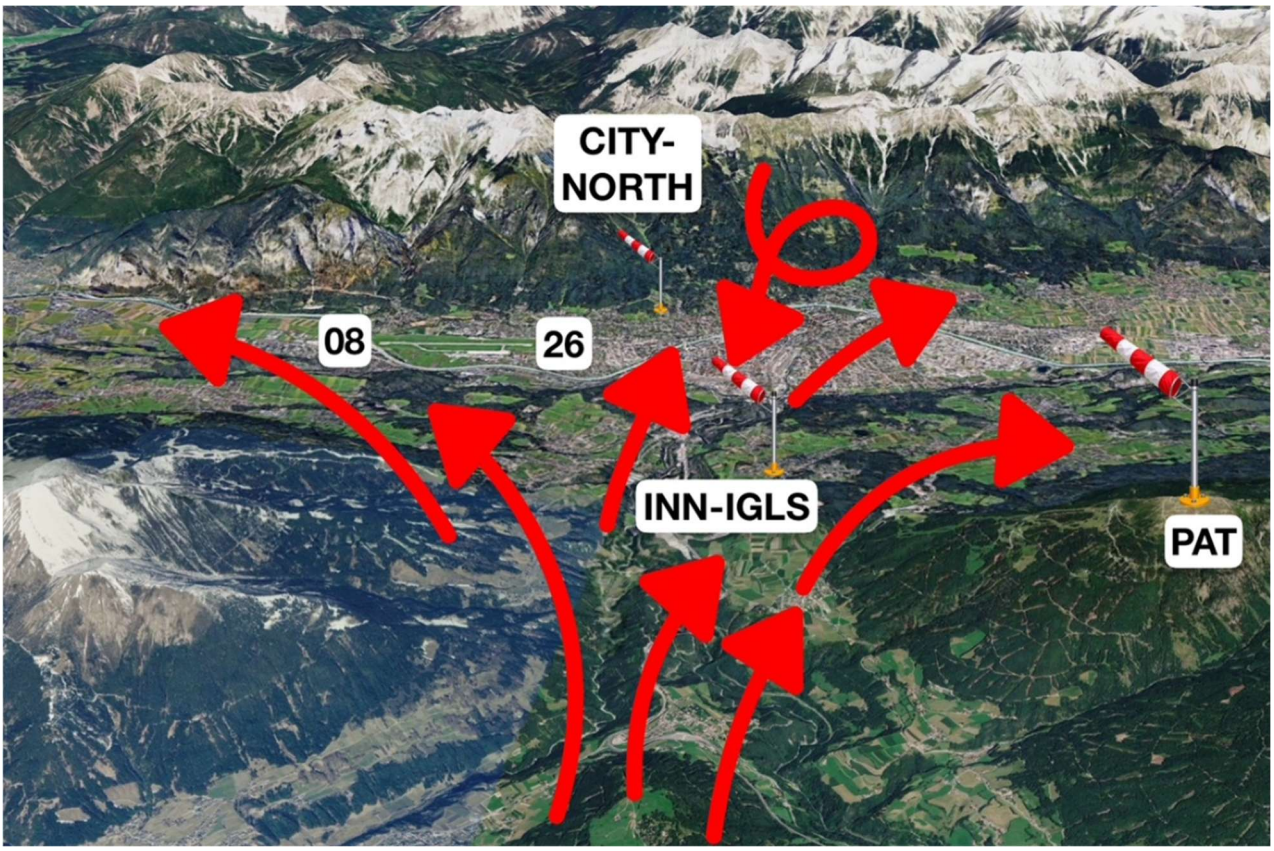
Always be aware that conditions might change rapidly and be prepared for a go-around any time! ATC will advise RWY 08 even with tailwind when turbulences become too strong and a landing on RWY 26 seems not possible any more.

2.2.2 Typical mature Föhn situation

Reported winds e.g.

- **Patscherkofel** 160/65
- **Igls** / INN 180/37
- **City North** 150/28
- **Threshold 26** 130/25G32
- **Threshold 08** 120/23

This situation requires a landing on RWY 08.



Wind direction in typical mature Föhn situation

2.3 ATC and ATIS announcements for Föhn

The ATIS Innsbruck on 126,030 MHz will provide the LOWI MET REPORT, that includes all additional information about the wind situation and turbulences, for example:

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WIND RWY 08 TDZ 270/15KT END 240/15KT MAX25 MNM8
RWY 26 TDZ 240/15KT MAX25 MNM8 END 270/15KT
WS IN APCH RWY 26 1000FT-WIND 180/30KT
MOD TURB IN APCH AND IN CLIMB-OUT SFC/FL140
FOEHN EST WIND AT 7400FT AMSL 160/40KT MAX60
AD TREND BECMG 130/15KT MAX30
```

ATC will provide wind readings, information on turbulences and RWY suggestions upon first contact and on request, especially if Föhn has not yet descended to the valley (described in 2.2.2).

Via ATIS, ATC can select the runway in use: RUNWAY IN USE 08 DUE TO FÖHN

The announcement *"RUNWAY IN USE 08 DUE TO FÖHN"* is selected and transmitted by ATC whenever clear föhn conditions are present at the aerodrome.

In periods of high traffic, an additional remark is appended at the end of the ATIS: *"EXPECT APPROACH VIA ELMEM"*. This allows all crews to prepare early for an RNP-Z 08 (for operators with approval) or RNP-V 08.

The ATIS can also be monitored by telephone at: +43 51703 6631.

As soon as RWY 08 is broadcasted as RWY IN USE, 'Föhn procedures are in force'. Crews may ask for any procedure described below or for assistance in decision making.

If the forecasts and actual weather for Innsbruck obtained before departure indicate conditions could be marginal for landing, it may be valuable to contact Innsbruck ATC +43 5 1703 6612 to obtain actual reports, including available pilot-reports about the detailed situation on the approach/departure and the further development.

2.4 Aspects of turbulences, safety and comfort

All variants of turbulences have been observed, e.g.

- only little turbulence during the approach, but very strong turbulence on short final
- strong turbulence during approach, but very smooth situation on final

Therefore, never underestimate the Föhn and be ready to react to the unexpected!

The published Föhn procedures aim for both, to improve safety but also for comfort by gaining awareness, where less turbulence may be expected.

3 Approach routes and profiles

To assure safety and to improve comfort, it is advisable during Föhn to follow a modified approach to Innsbruck airport.

3.1 Instrument and visual Föhn approach for IFR arrivals coming from the West, North, South

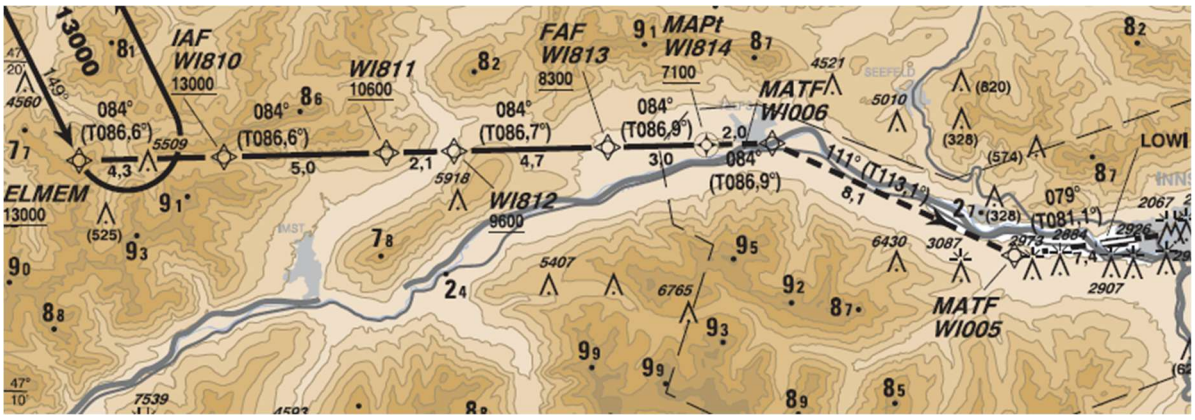
Choosing a routing arriving from the West may be a very good solution to avoid the turbulent conditions of the easterly INN valley and around and over the city of Innsbruck.

This routing is the best choice especially for crews with little LOWI experience. ATC will advise arrivals to proceed to ELMEM or WI811/813.

Inbound variants:

- Direct Elmem RNP-Z
- WI 811 or ELMEM for RNP-V 08
- WI 813 for Visual
- Continue visual approach along the western- (so-called upper-) inn-valley (along RNP-V waypoints) straight in RWY 08

Typically, the Föhn influence is not as strong in the western (upper) INN valley and comes into effect only on final approach to RWY 08.



In dense traffic also arrivals from the East are directed to the West to start their approach from there!

3.2 LOC/DME East approach above glideslope & circling to RWY 08

Procedure for crews not allowed to perform visual approach to LOWI:

Following the arrival from the east, the descent along Localizer-OEV shall be commenced at D18.0 maintaining between 2.000ft to 4.000ft above the approach profile (GS). This margin shall be maintained during the descent until passing south of TWR.

Strong turbulence may be encountered over the city of Innsbruck from passing north of INN-NDB until south of the field; therefore, follow the published circling procedure to RWY 08 but maintain the height margin above GS until passing south of TWR in 5.000ft MSL.



AXAMS, 3.700 ft MSL

Passing AXAMS (church of Axams is turning point to base leg) start right turn, select final flaps, speed plus wind-correction and start final descent, aim to cross the southern terrain-edge (westl. Mittelgebirge) at 3.200 ft MSL, bank-angle should be 25-30° to avoid being blown far to the north of the RWY-centerline.

3.3 Visual Approach from the East

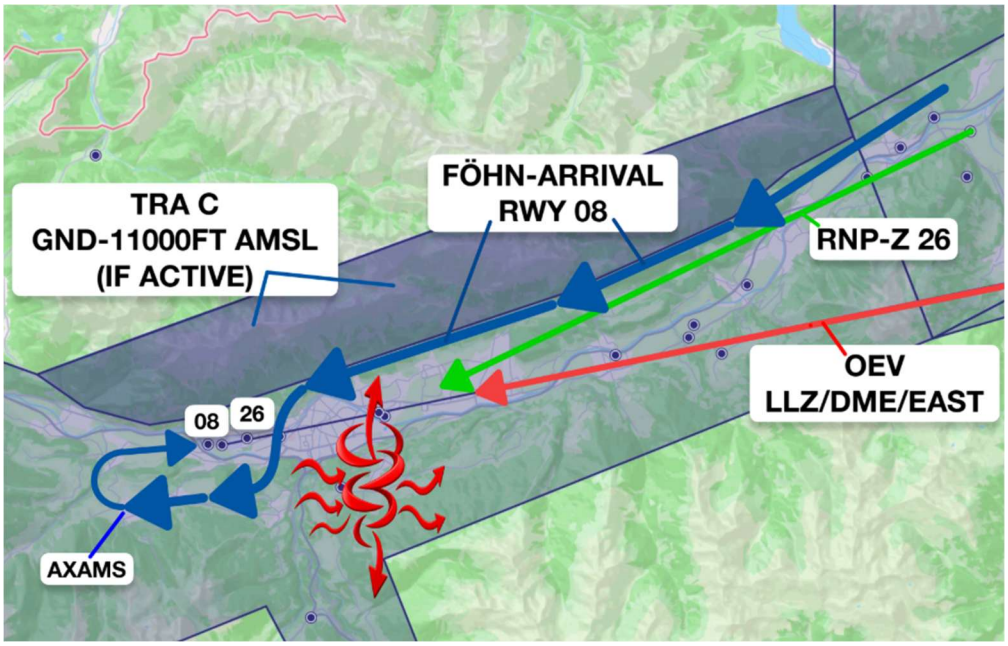
The following procedures require terrain familiarity and good preplanning as well as a thorough understanding for the local weather situation.

Valid if weather VMC below 9.000ft MSL

During Föhn most of the turbulences may be avoided by following slightly north of Localizer-OEV and staying 4.000ft above the check-altitudes as soon as reaching VMC during approach.

3.3.1 Visual Föhn Approach along Nordkette & circling 08

Procedure for INN experienced, familiar crews.
Valid for day, night if weather is VMC below 9000ft MSL



Föhn arrival along the Nordkette (Seegrube) and avoiding the glider area if active dark shaded area)

If the ATIS announces „glider area active “, this area must be avoided.

The intention of this visual approach is to fly close to the northern mountain range ("Nordkette") and to stay as high as possible for less turbulences.

Descent so as to reach a position abeam Seegrube (cable car) at 9.000ft MSL, select gear down and intermediate flaps. Turn left to cross the Inn valley, overfly the Airport and continue to Axams (church at Axams is turning point to baseleg) descending to 3.700ft MSL. Strong turbulence may be encountered while crossing the valley until south of the field.

Passing AXAMS, complete final landing configuration and turn right onto final RWY 08.

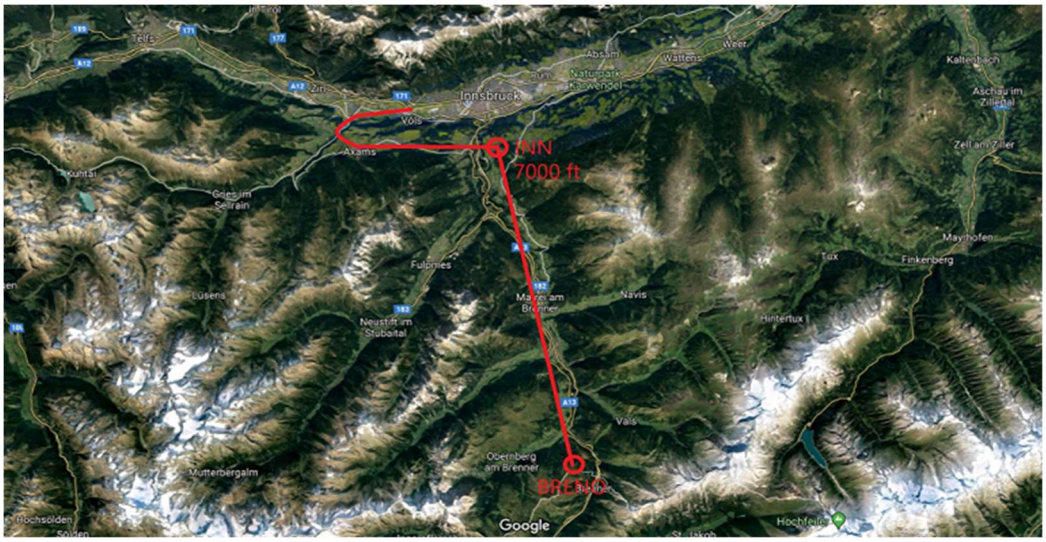


Seegrube at 9.000ft MSL before crossing the valley to the south

3.3.2 Visual Approach from the South (Breno)

Procedure for INN experienced, familiar crews.
Valid if weather is VMC below 11.000ft MSL.

Breno to INN NDB 7.000 MSL or above, continue to Axams descending to 3.700ft MSL. continue for final RWY 08.



3.4 Föhn-aspects on final RWY 08

- Expect turbulences and wind shear
- Be aware of possible downdrafts when crossing the river Inn on short final
- PAPI is available and shows 3,5° descend angle. Always follow precisely the PAPI at the given angle of 3,5°
- Aim for touchdown at the 1.000ft / 300m TDP marking (equals intersection TWY A). In case of touchdown after this point expect much more unstable wind conditions and wind shears (more variable wind direction and under very strong Föhn situation even with winds from the North).
- ATC will provide you with regular threshold wind readings during final approach
- If your skills allow you one short view on medium final to the TD-windsock as well to the main-windsock at the midpoint of the RWY you will gain a good optical picture of the wind directions or possible wind shears during landing
- Use the speed increments acc. your company or aircraft manufacturer
- In case of an aircraft wind shear warning system, follow the policy given by your company or aircraft manufacturer.

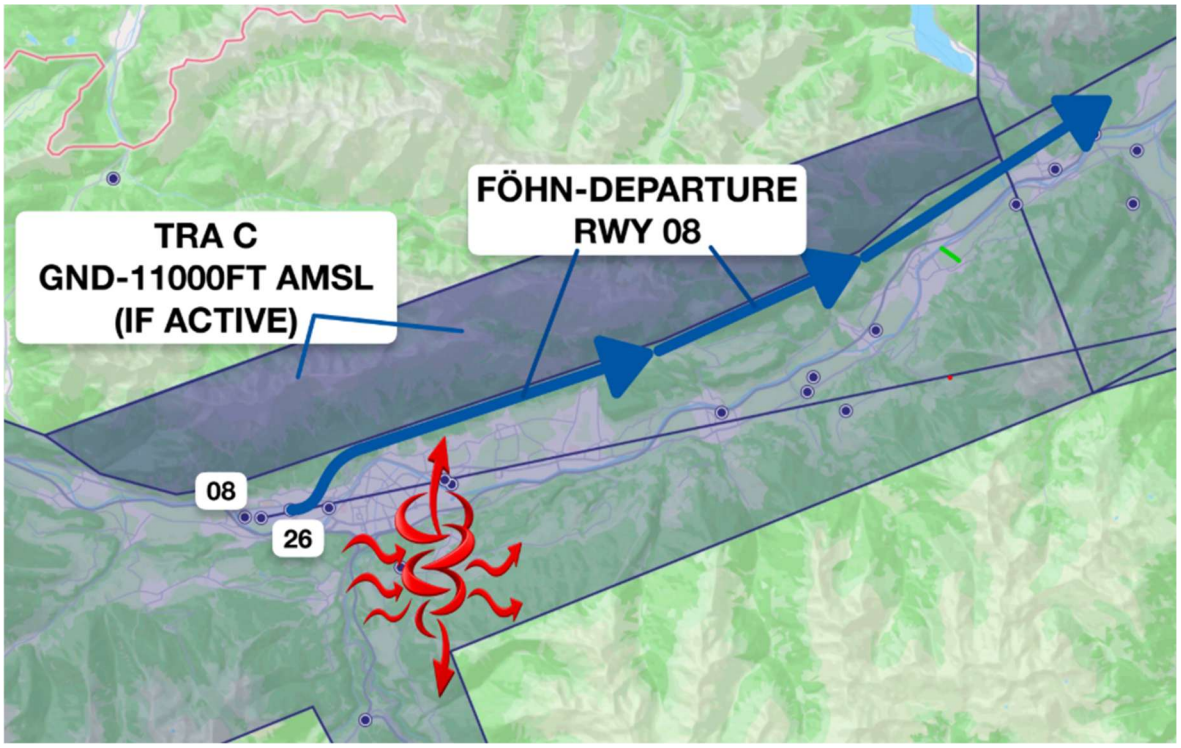
3.5 Balked Landing – Go Around RWY 08

Should a balked landing from final RWY 08 become necessary, follow the Föhn departure as described below.

4 Föhn Departure RWY 08

Visual Föhn Departure:

- During Föhn, departure RWY is 08.
- Advice ATC at start up if intended to follow the Föhn departure.
- Initially maintain RWY heading. Be aware of turbulence and windshear.
- When overflying the city of INN at low altitude (<500ft) expect strong down drafts (wind rotor).
- Therefore when passing 400ft AAL, it is recommended to turn visually towards the northern mountain range (‘Nordkette’) avoiding glider areas north of IFR departure track.
- If glider area is active maintain a constant look-out for gliders during all manoeuvres.



avoid glider area if active (dark shaded area)

Powerful aircraft may go straight out along the Localizer-OEJ to the East. But to avoid strong turbulence over the city and for comfort reason in very strong Föhn situation the „visual Föhn departure“ should be considered. Even a slight alteration of the departure track to the northern part of the inn-valley allows you to stay clear of the most significant turbulence.

Light aircraft <5,7t anyway need to turn visually towards the northern mountain range ("Nordkette") with a turn at 400ft AAL, to avoid down drafts over the city.