

# 4.09 GUIDE



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**Warning:** The current version 4.09m is not compatible with the previous versions of the sim when playing over the network (Online). Both the server and client must have the appropriate versions in order to connect.

#### Maps - final versions of

Bessarabia	Slovakia Summer
Iasi	Slovakia Summer Light
Odessa	Slovakia Winter
MTO	Slovakia Winter Light
MTO Light	

#### New Planes

Avia B-534-IV (flyable)  
 CW-21 (AI only)  
 Fokker D.XXI - 5 versions (Only SARJA 3 Early and Late flyable)  
 Fiat G.55 Series I (early and late - AI only)  
 I-15bis (AI only)  
 I-16 Type 5 + Ski version (flyable)  
 I-16 Type 6 + Ski version (flyable)  
 Letov S-328 (AI only)  
 Re.2000 (AI only)  
 SM.79 (flyable)

#### Cockpits

MC.200 series 7 and series 7 FB flyable (new cockpit)  
 MC.200 series 3 (improved original cockpit)

#### Ground objects

MBV-2 and MBV-2 (flak version) trains have new models + all guns are functional

#### Other

Quick Mission Builder with new features  
 Updated new default skin pack  
 Parachutes are not AAA target anymore  
 Navigational lights turned off during flight by AI planes  
 Pylon/bomb racks weight fixed -> better climb and takeoff performance for planes armed with external ordnance

#### Corrections in Flight Models (by Maddox Games)

MC-200 increased airframe drag-> reduced speed  
 P-11c corrected rudder roll response. Previously left rudder was inducing right roll and vice versa.  
 Ta-152C wing area corrected from Fw 190D-9 values (~1.2m<sup>2</sup>) -> slightly improved turn performance  
 DB-603L critical altitude increased from 9200m to 10200m.

#### Changes in Graphics (by Maddox Games)

Increased buffer size for stationary objects (buildings etc.) to prevent freezes under some circumstances.

Colors of water corrected for Water=2,3,4 modes. Now when looking down it is no more black/dark blue.

Optimized Shaders for Nvidia 8X00 series video cards.

Added a new mode for increased visibility distance. Visibility increased from 36 km to 72km under "Clear" and "Good" weather conditions.

Note: This mode is not optimized for performance: (freezes and low fps are possible on low-end systems). This new feature is available only in "Perfect" game graphics mode.

Also, there is a possibility to have problems with clouds and their shadows at far distances, due to some engine limitations.

Modify your conf.ini string in the [Render\_OpenGL] section to use this mode:

LandGeom=3 (new mode is ON)

LandGeom=2 (back to normal mode)

**Daidalos Team would like to thank all external beta testers from the following virtual squadrons for their hard work: Letka 13, 6° Stormo Virtuale, 102nd-YU, 352nd VFG, Kraken, and Sean Trestrail**



**Внимание:** Текущая версия 4.09m не совместима с предыдущими версиями при игре по сети. Сервер и клиент должны быть обновлены до одной и той же версии.

#### Карты, финальные версии.

Бессарабия Словакия лето  
Яссы Словакия лето Light  
Одесса Словакия зима  
МТО Словакия зима Light  
МТО Light

#### Новые самолеты

Avia B-534-IV (летабельный)  
CW-21 (только ИИ)  
Fokker D.XXI - 5 версий (из них только SARJA 3 Early и Late летабельные)  
Fiat G.55 Series I (только ИИ)  
I-15bis (только ИИ)  
I-16 Type 5 + лыжная версия (летабельный)  
I-16 Type 6 + лыжная версия (летабельный)  
Letov S-328 (только ИИ)  
Re.2000 (только ИИ)  
SM.79 (летабельный)

#### Кабины

MC.200 series 7 и series 7 FB летабельный (новая кабина)  
MC.200 series 3 (исправлена старая кабина)

#### Наземные объекты

МБВ-2 и МБВ-2 (зенитный) – обновлены 3D модели и все стволы сделаны работающими.

#### Другое

Новые возможности в быстром редакторе.  
Изменен пакет новых стандартных текстур для самолетов.  
Зенитки больше не стреляют по парашютам  
Навигационные огни выключены ночью на ИИ самолетах  
Исправлен вес для пилонов и кронштейнов бомб -> улучшены скокроподъемность и взлетно-посадочные характеристики самолетов с внешними подвесками.

#### Изменения в полетной модели (автор Maddox Games)

MC-200 увеличено лобовое сопротивление -> уменьшена макс. скорость.  
P-11c исправлена влияние руля направления на крен. Ранее, отклонение руля влево вызывало крен вправо и наоборот.  
Ta-152C – площадь крыльев изменена со значения для Fw 190D-9 (~1.2m<sup>2</sup>) -> улучшен вираж.  
DB-603L критическая высота изменена с 9200м до 10200м.

#### Изменения в графике (автор Maddox Games)

Увеличен размер буфера статических объектов, чтобы предотвратить замирания, происходившие в некоторых случаях.

Изменен цвет воды в режимах Water=2,3,4. Теперь при виде сверху она более темная.

Оптимизирована работа с шейдерами для семейства видеоадаптеров Nvidia 8X00.  
Добавлен новый режим для дальности отображения. Максимальная видимость увеличена с 36 км до 72 км при погодных условиях "Безоблачно" и "Ясно".

**Внимание.** Этот новый режим не оптимизирован: возможны замирания и низкий FPS на слабых системах.

Данный режим доступен только для настроек "Превосходно".

Также возможны проблемы с отображением туч и их теней на большой дистанции из-за некоторых программных ограничений.

Чтобы включить данный режим добавьте в раздел [Render\_OpenGL] файла conf.ini строку:

LandGeom=3 (новый режим вкл.)

LandGeom=2 (вернуть старый режим)

**Daidalos Team приносит сердечную благодарность внешним бета-тестерам из следующих виртуальных эскадрилий: Letka 13, 6° Stormo Virtuale, 102nd-YU, 352nd VFG, Kraken, Sean Trestrail**



**Achtung: Die Netzwerk- bzw. Online-Funktion der aktuellen Version 4.09m ist nicht zu den vorherigen Versionen des Titels kompatibel. Sowohl Server als auch Client müssen für einen erfolgreichen Verbindungsaufbau über dieselbe Programmversion verfügen.**

### **Karten**

Bessarabien	Slowakei Sommer
Jassi	Slowakei Sommer Light
Odessa	Slowakei Winter
MTO	Slowakei Winter Light
MTO Light	

### **Neue Flugzeuge**

Avia B-534-IV (flyable)  
CW-21 (KI)  
Fokker D.XXI - 5 Ausführungen (nur Serie 3 früh und spät flyable)  
Fiat G.55 Serie I (früh und spät - KI)  
I-15bis (KI)  
I-16 Typ 5 + Wintervariante mit Skifahrwerk (flyable)  
I-16 Typ 6 + Wintervariante mit Skifahrwerk (flyable)  
Letov S-328 (KI)  
Re.2000 (KI)  
SM.79 (flyable)

### **Cockpits**

MC.200 Serie 7 und Serie 7 FB flyable (neues Cockpit)  
MC.200 Serie 3 (verbessertes neues Cockpit)

### **Bodenobjekte**

sowj. Panzerzüge MBV-2 und MBV-2 (Ausführung mit Flak) – neue Modelle + alle Kanonen funktionieren

### **Sonstiges**

Quick Mission Builder mit neuen Features  
Überarbeitete Default-Texturen bei einigen Flugzeugen  
Fallschirme werden von der Flak nicht mehr als Ziele aufgefaßt  
Positionsleuchten bei KI-gesteuerten Flugzeugen werden im Flug ausgeschaltet  
Gewicht von Bombenhalterungen korrigiert - bessere Steig- und Startleistungen für Flugzeuge mit externer Abwehrbewaffnung

### **Korrekturen im Flugmodell (durch Maddox Games)**

erhöhter Drag bei allen MC-200 -> Geschwindigkeitsreduktion  
Korrektur der Steuereingaben für Querruder bei P-11c. Vorher induzierte das linke Ruder eine Rolle nach rechts und umgekehrt.  
Tragfläche bei Ta-152C um ~1,2m<sup>2</sup> korrigiert (bisher wurden die Werte der Fw 190D-9 verwendet) -> leicht verbesserte Kurvenleistung.  
Volldruckhöhe für DB-603L von 9200m auf 10200m angehoben.

### **Korrekturen bei Grafiken (durch Maddox Games)**

Erhöhte Puffergröße für stationäre Objekte (Gebäude etc.), um unter bestimmten Bedingungen auftretenden Freezes vorzubeugen.

Korrektur der Farben bei Water=2,3,4. Beim Blick nach unten erscheint es nun nicht mehr schwarz / dunkelblau.

Optimierte Shader für Grafikkarten der Serie Nvidia 8X00.

Neuer Modus für erweiterte Sichtweite hinzugefügt. Die Sichtweite erhöht sich bei Gebrauch von 36 km auf 72km bei „klaren“ bzw „guten“ Wetterbedingungen.

Hinweis: Dieser Modus ist nicht leistungsoptimiert: (bei Low-End PCs können Freezes und niedrige Frameraten auftreten).

Dieses neue Feature funktioniert nur im Grafikmodus „Perfekt“. Außerdem besteht die Möglichkeit von Darstellungsproblemen bei Wolken und Wolkenshatten in größerer Entfernung (Einschränkung der Grundengine).

Um den Modus zu aktivieren ändern Sie Ihre conf.ini unter [Render\_OpenGL] wie folgt:

LandGeom=3 (neuer Modus ist AN)

LandGeom=2 (zurück zur normalen Sichtweite)

**Das Daidalos Team möchte sich bei allen externen Betatestern für ihre harte Arbeit bedanken. Besonderer Dank gilt dabei den folgenden virtuellen Staffeln: Letka 13, 6° Stormo Virtuale "Diavoli Rossi", 102nd-YU, 352nd VFG, Kraken, und Sean Trestrail**



**Attention: la version actuelle 4.09m n'est pas compatible avec des versions précédentes du Simulateur quand on vole sur l'internet (Online). L'hôte et le client doivent avoir tous les deux la version identique pour pouvoir se connecter l'un à l'autre.**

### **Versions finales des cartes géographiques**

Bessarabia

Iasi

Odessa

MTO

MTO version "légère"

La Slovacquie, été

La Slovacquie, été, version "légère"

La Slovacquie ,hiver

La Slovaquie hiver, version "légère"

### **Nouveaux avions**

Avia B-534-IV (opérationnel)

CW-21 (seulement AI)

Fokker D.XXI - 5 versions (seule Sarja 3 version des premières générations et version des generations plus tardives sont opérationnel )

Fiat G.55 Series I (version des premières générations et version des generations plus tardives, mais seulement AI)

I-15bis ( seulement AI)

I-16 Type 5 +version "Ski" ,( opérationnel)

I-16 Type 6 +version "Ski" ,( opérationnel)

Letov S-328 (seulement AI)

Re.2000 (seulement AI)

SM.79 (opérationnel)

### **Cockpits**

MC.200 series 7 et les series 7 FB (opérationnel)(cockpit nouveau)

MC.200 series 3 ( cockpit original amélioré)

### **Objets au sol**

Les trains MBV-2 et MBV-2 (version DCA) sont remodelé et toutes les mitrailleuses sont actives

### **Autres**

Plusieurs nouveautés dans le QMB

Nouveau skin-pack standard

La DCA ne tire plus sur les parachutistes

Les lumières de navigation sont éteintes chez les avions AI

Le poids des pylons/racks de bombes sont corrigés=>les avions ,équipés avec des armes externes, prennent mieux l'air en décollant et en montant

### **Corrections des " Flight Models "(par Maddox Games)**

MC-200: augmenté la résistance de l'avion=> la vitesse est réduite

P-11c: corrigé la réponse du gouvernail .Auparavant l'application du gouvernail gauche induisait un tonneau vers la droite et vice versa

Ta-152C :la surface des ailes a été corrigé (vers les valeurs du FW-190D-9 : +/- 1.2 m<sup>2</sup> )

DB-603L: l'altitude maximum est augmenté de 9200m à 10200m

### **Modifications des arts graphiques (par Maddox Games)**

Augmenté la mesure du "buffer" pour les objets stationnaires (les maisons etc...), pour éviter des stagnations d'images dans certaines circonstances.

Corrigé les couleurs de l'eau dans les modes 2,3,4. En regardant en bas, l'eau n'est plus noir-bleu foncé

Optimisé les "shaders" pour les cartes video de la série Nvidia 8x00

Ajouté un mode pour une plus profonde visibilité à distance. La visibilité est augmentée de 36 km à 72 km, dans les cas de circonstances météo "clear" et "good"

Remarquez que cette mode ne vas pas augmenter la performance: (des stagnations d'images et des fps bas sont possible avec des systèmes plus anciens)

Cette nouveauté est disponible uniquement en mode "parfait" (perfect)

Aussi, il y a une possibilité de rencontrer des problèmes avec les nuages et leurs ombres à des distances longues. Ceci à cause des limitations du simulateur même

Pour utiliser ce mode vous pouvez modifier votre configuration.ini (voir la section [Render OpenGL])

LandGeom=3 (la nouvelle mode est active)

LandGeom=2 (mode standard)

**Le Team Daidalos tient à remercier vivement tous testeurs "Beta" des escadrilles suivantes, qui ont bien voulu y consacrer leur temps précieux. Letka 13, 6° Stormo Virtuale "Diavoli Rossi", 102nd-YU, 352nd VFG, Kraken, et Sean Trestrail**



The B-534 was designed as a single-engine biplane fighter with a license-built Hispano-Suiza inline powerplant, and fixed landing gear. The first B-534 prototype flew in late May 1933. More work followed and the first order for the Czechoslovakian Air Force was placed in mid-1934. At that time, the B-534 was well ahead of its contemporaries. The United Kingdom was still dependent on Hawker Furies, with the first Gloster Gladiators being produced at this time. The Soviet Union was placing its hope on its Polikarpov aircraft designs. The United States was still using descendants of the Curtiss Hawk series, with the Seversky P-35 and Curtiss P-36 just about to fly prototypes. First deliveries of the B-534 to the Czechoslovakian air force began in late 1935, and 445 or so had been completed by 1938. The abrupt partition of Czechoslovakia in 1939 prevented the use of the B-534 in combat by the nation that had produced it. By then, high performance monoplanes such as the German Messerschmitt Bf 109, Hawker Hurricane and Supermarine Spitfire were raising the bar of fighter/interceptor standards. Four sub-types were produced during the B-534's production run, all with mostly minor improvements.

The B-534 was first used in combat by the Slovenské vzdušné zbrane (Slovak Air Force). Germany took control of the "Czech" part of Czechoslovakia as Protectorate of Bohemia and Moravia, leaving the "Slovak" part, Slovakia, as a minor ally. Slovakia acquired some 80 B-534s and Bk-534s from the Czech air force and quickly had to use them against Hungary during the Slovak-Hungarian border clash of March 1939. Later, two squadrons of B-534s assisted the German Luftwaffe during the Invasion of Poland in September 1939. The same squadrons served with the Germans in Ukraine during summer 1941, with one squadron returning in 1942 for anti-partisan duty. Obsolescence, lack of spare parts and the old Czechoslovak air force's curious fuel mixture (BiBoLi, a mixture of alcohol, benzol and petrol) finally relegated the surviving B-534s to training duties.

This would have been the last of the B-534s in Slovak colors if not for the Slovak National Uprising of September-October 1944. The rest of the Slovak air assets did not turn-coat as expected and the leaders of the uprising were faced with using a rag-tag collection of leftover aircraft, including several B-534s at Tri Duby airfield. On 2 September 1944, Master Sergeant František Cyprich, just after testing a repaired B-534, downed a Junkers Ju 52 transport under Hungarian colors on its way to a base in occupied Poland. This was the last recorded biplane air-to-air victory.

Bulgaria bought 78 B-534s in 1939, well after the partition. The last batch of these aircraft arrived in March 1942. On 1 August 1943, seven of these aircraft were able to make two passes at American B-24 Liberator bombers returning from the raid on Ploiești. Hits were scored but no B-24s were shot down and some of the B-534s that received damage in the combat, crashed on landing. After the anti-German coup of 9 September 1944, Bulgaria switched sides overnight and its B-534s were often used in ground attacks against German units. On 10 September 1944, six B-534s were involved in a brief melee with six German Bf 109s at low altitude. One B-534 was lost, but the Germans quickly broke off, wary of the low altitude and the B-534's manoeuvrability.

Germany has also used Avias as a flight school trainer aircraft as well as for glider/target towing roles.

### General characteristics

Wingspan: 9,40m

Length: 8,10m

Height: 3,15m

Wing area: 23,56m<sup>2</sup>

Wing surface load: 78kg/m<sup>2</sup>

Empty weight: 1460kg

Take off weight: 1980kg

### Performance

Max. ceiling: 10600m

Max. range: 600km

Maximum speed – fully loaded and equipped plane without bombs:

at 100m @ 2400RPM = 380km/h

at 4000m @ 2200RPM = 363km/h

Minimal speed: 120km/h

Stall speed: ~100km/h

Optimal cruising speed: at 4000 m = 300km/h

Maximum structural dive speed: 650 - 670km/h

Initial climb rate: 16m/s

Climb: to 5000m = 5,3min

to 8000m = 12min

to 9000m = 17min

Optimal speed for climbing: 150 – 180km/h

Landing distance: 300m – optimal speed 130 – 140km/h

## Armament

4x machine gun (vz.30) caliber 7,92mm with rate of fire 1100 rounds/min with 300 rounds per gun

6x 10kg general purpose bombs

4x 20kg general purpose bombs

## Credits

Szalai Viktor, Mila Greiner, Martin Kubani, Viikate, Robert Ulbrik, LesniHu, Kraken, Magot, SaQSoN, and the rest of Daidalos Team

Special thanks to entire SK/CZ IL-2 community for supporting this project and Letka 13 members for testing

## Cockpit Guide



- |                                 |                               |                             |
|---------------------------------|-------------------------------|-----------------------------|
| 1. Compass                      | 12. Fuel pressure indicator   | 23. MG cocking lever        |
| 2. Altimeter                    | 13. Fuel control              | 24. Mixture control         |
| 3. Turn indicator               | 14. Fuel indicator            | 25. Radiator blinds control |
| 4. Rate of climb indicator      | 15. Engine priming fuel pump  | 26. Bomb release            |
| 5. Air speed indicator          | 16. Fuel level indicator pump | 27. Switch box              |
| 6. Tachometer                   | 17. Brake pressure indicator  | 28. Gun camera control      |
| 7. Magneto switch               | 18. Oxygen pressure indicator | 29. Flare pistol            |
| 8. Pressure indicator           | 19. Guns cocked light         | 30. Pressure pump           |
| 9. Oil temperature              | 20. Elevator trim indicator   | 31. Flare pistol cartridges |
| 10. Water temperature indicator | 21. Elevator trim wheel       |                             |
| 11. Oil pressure indicator      | 22. Throttle lever            |                             |

## Note:

**1. Avia B-534 has an automatic fire extinguisher installed (Kubat vz. 30 containing 8kg of tetrachlormethane pressurized to 1 Mpa (10atm)).**

**2. Mixture control: to be engaged over 6000m.**

**3. The throttle lever moves the opposite direction which is historically correct. The pilot increased the throttle by pulling the lever toward him and decreased the throttle by pushing it forward.**

**4. Avia has the ability to tow gliders. This can be set up via FMB.**

The Curtiss-Wright Model 21 (also known as the Curtiss-Wright Model 21 Demonstrator, the Curtiss-Wright CW-21 Interceptor, the Curtiss-Wright CW-21 Demon) was a United States-built interceptor fighter aircraft, developed by the St. Louis Airplane Division of Curtiss-Wright Corporation during the 1930s.

The CW-21 was not commissioned by the U.S. military, though it was test flown at Wright Field in Dayton, Ohio. The Army Air Corps immediately rejected the aircraft, with one officer commenting that it took a genius to land it. Instead it was developed for export sales by the St. Louis Airplane Division of Curtiss-Wright. The aircraft was a single seat, all-metal cantilever low-wing monoplane with rearward retracting landing gear. The Model 21 was powered by a 1000hp (746kW) Wright Cyclone nine cylinder air-cooled radial Wright R-1820-G5 engine.

The Model 21 was designed by George A. Page, Jr. based on Carl W. Scott's design of the two-seater Model 19. The prototype first flew in January 1939 and bore the civil experimental registration NX19431. The prototype was designed to carry various combinations of two 7,62 (0.303in) or 12,7mm (0.5in) machine guns, mounted in the nose and synchronized to fire through the propeller.

The first sale of the CW-21 Demon in 1939, was to the Chinese Air Force, which received three completed examples and kits for 32 more. Assembly would be undertaken by the Central Aircraft Manufacturing Company (CAMCO) located in Loiwing on the China-Burma border. Three CW-21s were furnished to the Chinese as kits, assembled in Loiwing, and delivered to the 1st American Volunteer Group (Flying Tigers). These crashed in poor visibility on a flight from Rangoon to Kunming on 23 December 1941.

In 1940, The Netherlands ordered 24 examples of a modified version designated the CW-21B (together with a number of two-seat CW-22), for the Royal Netherlands East Indies Army Military Aviation (Militaire Luchtvaart van het Koninkrijk Nederlands-Indisch Leger; ML-KNIL).

The modifications consisted of inward retracting landing gear, a semi-retractable tail wheel and a slightly larger fuel tank. These changes gained an 8mph (13km/h) speed increase at sea level.

Deliveries started in June 1940, but only 17 had been received by Vliegtuigroep IV, Afdeling 2 (No. 2 Squadron, Air Group IV; 2-VLG IV), when war with Japan began on December 8, 1941. With its rudimentary pilot protection, lack of self-sealing fuel tanks and light construction, the CW-21B was not unlike the opposing Japanese planes. It had similar firepower to the Nakajima Ki-43 "Oscar", but worse than the cannon-armed A6M Zero. Its climb rate wasn't much better than either. Squadron VLG IV claimed four aerial victories during the Netherlands East Indies campaign but the ML-KNIL was overwhelmed by the sheer number of Japanese adversaries, and were soon lost in combat or destroyed on the ground. Japan has captured at least one CW-21.

### **General characteristics**

Length: 8,3m

Wingspan: 10,7m

Height: 2,7m

Wing area: 16m<sup>2</sup>

Empty weight: 1534kg

Loaded weight: 2041kg

Powerplant: Wright Cyclone R-1820-G5 nine cylinder radial air-cooled engine, 1000hp (746kW)

### **Performance**

Maximum speed: 506km/h at 5200m

Range: 1010km

Service ceiling: 10500m

Rate of climb: 1400m/min)

### **Armament**

4x 0.303 or 2x 0.303 + 2x 0.5 machine guns

### **Credits**

SaQSoN, Gibbage, FC99, LesniHU, Viikate, Magot

The Fiat G.55 was one the best Italian-produced aircraft of the war, and probably among the best Axis fighter of its period, comparable to the Bf 109G-6. It was developed around a license-built version of Daimler-Benz DB-605 engine. The first production sub-series (Sottoserie 0) had 4x 12,7mm and 1x 20mm guns in the nose, and saw very limited operational use with Regia Aeronautica before the Armistice of 1943. The aircraft was much widely used by ANR (Aeronautica Nazionale Repubblicana). The Serie I, a better armed version, was also developed before Armistice, replacing Sottoserie 0. It fought over the Northern Italy against raids of Allied bombers. A torpedo-bomber version was designed and the prototype built, but never entered production. The evolution of G.55 was the G.56, a formidable fighter equipped with DB-603 engine that outclassed both Bf 109K and Fw 190D, but never passed the prototype stage due to the end of the war.

### General characteristics

Length: 9,37m

Wingspan: 11,85m

Height: 3,13m (without the antenna mast)

Wing area: 21,11m<sup>2</sup>

Empty weight: 2630kg

Loaded weight: 3520kg

Max takeoff weight: 3718kg

Fuel 431kg

### Performance

Max speed: 620km/h @ 7000m, 2600rpm, 1,3kg/cm<sup>2</sup>

Max speed @ 6000m: 600km/h

Max speed @ 8000m: 627km/h

Cruise speed: 496km/h (8/10 of max speed)

Operational range: 1200km (2,5 hours) @ cruise speed

Engine: Fiat R.A.1050 R.C.58 Tifone (license built Daimler-Benz DB-605A), 1450hp

The DB-605A was designed for a max power of 1475hp at 2800rpm, but the first engines produced, due to detonation problems and piston failures, had the "emergency" settings disabled and were limited to 2600rpm, giving a max power of 1350hp. Problems were solved in 1943 by strengthening some parts and adopting new spark plugs by Bosch. Thus a 2800rpm regime was possible and the manifold pressure could be increased up to 1,42kg/cm<sup>2</sup>.

The same problems afflicted also the FIAT version and were solved a bit later: until early 1944 the FIAT engine was limited to 2600rpm and manifold pressure to 1,3 kg/cm<sup>2</sup>. This fact has been simulated in IL-2 by introducing a different model called "G.55 Series I late" that does not have the engine limitation. The two models are otherwise identical in all other aspects.

### Armament

2x Breda-Safat 12,7mm with 300 rounds each

1x MG151/20 20mm gun in the nose with 250 rounds

2x MG151/20 20mm guns in the wings with 300 rounds each

Bombload: none

### Credits

Bubi, Nibbio. Maraz, Abraxa, char\_aznable, Gitano, Veltro, LesniHU

6S for beta testing

Bruno for information and documents

The story of the Fokker D.XXI begins in May 1934. The Dutch Colonial Office offered a request to Fokker for building a simple and easy care fighter which would replace Curtiss Hawk P-6. The specification didn't underline speed and climb performance. Armament consisted of one 12,7mm mg in fuselage and two 7,62mm mg's in wings and also light bombs. Two offers were compiled under the guidance of the main designer Erich Schatzkin. The first was a bi-plane designated Fokker D.XIX and the other was a low wing monoplane which had a working title "112". The Dutch Colonial Office chose the low wing monoplane "112" which became Fokker D.XXI in November 1934. Fuselage of the plane was constructed of steel tubes and wings were wooden. The 645hp air-cooled Bristol Mercury VI.S engine was chosen to place of the original liquid cooled Roll-Royce Kestrel engine.

The first flight of the prototype took place in Eindhoven airfield on the 27th of February in 1936 with Emil Meinecke at the controls. The first tests went well and by mid of March in 1936 the plane was flown to Chiphol for additional testing. The doctrines of the Dutch Colonial Office changed soon after the prototype was ordered and its interest towards the Fokker D.XXI program faded out. The Dutch Colonial Office announced that the Ministry of Defence would take possession of the whole program and would produce planes for homeland air defence. The commander of the Dutch air force announced to the Ministry of Defence that the Air Force need's at least 18 top quality fighters. The Fokker D.XXI didn't achieve the expectations of the Air Force and the Ministry of Defence froze the whole program. However Fokker continued the developing test flights and marketing to foreign countries. In the autumn of 1936 the Dutch Ministry of Defence started again the developing test flight program of the D.XXI despite of the stunning statement of the air force commander. In January of 1937 the Chief of the Material Center of the air force informed the Ministry of Defence that there were no obstacles to acquire Fokker D.XXIs. Some changes to the aircraft structure and instrument layout were made.

Fokker's active marketing to foreign countries brought some success too. The first customer was Finland, Fokker's old customer. Finland decided to purchase Fokker D.XXI fighters for its Air Force as early as September of 1936 although development of the plane was unfinished and not a single example was sold to other customers. Fokker had offered the plane to three countries and discussions with three additional countries were in progress. Besides Finland the Spanish Republicans bought the manufacturing licence of the plane. Denmark also bought two planes and a licence in 1938. Denmark had two Fokkers when Germany occupied the country in May of 1940.

### **Finnish D.XXI Series 3 Early (during Winter War) and Late (during Continuation War)**

The Staff of the Finnish air force decided to recommend Fokker D.XXI to the Finnish air force in late summer of 1936. The decision was made after the Staff of the air force had asked offers from 26 manufacturers and only seven answered within the deadline. Advantages of the Fokker D.XXI were its pretty cheap price and the possibility of licence manufacturing. A Finnish manufacturer Tampella had a licence for Mercury engine and the easiness of a ski assembly also influenced the decision. The plane wasn't a top fighter for it's time but it was considered that it was effective enough against the Russian bomber types. Finland bought seven planes ready made (FR-76 - 82, series I) and a licence for 14 planes (FR-83 - 96, series II). An unlimited manufacturing licence was acquired on the 15th of June in 1937 (FR-97 - 117, series III).

The series 3 model is basically identical to series 2. Original series 1 planes didn't have the extra rear window, but it was later retrofitted to all series 1 planes as well.

#### **General characteristics**

Length: 8,20m  
 Wingspan: 11,00m  
 Height: 2,95m  
 Empty weight: 1594/1684kg  
 Takeoff weight: 1970/ 2060kg

#### **Performance**

Engine: Bristol, PZL or Tampella Mercury VII. 840hp.  
 Speed at sea level: 342km/h  
 Maximum speed: 418km/h @ 5000m  
 Operational range: 950km @ 330km/h cruise speed

#### **Armament**

2x 7,7mm Browning in fuselage with 500 rounds each  
 2x 7,7mm Browning in wings with 500 rounds each

**Note: Some Finnish pilots preferred to have right side cowl MG filled with tracers and other three guns totally without tracers. This was done to create single continuous stream of tracers to help with aiming. This loadout is available as optional.**

### Difference between early & late versions

After the Winter War, Fokkers received a self sealing fuel tank & improved armour seat for pilot.

### Cockpit Guide



- |                                              |                                                                       |
|----------------------------------------------|-----------------------------------------------------------------------|
| 1. Airspeed Indicator (km/h)                 | 11. Engine cylinder head temperature (°C)                             |
| 2. Turn and Bank Indicator                   | 12. Wheel break pressure                                              |
| 3. Variometer (meters)                       | 13. Fuel pressure (kg/cm <sup>2</sup> )                               |
| 4. Altimeter (meters)                        | 14. Oil pressure (kg/cm <sup>2</sup> )                                |
| 5. Gyro & Magnetic compass                   | 15. Oil temperature (°C)                                              |
| 6. Lateral attitude indicator / inclinometer | 16. Manifold pressure (centimeters of mercury)                        |
| 7. Fuel indicator (litres)                   | 17. Tachometer (hundreds of RPM)                                      |
| 8. Oxygen regulator delivery                 | 18. Magneto selector                                                  |
| 9. Oxygen regulator supply available         | 19. Switches for navigation lights, cockpit lights, and landing light |
| 10. Clock                                    |                                                                       |

### **Note: Gun sights randomization**

**Both Goertz tube sight and Revi 3a were used in Finnish Series 3 Fokkers. About 40% of all planes had Revi. Therefore a virtual pilot in game has a 40% chance to get Revi when default skin is selected. With user skins (BMP) the sight is Goertz by default but can be certain skins can be bind to Revi with Customization.ini file in skin folder.**

### **Finnish D.XXI Series 4 (AI only)**

On the 9th of September in 1939 an order was made of the Series 4 (FRw-118 - 167). American Pratt & Whitney R-1535 Twin Wasp Junior was chosen for its engine because Mercury engines were needed for Bristol Blenheim bombers which were ordered in April of 1939. Performance of the Series 4 planes was much worse than that of their Mercury-engined sisters. Compared to a Mercury engine plane from a year 1939 over 400kg increase in weight and decreased power of its engine dropped the plane's performance to trainer class.

**General characteristics**

Empty weight: 1850kg  
Takeoff weight: 2400kg

**Performance**

Engine: Pratt & Whitney R-1535 Twin Wasp Junior. 825hp  
Speed at sea level: 354km/h  
Maximum speed: 361km/h @ 2500m  
Operational range: 800km @ 330km/h cruise speed

**Armament**

4x 7,7mm Browning in wings with 300 rounds each

**Dutch D.XXI (AI only)**

On the 31st of December in 1937 the Dutch air force ordered 36 planes for two squadrons when the situation got worse in Europe. At the same time more advanced fighters were hoped for. When Germany invaded the Netherlands in May of 1940 the Dutch had only 28 Fokker D.XXI's and 23 Fokker G.1's to put against German Luftwaffe. The Dutch Fokker D.XXI pilots scored many victories during three days. The Dutch air force lost almost all of its planes in the battles, only handful of Fokker D.XXIs was still operational when the air force ran out of machine gun cartridges. Netherlands surrendered after five days of fighting.

**General characteristics**

Empty weight: 1450kg  
Takeoff weight: 1940kg

**Performance**

Engine: Bristol Mercury VIII. 850hp  
Speed at sea level: 342km/h  
Maximum speed: 446km/h @ 5100m

**Armament**

4x 7,9mm Browning in wings with 300 rounds each

**Danish D.XXI (AI only)**

Denmark ordered two D.XXIs from Holland and a further 10 were built in the Royal Army Aircraft Factory, Copenhagen. They had Mercury VI-S engines and one 20 mm Madsen cannon in a fairing beneath each wing. All Danish D.XXIs were destroyed on the ground during German attack on Denmark in April, 1940.

**General characteristics**

Empty weight: 1225kg  
Takeoff weight: 1750kg

**Performance**

Engine: Bristol Mercury VI-S. 645hp  
Speed at sea level: 332 km/h  
Maximum speed: 395km/h @ 4274m

**Armament**

2x 7,7mm Browning in fuselage with 500 rounds each  
Optional: 2x 20mm Madsen cannon pods with 60 rounds each.

**Credits for all Fokker versions**

Models: Viikate  
Textures: Hurri-Khan, 1.Java Serval, Viikate  
Special thanks to F19 Orheim for testing and Revi manual.

In 1933, Russian Nicolay Polikarpov developed one of the most outstanding biplanes ever used in combat. The Polikarpov I-15 had amazing combat performance due to its gull-shaped top wing that allowed the plane to do a complete turn in eight seconds. Although the first 59 planes were built with an American 630hp Wright Cyclone engines, they were quickly replaced with Soviet made M-22 and M-25 radial engines that increased the horsepower.

Pilots of the I-15 had two main complaints. The gull-shaped wing did not allow the pilots to view the horizon during flight and especially while landing. Also, at high speeds the plane was unstable during level flight, which would complicate the attack of an enemy airplane and make it difficult to aim the machine gun. In 1935 Nicolay Polikarpov was asked to design and perfect the I-16 monoplane by the Air Force Red Army in response to the negative feedback on the I-15 from pilots.

The Polikarpov I-15 did not go away. In October of 1936 the Soviet Union sent a squadron of I-15's to the support of the Spanish Republic, where these manoeuvrable biplanes were unexpectedly popular in their combat role. Inexperienced pilots could learn to fly the Polikarpov I-15 very quickly and it was easy to take off and land. This new found excitement for the plane forced the Soviet Air Force to renew their manufacturing contract for more Polikarpov I-15's with a few modifications from Nicolay. The top wing was no longer gull-shaped, the M-25 750hp engine was installed, and a new exhaust system added, to make up this new I-15bis. The term "bis" meant second version or variant. In 1938, 1104 I-15bis airplanes were manufactured which made it the most mass produced Soviet fighter of that period. In 1939, an additional 1304 Polikarpov I-15bis aircraft's were produced, just before the contract was over and production of the I-153 began. The final 27 Polikarpov I-15bis to roll off the assembly line were equipped with the M-62 900hp engine.

Soviet Air Force pilots came to love the I-15bis because all of the flaws from the previous version were no longer present and the plane was very stable and performed excellent in combat. In 1941 there were still several Polikarpov I-15bis aircraft patrolling the borders of the USSR. They began to be used for auxiliary tasks such as investigating artillery fire, destruction of nightlights, night attacks, and anti submarine defence along the coast. Slowly they were replaced by the MiG-3, LaGG-3, and the Yak-1. The I-15bis remained at several airfields and warehouses as their replacements were being delivered. During the many years of service the I-15bis was used in Spain, Mongolia, Finland, Russia, and even during the Japanese campaign in 1945.

### **General characteristics**

Length: 6,10m

Wingspan: 9,75m

Height: 2,20m

Wing area: 21,9m<sup>2</sup>

Empty weight: 1310kg

Takeoff weight: 1730kg

### **Performance**

Engine: Shvetsov M-25V. 775hp

Speed at sea level: 321km/h

Max. speed: 370km/h @ 3500m

Operational range: 570km

### **Armament**

4x 7,62mm PV-1 machine guns in fuselage. Two ammunition boxes with 1100 rounds each for upper MGs and 2 boxes with 425 rounds each for lower MGs.

Bomb load:

4x AO-10

2x AO-10 + 2x FAB-50

2x FAB-50

Rockets:

4x RS-82

### **Credits:**

Vladimir "SaQSoN" Kochmarsky, Alex Porozov



The I-16 was introduced in the mid-1930s and formed the backbone of the Soviet Air Force at the beginning of World War II.

The Type 5 production started in July 1935, all powered with the M-25 engine. Type 4 cowling was redesigned. It was now slightly conical (like on rebuilt TsKB-12bis, without gap between fuselage and cowling. Nine big holes with shutters were made to provide cooling air intake, eight holes were shared by cooling flow and exhaust system. This shape of cowling was used on all later models.

The PV-1 machineguns were replaced by more advanced ShKAS, provision for 200kg external bombs was included. In the SPB (Zveno-6) bomber each of two I-16 Type 5 carried 2250kg bombs.

In 1935-1937 Type 5 was the fastest fighter in the world, but experience in Spain demonstrated that speed by itself does not provide guaranteed victory in air combat. Turn time (15sec) was larger than for slow biplanes (like Italian Fiat CR.32), and close in manoeuvring engagements were fatal for the first Type 5's. This experience caused widespread concern among Soviet aviation experts that role of manoeuvrable and slow biplanes will be important in future air combats as well. As a result, the I-153 biplane was in production much longer than more advanced I-16.

Later, when proper tactics were used against biplanes (single-pass high speed attack with turn at safe distance), the advantages of the fast monoplane over slow manoeuvrable machines was proven, but the wrong concept prevailed for almost 5 years.

I-16 Type 5 was used by Republicans during Spanish War and by Chinese against Japan invasion (1937). Success depended strongly on the level of pilot training. With arrival of more modern Bf 109 and Zero fighters advantages of Type 5 faded. Large numbers of Type 5 were still in service on June 22, 1941, taking the hardest hits of the advancing Luftwaffe.

About 1500 built, until I-16 Type 6 replaced it on production line in late 1937.

### **General characteristics**

Length: 6,13m

Wingspan: 9m

Height: 3,25m

Wing area: 14,5m<sup>2</sup>

Empty weight: 1120kg

Takeoff weight: 1500kg

### **Performance**

Engine: Wright R-1820 Cyclone M-25

Speed at sea level: 390km/h

Max speed: 445km/h @ 2700m

Operational range: 540km

### **Armament**

2x 7,62mm ShKAS machine guns in wings with 900 rounds each

or 2x 7,62mm PV-1 machine guns in wings with 900 rounds each (pre-production model armament)

Bombload: 2x FAB-50 or 2x FAB-100

### **Credits**

Model changes from I-16 Type 18: Viikate (originally inspired by L&B)

Textures: Hurri-Khan

The I-16 was introduced in the mid-1930s and formed the backbone of the Soviet Air Force at the beginning of World War II.

The I-16 Type 6 replaced the I-16 Type 5 on the production line at GAZ-21 and GAZ-153. As a result of pilot's complaints, the Polikarpov Design Bureau returned to open cockpit and replaced the forward sliding canopy with a fixed, single piece windscreen, which provided the pilot with a far better overall view.

The I-16 Type 6 had an improved 730hp M-25A engine. The OP-1 gunsight was replaced by a more advanced PAK-1 which was a copy of the French Clair gunsight. Early production I-16 Type 6s retained the OP-1 gunsight. The PAK-1 was housed behind the windscreen while the OP-1 protruded through the windscreen. The PAK-1 became the main type of gunsight used on all I-16 variants from the I-16 Type 6 onwards.

For winter operations, the I-16 Type 6s could be equipped with a ski landing gear which was fixed in the lowered position when the skis were fitted.

The armament of the I-16 Type 6 was the same as the earlier I-16 Type 5, two ShKAS 7,62mm machine guns. Before the IL-2 became available in quantity, I-16 Type 6s were used in the ground support role. For ground attack duties the I-16 Type 6 could be armed with either four or six RS-82 unguided air-to-ground rockets or with bombs (200kg). Many ground attack Type 6s had the propeller spinner removed, however, this was not a standard feature.

Approximately 730 planes of Type 6 were built.

### **Note:**

**1. Many sources about I-16 Type 6 have conflicting information. Typically most western sources claim that Type 6 was relatively a large patch with small improvement from Type 5. While most Russian sources identify Type 6 as a small patch with third ShKAS installed at the bottom of the fuselage. So from Russian perspective, type 6 could be seen as later version of Type 5.**

**More info:** <http://i16fighter.narod.ru/mods/t6.htm>

### **2. Gun sights randomization**

**There is an about 10% chance that a virtual pilot in game will receive the early production OP-1 sight instead of the advanced PAK-1.**

### **General characteristics**

Length: 6,13m

Wingspan: 9m

Height: 3,25m

Wing area: 14,5m<sup>2</sup>

Empty weight: 1260kg

Takeoff weight: 1660kg

### **Performance**

Engine: Wright R-1820 Cyclone M-25A

Speed at sea level: 390km/h

Max speed: 440km/h @ 2700m

Operational range: 540km

### **Armament**

2 x 7,62mm ShKAS machine guns in wings with 900 rounds each

Bombload: 2x FAB-50 or 2x FAB-100

Rockets: 4x RS-82 or 6x RS-82

### **Credits:**

Model changes from I-16 Type 18: Viikate (originally inspired by L&B)

Textures: Hurri-Khan

Design work on the plane started in 1932 to meet a requirement from the Finnish Air Force although the Finn's never accepted the type due to production delays and contract cancellation. It first flew in 1934 and began equipping the Czech Air Force the following year. However, the Czechoslovak Ministry of National Defence became interested in the type, and, in 1934, the S-328 had been ordered into production as the Czechoslovak Air Force's standard reconnaissance aircraft. Powered by a Walter-built Bristol Pegasus II-M-2 nine-cylinder radial rated at 635hp at sea level and 580hp at 1524m, the S-328 was a sturdy all-metal aircraft with fabric covering apart from the light metal fuselage upper decking. Armament normally comprised two fixed forward-firing 7,92mm machine guns in the wings and a pair of the same weapon on a swivelling Skoda mounting in the observer's cockpit, and racks could be attached beneath the fuselage and lower wings.

Successive orders for the S-328 kept the aircraft in continuous production at Prague-Letnany, and when in March 1939 German troops occupied Bohemia and Moravia, dissolving the Czechoslovak Republic, the S-328 was still on the assembly lines and remained so until a total of 450 had been completed. Almost immediately after the occupation of Bohemia and Moravia, S-328s were pressed into service as trainers with the Luftwaffe's A/B-Schulen, while others were passed to the Slovak Air Force which had been established under Luftwaffe patronage. But the S-328's wartime career was not to be confined to the passive role of training. With the formation of the Störkampfstaffeln by the Luftwaffe during the winter of 1942-43, the S-328 once more achieved operational service. The Störkampfstaffeln, the forerunners of the later Nachtschlachtgruppen, were hurriedly formed to provide an answer to the nocturnal harassing of the Russian Polikarpov Po-2 biplanes, and the S-328s, among other types, were crewed by volunteers from the ranks of the instructors at the A/B-Schulen, although most of the Letovs had been supplanted by later types by the spring of 1943. Letov S-328 was also used for glider towing.

In addition, Letovs has been used operationally by German allies, Bulgaria, and Slovakia. The Slovak Š-328s carried out reconnaissance and bombing sorties in support of the Slovak troops in the invasion of Poland in September 1939. Following Slovakia's participation in the German attack on the Soviet Union in 1941, Slovak Š-328s were used for anti-partisan operations in western Ukraine in the summer of 1941, being used again on the Eastern front in the summer of 1942. Three Slovakian aircraft were seized by Slovak insurgents and actually flown against the Germans in late 1944 during the Slovak National Uprising in September to October 1944.

### General characteristics

Wingspan: 13,71m

Length: 10,36m

Height: 3,45m

Wing area: 39,40m<sup>2</sup>

Wing surface load: 70kg/m<sup>2</sup>

Empty weight: 1680kg

Take off weight: 2750kg

### Performance

Max. ceiling: 7200m

Max. range: 1280km

Maximum speed – 328km/h

Optimal cruising speed: 250km/h

Climb: to 5000 m = 17min

### Armament

2x wing mounted machine gun vz.30 caliber 7,92mm with rate of fire 1100 rounds/min with 400 rounds per gun.

2x observer's rear machine gun vz.30 caliber 7,92mm with 840 rounds in 12 ammo cartridges.

Up to 120kg of bombs or paraflares

### Credits

Szalai Viktor, Martin Kubani, Robert Ulbrik, Magot, LesniHU, SaQSoN, Viikate and the rest of Daidalos Team  
Special thanks to entire SK/CZ IL-2 community for supporting this project and Letka 13 members for testing

### Note:

**1. Due to current AI shooting accuracy, Letov S-328 observer/rear gunner is very effective in its defensive role. The rear machine gun is set to its historically correct high rate of fire and the MG mount to its turning/sliding radius. Thus, we suggest you set Letov S-328 to "Rookie" pilot in order to decrease its effectiveness.**

**2. Letov has the ability to tow gliders. This can be set up via FMB.**

The Re.2000 was designed by Ing. Longhi of Caproni Reggiane, who has worked in the USA previously, and the plane had a strong exterior resemblance with Severski P-35 (though being more aerodynamically refined and with much better performance). The prototype flew in May, 1939. The design included a "wet wing" to store fuel (in the center section of the wing). This was judged unfit for war use by Regia Aeronautica and the aircraft was discarded. On the other hand, Sweden, Hungary and Great Britain were interested in the plane and all of them placed orders (the British order for 300 planes was cancelled after the declaration of war).

Due the shortage of fighters, even Regia Aeronautica employed small numbers of Re.2000s, mainly for actions over Malta, for which a field modification for carrying two 100kg bombs was adopted. Also a version was produced for catapult launch from Italian warships, but they saw no operational use.

Hungary employed about 70 Re.2000s that saw an intense use as fighters on the Eastern front, and later developed a license built version (Heja II.) with different engine (Gnome Rhone K-14) and machine guns (Gebauer 12,7mm).

Sweden employed 60 Re.2000s for air space patrol.

The Re.2000 was reported by all pilots for having good power and good handling features. However, maintenance and reliability of the Piaggio engine was troublesome.

### **General characteristics**

Length: 7,99m

Wingspan: 11m

Height: 3,2m

Wing area: 20,4m<sup>2</sup>

Empty weight: 2090kg

Fuel weight: 260kg

Useful load: 911kg

### **Performance**

Speed at ground level: 425km/h

Max speed: 530km/h @ 5300m

Operational range: 3h at 6000m @ 430km/h cruise speed

Service ceiling: 10500m

Rate of climb: 11m/s

### **Armament**

2x Breda-Safat 12,7mm with 300 rounds each

Bombload: 2x 100kg (field mod.), 88x 2kg bomblets

### **Credits**

Szalai Viktor (Jutocsa), Maraz, char\_aznable, Gitano

6S for beta testing

Bruno, Gatt, Sagittario for information and documents

The SIAI Marchetti SM.79 was originally designed as a high-speed passenger and transport plane. The prototype flew in 1935. A special race version was built, that won, among others, the "Istres-Damascus-Paris" race. The design was quickly adapted to the bomber role.

The aircraft had large operational use during the Spanish Civil War, when it was a very effective and fast aircraft, almost impossible to intercept for biplanes of that era. At the outbreak of WWII, though being already almost obsolete, it was the main bomber aircraft of Regia Aeronautica. Shortly after, it was adapted to be used as a torpedo bomber, role to which it was very fit, thanks to its good manoeuvrability and its ruggedness and resistance to damage. All SM.79's were quickly switched to the torpedo bomber role. They took part in all the major naval engagements in the Mediterranean. The new Savoia-Marchetti project, the SM.84, that had to replace the SM.79 with a more modern torpedo bomber, was a failure, and SM.84s were quickly retired from torpedo bomber role. All together, SM.79s and the few SM.84s sunk 8 military ships and 14 transport ships, and damaged 14 military and 3 transport ships. Among the military ships damaged, there were the battleship Nelson, the aircraft carrier Indomitable and the cruisers Kent, Liverpool (torpedoed twice) – Glasgow, Manchester, and Phoebe. All this was achieved with high losses (110 torpedo bombers lost). As a torpedo bomber, the SM.79 flew war missions up to 1944, in the ranks of Aeronautica Nazionale Repubblicana.

After the war the plane was used as a transport. Today only two aircrafts, of over 1500 built, are preserved.

The wing of the SM.79 was made of wood (this gave it a long floatation time when the aircraft ditched into the sea), the fuselage structure was made of steel tubes, covered with metal forward, metal and plywood over the top, and fabric on all other surfaces.

### General characteristics

Length: 16,2m  
Wingspan: 20,2m  
Height: 4,1m  
Wing area: 61,7m<sup>2</sup>  
Empty weight: 6890kg  
Fuel: 1720kg  
Useful load: 3700kg

### Performance

Speed at ground level: 360km/h  
Max speed: 430km/h @ 4000m  
Operational range: 1820km with full bombload and 75% fuel  
Engines: 3x 780hp Alfa Romeo 126 RC.34 radials  
Maximum safe dive speed: 550km/h

### Armament

1x fixed Breda-Safat 12,7mm with 350 rounds  
2x flexible Breda-Safat 12,7mm with 500 rounds  
2x flexible Breda-Safat 7,7mm with 350 rounds  
Bombload:  
2x 500kg (very rarely used)  
5x 250kg (rarely used)  
12x 100kg (most common bombload)  
6x 100kg (reduced bombload for longer range or takeoff from short fields)  
12x 50kg (field modification for reduced bombload for longer range or takeoff from short fields)  
672x 2kg bomblets

### Pilot's notes

Propeller pitch has only two effective position in SM.79: minimum (fine => higher RPM), used for takeoff and climb, and maximum (coarse => lower RPM) used for level flight and other conditions. In IL-2, this is modelled so that "prop pitch" positions from 100% to 50% corresponds to fine, "prop pitch" positions from 49% to 0% correspond to "coarse". **The pilot should switch to "coarse" after climb (by reducing "prop pitch" command below 50%) to avoid over-revving and ruining his engines. Prop control: maximum allowed RPM is 2400/min.**

Flaps: SM.79 has completely automated flaps/slats. These are automatically and gradually deployed (via hydraulic actuators) when the aircraft IAS falls below 210km/h. Maximum extension is reached when IAS drops to 140km/h. Retraction is also automated, at the same speeds. Ailerons also act as flaps (flaperons) by deflection downwards with the automated mechanism

## Cockpit Guide



1. Compass
2. Artificial Horizon
3. Fuel Indicator
4. Turn and Bank Indicator
5. Variometer
6. Altimeter
7. Airspeed Indicator
8. Clock
9. Landing Gear Indicator
10. RPM Indicator for each engine
11. Manifold Pressure Indicator
12. Engine Oil Temperature (E needle: input; U needle: output)
13. Oil Pressure Indicator
14. Fuel Pressure Indicator
15. Magnetos
16. Throttle lever for each engine
17. Pitch lever for each propeller
18. Mixture lever for each engine
19. Outside Air Temperature

### Gun positions

**Dorsal and ventral positions are covered by doors. These doors open automatically when there is an enemy in sight (either aircraft, ships or vehicle). The doors can also be opened/closed manually by the pilot via "Open Cockpit" command.**

### Bombsight

The Jozza bombsight is an open sight view (without scope or other optical sights) with manual bomb drop.

In the real world, usage of this sight was rather complex; three different methods for range sighting existed. The first two ones implied the use of ballistic tables for each type of bomb, and of indexed scales that are on the instrument (that cannot be implemented in IL-2). The third sighting method only implies measurement of TAS and height, so can be adopted in IL-2.

The usual keys are used to operate the bombsight:

- Bombsight Altitude +/-: used to input aircraft height (subtracted of target height, if applicable)
- Bombsight Velocity +/-: used to input true air speed (TAS) of aircraft
- Bombsight Elevation +/-: these key are only used to move visual angle when in bombsight view, and have no effect on actual sighting.
- Bombsight side slip +/-: these keys rotate the sight in the yaw axis, are used for bombing in presence of wind and for bombing moving targets (e.g. ships)

### Sighting procedure

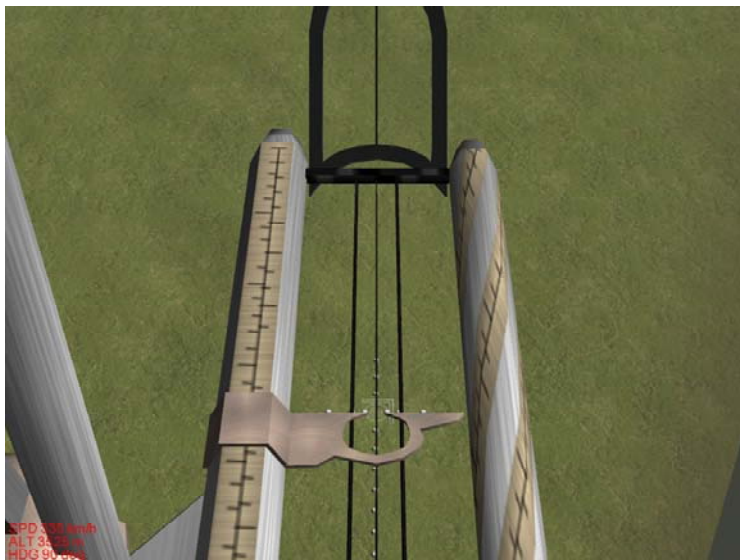
For attacking fixed targets, sighting is very easy: TAS and height of aircraft are input via the bombsight keys. The target must be aligned with the central line of the sight. The rudder trim is used for small adjustments of aircraft route, to align the target.



The dropping point is when the target passes through the sighting line that crosses the first (i.e. the more distant) of the two cursors and the upper reference point.



The player can check this in the bombsight view. In this view, the players' eye is positioned where the upper reference is, so it's only needed to look at the target when it passes through the first cursor, and drop bombs.



**Note: All bombs are dropped one at a time, excluding the bomblets that are all dropped all with a single keypress, in about 4 seconds.**

### **Torpedo sight**

The "Marazio-Unia" Torpedo Sight is mounted when a torpedo is chosen as arming option. In this case, the bombsight is not present. This torpedo sight is a very simple graphometer, it indicates the lead angle that must be calculated/estimated via some external way (torpedo tables or Bruno's excellent torpedo tool, (see <http://brudile.googlepages.com/torpedosight.zip>). The angle is changed using the bombsight side-slip keys and can be a visual help for manually dropping the torpedo.

### **Torpedo**

**The Whitehead torpedo can be launched at a slightly higher height than other torpedoes (slightly above 100m) but it sinks in the water more than others before getting to the correct depth. For this reason, it must be dropped at no less than 400-500m from the ship; otherwise it will pass below the ship and will not explode.**

### **Credits**

- RAF\_Cobber, I/Jg53 Nibbio, 6S.Maraz, ItalianWings, char\_aznable, 1SMV\_Gitano, UF\_Josse, Tchaika , Caspar, Bolox, Avala, 150GCT\_Veltro, LesniHU.
- 6S, 1SMV, 150GCT for beta testing
- 150GCT\_Italo, 1SMV\_6Cilindri, char\_aznable, Maraz for additional skins
- Bruno, Gatt, Sagittario, Mapalm for informations and documents



Programmed by FC99 and MicroWave

**1. Editable Altitude**

Player can choose any altitude he wants between 100-10000m. It is possible to pick one of presets or to type a completely new value.

**2. New Option- Cloud Height**

Player can set any alt between 500-2500m. It is possible to pick one of the presets or to type a completely new value.

**3. New Option- Altitude Difference**

Player can set altitude difference between him and the enemy, depending on Situation setting. Maximum difference is 3000m. It is possible to pick one of the presets or to type a completely new value.

**4. New Target Option- Scramble**

Player starts on the ground and has to take off. There are 3 scramble scenarios which scenario is flown is chosen randomly. For adding variety it is good to pick enemy from different flights.

**5. New maps added**

Slovakia summer & winter, Bessarabia, MTO and Kuban

**6. New Option- Pos.**

This option works only with Target None selected. It has the following 3 possibilities:

1. N- neutral setting, same as old Target None missions.
2. A- Advantage player, player start close behind the enemy.
3. D- Disadvantage player, enemy start behind the player.

**New QMB layout**



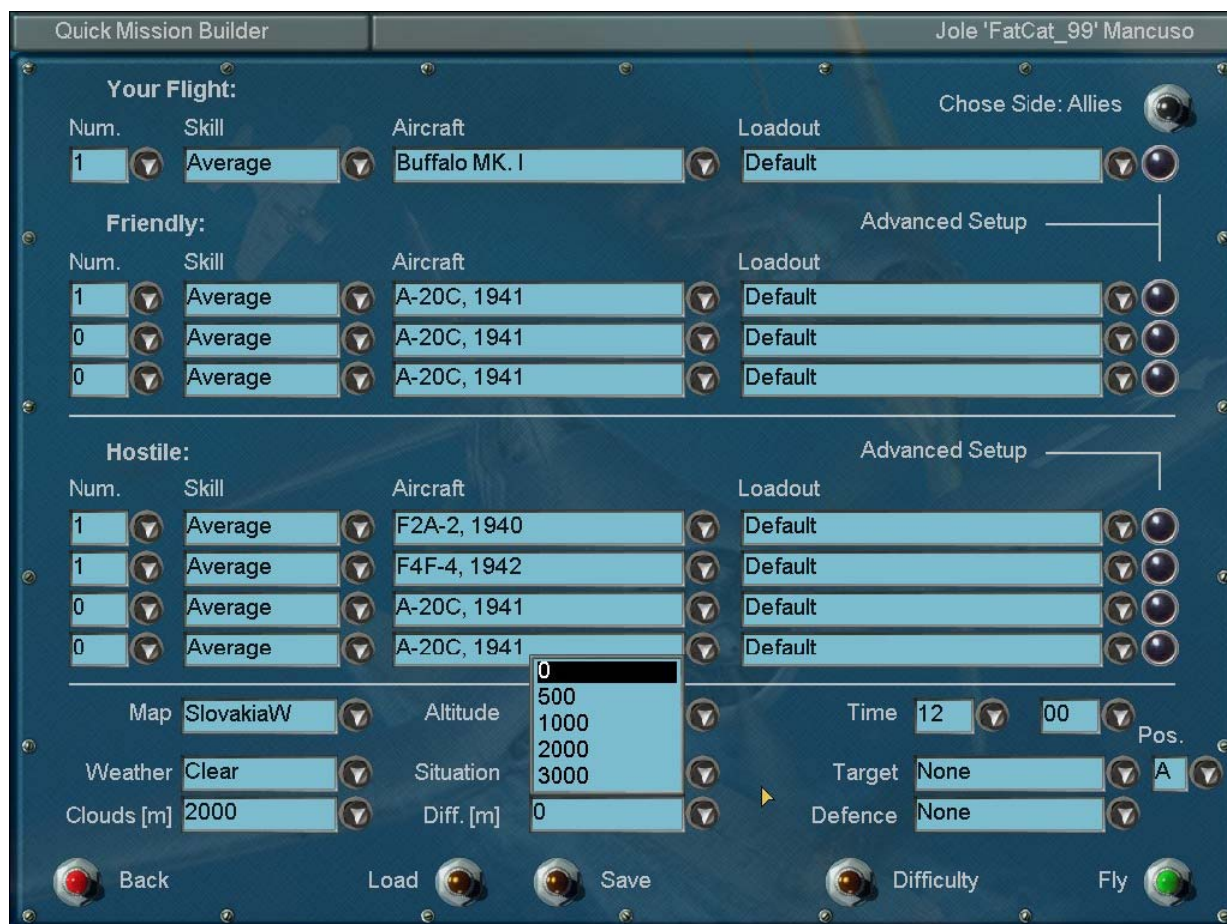
## New Maps



## Setting Clouds Altitude



## Setting Altitude difference between player and enemy



## New Target option Scramble



## New option Pos.

Quick Mission Builder Jole 'FatCat\_99' Mancuso

**Your Flight:** Chose Side: Allies

Num.	Skill	Aircraft	Loadout
1	Average	Buffalo MK. I	Default

**Friendly:** Advanced Setup

Num.	Skill	Aircraft	Loadout
1	Average	A-20C, 1941	Default
0	Average	A-20C, 1941	Default
0	Average	A-20C, 1941	Default

**Hostile:** Advanced Setup

Num.	Skill	Aircraft	Loadout
1	Average	F2A-2, 1940	Default
1	Average	F4F-4, 1942	Default
0	Average	A-20C, 1941	Default
0	Average	A-20C, 1941	Default

Map  Altitude  Time   Pos.   
Weather  Situation  Target   
Clouds [m]  Diff. [m]  Defence    
  
  
Fly

Back  Load  Save  Difficulty  Fly

# The Bessarabia-Maps in IL-2

A Readme by Jörg Wiedemann



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## Bessarabia Readme

### Introduction

This file is meant to provide the some background information for creating missions which depict the historical events as close as possible. We tried to make the map as close to reality as possible with our limited resources.

### Weather & time of year

Most military action took place in spring and summer during 1941's axis as well as 1944's soviet advance. The map is designed for summer with a temperature of 25°C. Summer in the region is pretty warm compared to Germany. The weather is often good for flying with some clouds. In the next chapters you can find some basic information on what happened in "our area".

### Ground Operations 1941

In 1940, the USSR claimed Bessarabia from Romania, and the latter had to give in as it was simply too weak to resist. This lead to an alliance between Germany and Romania, which became militarily active during operation Barbarossa.

On June 22 1941, the *Wehrmacht* alongside with the Romanian Army and other Allies attacked the Soviet Union. But on the Romanian-Soviet border, matters stayed relatively calm for the first week of the war.

Only on July 2, operation "München" is launched. The German *11. Armee* is ordered to take Dubossary and Balti while the *Romanian 4<sup>th</sup> Army* moves towards Kishinev and Tighina. North of our map, the 3<sup>rd</sup> Romanian army aims for the Bukovina area. Already on July 7, Romanian troops reach the river Dneestr in heavy fighting and bad weather.

Between July 8 to 10, in the area of Balti, the village Mandresti sets the scene for heavy ground actions. After that, the soviet *12<sup>th</sup> Army* initiates a rapid but yet organized withdrawal while waiting for reinforcements in shape of the soviet *9<sup>th</sup> Army*, approaching from the Moscow military district.

On July 7, a strong soviet counterattack takes place near Mi Clauseni and causes considerable losses to the *Romanian 35<sup>th</sup> Reserve Infantry Division*.

On July 9, here the Romanian Air Force flies 80 plus sorties and drops more then 22 tons of bombs after being called for to help. North of that, the German *76. Infanteriedivision* switches to the defensive in order to hold its positions.

The strongest fighting of that operation takes place during the battle of Tiganca. Both sides fly air support missions from July 2 to 14. These clashes are so fierce that some Romanian units loose as much as 40 % of their strength here.

On July 13 a new axis attack with armored support is launched towards Kishinev from several starting points. Two days later, it reaches up to 8 km to today's Moldavian capital which is already fully taken on the next day.

Due to the axis success in the northern area, the soviet *9<sup>th</sup> Army* is forced to retreat from its positions on the southern Prut back to the Dneestr. On July 20, the *15<sup>th</sup> Romanian Infantry Division* takes Tighina-Benderi. Already on

## Bessarabia Readme

July 20, all Red Army Forces had withdrawn behind the Dnestr - the old Soviet-Romanian border. This signals the completion of operation "München".



Picture: Frontlines 1941

In August, the two axis armies start the next stage: Targeting their thrust at Vosnessensk just out of the northeastern corner of our map, they try to isolate the Soviet 9<sup>th</sup> Army from the main front, then destroy and take Odessa. On August 7 already, Kotovsk, Pervomaisk, Kirovograd and also Vosnessensk are reached.

Around Odessa, the *Krasnaya Armiya* mans defensive positions on August 10 on a line ca. 20-25 km away from the port to protect it from artillery fire. Behind that, two more defensive lines are still under preparation. Commander in chief is Konteradmiral G. V. Zhukov. He can also rely on support by the whole Black Sea Fleet and its Air Force *VVS-ChF*.

On the 13<sup>th</sup>, the Romanian 4<sup>th</sup> Army starts its first attack simultaneously at three points. The Red Army is supported by artillery from ships like the old destroyers *Frunze*, *Dershinsky*, *Shaumyan*, *Nezamozhnik* and the cruiser *Krasny Krym*. This gives the Romanians a hard time. But even against that marine and air support, they advance slowly, while both sides suffer huge losses. Inside the fortress, ammunition and other supplies become very limited.

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Nevertheless, the defenders are in high spirits. On September 22, a carefully prepared amphibious counterattack is started from Sevastopol on the Crimea, aiming at the bay northeast of Odessa.

But one week later Sevastopol itself and the Crimea are in big danger of being captured. So, the soviet *STAVKA* decided to evacuate Odessa which was very successful realized from October 7 to 15.

### Air action 1941

During "München", the Axis advance to the Dnestr, the air forces also took part in the intense battles for the river crossings over Prut and Dnestr. Also, the soviet *VVS* flew several unsuccessful attacks on Romanian shipping, being partly engaged by *III./JG52*. Both sides attacked enemy airfields as well as targets like bridges, troops and transport columns.

A lot of air action took place during the siege of Odessa, including the sinking of several Russian vessels by *III./StG77*, the destruction of a huge soviet depot inside the city by Romanian bombers and a lot of ground attacks by *IL2*'s as well as *IAR-80*, *PZL.11* and other types. A soviet analysis of the siege emphasizes the big influence of air power on the successful defense of Odessa. Besides the relatively small number of fighters and attack planes within the city, bombers from Nikolayev and Ochakov (both outside the map to the East) were able to support the city. The fighters from Odessa alone flew 3.780 sorties between August 22 and October 16.

Examples for historic missions during the Odessa-campaign:

On August 20, the *Gruparea Aeriana de Lupta* flew 118 sorties and dropped 78 tons of bombs on Freudenthal, Dalnik, Marienthal and other places. One day later, bombs from Romanian Blenheims hit the cargo-boat *Bryansk*. 9 days before, other Blenheims damaged the gunboat *Krasny Adjaristan*.

During the soviet amphibious landing, the Stukas of the newly arrived *III./StG77* attacked the fleet, sinking the destroyer *Frunze*, a gunboat and a tug as well as damaging the destroyers *Bezuprechny* and *Besposhachadny*. *GAL* also intervened, flying 71 sorties and dropping 32 tons of bombs on the Soviet forces. One transport ship was reportedly damaged by the He-111H of the *5th Bomber Grupul*. Another successful mission of the *GAL* destroyed the largest Soviet supply depot at Odessa, which was situated near Tatarka.

### Ground Operations 1944

Basically since the battle of Kursk in July 1943, the Southern part of the Eastern Front was steadily moving westwards due to the never ending pressure which the Red Army was able to keep upon the Wehrmacht. In February, the bridgehead of Nikopol which is 400km east of the Dnestr had to be given up by the German *6.Arme*e.

During the March 1944, the soviet advance reaches Bessarabia. On March 24, the *1<sup>st</sup> Ukrainian Front* starts to attack Odessa. After blowing up as much as possible, the axis troops leave Odessa on April 10, always disturbed by strong Partisan groups within the city. The last Romanian fighters (*Bf-109*) leave the city on April 5, landing at Tecuci's airfield.

On April 6, elements of the German 6th Army trapped at Razdelnaya are heavily engaged by elements of the 3rd Ukrainian Front until April 8, when



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they are eliminated. On the very same day, Botosani is retaken by the 1<sup>st</sup> and 2<sup>nd</sup> *Ukrainian Front*. Two days later, elements of 2<sup>nd</sup> *Ukrainian Front* cross the Seret River and capture Radauti and Suceava. On April 16 already, the 3<sup>rd</sup> *Ukrainian Front* establishes a bridgehead over the Dneestr south of Tiraspol in a bend of the river. The weakened Germans can only throw in the battle weary 306. *ID*. It had just come from Nikopol, and therefore is totally unable to fulfill any offensive task. The soviet bridgehead remains and provides a valuable position for the following offensive.

In April, the front stabilizes along the Dneestr to the East and the two relatively small rivers Bahlului (east of Iasi), and Reut (between Kornesti and the Dneestr) in the North. Both sides dig in defensive positions. On the axis side, big systems of sometimes up to 50km depth are prepared, including the "Trajan-Linie" constructed over a long stretch behind the actual front. The German *FHQ* was sure that the next summer offensive of the Red Army would target for the southern part of the *Ostfront*. So, here ca. 60% of the armored ground forces available in the East are concentrated together with big parts of the *Luftwaffe* including the elite units *Schlachtgeschwader 2* and *Jagdgeschwader 52*.



Picture: Frontline between April and August 1944

Within some calm weeks, the red 2<sup>nd</sup> *Tank Army* is brought back to full striking power and is ready to attack again. In early May the battle of Targul-Frumos erupts. The Soviets target is Iasi, but the operation fails. The Russians loose more then 300 tanks within three days only and the battle

## Bessarabia Readme

ends with a defensive success for the German *LVII. Panzerkorps* (mainly *PG-Division Großdeutschland* and *24. Panzerdivision*) and *L. Armeekorps*. It was the first time that Tigers and Stalin-tanks clashed. Later in May, the shaken red *2<sup>nd</sup> Panzer Army* had to be pulled to the rear to recover from this slaughter.

Around May 30, the German *8. Armee* starts local attacks north of Iasi near Stanca in order to improve its defense position. Big aerial battles develop in the region, where in the meantime the *7<sup>th</sup> Guards Fighter Division* under *A. I. Pokryshkin* as well as all three Gruppen of *JG 52* had arrived. Battles are mean and both sides recorded heavy losses, especially among the inexperienced Airacobra-pilots. Ca. 40 % of Pokryshkin's Guards units pilots never have flown a combat sortie before arriving in Bessarabia! But after 2-3 days of heavy fighting, things calmed down to normal levels of activity, and soviets retake the small areas which were taken by the Wehrmacht.

In July 1944 the soviet operation "Bagration" virtually destroys the whole *Heeresgruppe Mitte*. Germany has to fill gaps by relocating important air and mobile ground units to save the disastrous situation there. But again, this leads to a precarious situation on the Romanian front. Only very few tank units and other strong assets are left in Romania. When General Friesner takes over command of *Heeresgruppe "Südukraine"* in late July, he immediately identifies the potential disaster of encirclement for his *6. Armee* and requests a strategic withdrawal to the natural defense lines of the East Carpathians and the Danube (at the Eastern respectively southern end of our map). But this was not acceptable for Hitler and the Romanians from political points of view. By then, some Romanians including "Conducator" Antonescu already were involved in secret diplomatic talks with the Allies about peace.

In the meantime, the *15<sup>th</sup> US Air Force* intensifies its attacks on Ploesti as well as military targets on our map, because its bombers are now able to land in the USSR. In the course of operation "FRANTIC", airfields were prepared there for shuttle ops between Russia and the ETO/MTO. The *Luftwaffe* tries to answer with "Sternflüge": All more or less suited single-engined warplanes including the obsolete IAR80 from the *ARR* and Fw190 from *Schlachtgeschwader 2* are dispatched against the *USAAF*.

On August 20 the soviet "*Iasi-Kishinev-Operation*" breaks loose with enormous artillery preparation. The two breakthrough zones near Iasi and Kishinev are located exactly on areas where weak Romanian troops are standing. That is a second death sentence for the German *6. Armee* - it is encircled after only 3 days. The Russians control the battlefield as well as the air, and *Sturmoviks* and fighter groups hunt down everything German which moves on the ground during daytime. On August 23, Antonescu is arrested and the Romanian King Michael I declares an armistice with the Soviet Union. In turn, Germany tries in vain to reinstall another government and the *Luftwaffe* bombs Bucharest. This all leads to open hostilities between the former allies. In the meantime, the combat groups of the red *7<sup>th</sup> Guards Army* soon control all crossings over the river Prut and prevent any organized escape of the *6. Armee*. More southwards, German troops are attacked by Romanians. In only two weeks, the whole army and also big parts of the *8. Armee* are destroyed, a catastrophe worse than Stalingrad. On top of that,

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Ploesti's oil sources are lost for Germany and thus the entire Wehrmacht is definitely deprived of its main fuel source.



Picture: Situation after just four days of soviet advance

### Air action 1944

As already pointed out, there were some focus times for aerial warfare, connected to ground actions. That means, that most actions are related to tactical warfare.

Real bombers (level as well as divers) always came in groups of 9 or more, subdivided in the 3-vic. They cruised at altitudes of ca. 2.000 to 4.000 meters. Mostly they were accompanied by escorts, smaller numbers on axis side but on the same numerical level in case of the Red Air Force.

Ground attack planes usually flew in groups between 6 and 12 at levels below 2.500 meters.

Additionally there is a strategic component given by the *USAAF* throughout the campaign, who flew B-17 and B-24 bombers and P51B and C as well as P38J as escorts. The *heavies* came in combat boxes of 18 planes at altitudes of ca. 5-7.000m with their *little friends* above them. These escorts sometimes dropped down to do some strafing runs on the airfields of their opponents while en route to the Ukraine.

Examples for historic missions during 1944:

On March 30, some Ju87D-5 and Ju87G from *I./SG2* took off from Beresovka (In the very East of our map) in order to attack T-34 which had disrupted the railway line Iasi – Kishinev in the area between Ungheni and Cornesti Targ.

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This is a distance of more than 200km to the West! During that mission, Mr. Alwin Boerst (CO of *I./SG2*) was shot down and killed in his Ju87G.

Exactly 2 months later at 14:25, ten Airacobras from *100.GIAP* took off in Stefanesti to cover ground troops. In an altitude of only 4.000m, they reportedly met a group of 18 Ju87, covered by two Fw190 and eight Bf109. A fierce dogfight developed, and both sides lost two respectively three planes. On that very day, *JG52* filed 55 (sic!) claims, of which 38 were P-39's...

The entire *Staffel 6./JG52* took off for a Sternflug on June 24. After having been lead to the bombers, the *Staffel* flew a head-on attack through a group of bombers and was immediately dispersed. After that, Lipfert and his wingman attacked a Liberator, setting on fire one after the other of its engines until it fell near Stefanesti. Only 2 planes of the entire *Staffel* came back to *Gartenzaun* (airfield) on that day. Other units were ordered to attack the fighters, i.e. Erich Hartmann claimed a Mustang.

### ***Known bugs***

- One bridge in Bacau ends in the water, but is usable for AI.
- A lot of Airfields constructed by the VVS and Luftwaffe in 1944 are not shown; this is a compromise.

### ***The Map: Production and Team***

The region was one of the candidates already when Ian Boys and **Jörg EJGr.Ost\_yogy Wiedemann** started *Kurland* in 2003.

After "*Kurland*", I needed a break, but "*Romania*" still stayed in my mind somehow. In 2005, I organized the necessary original Luftwaffe maps and got the map tools via Ian. At that time, Ian persuaded me to first do a "small training map", which ended up taking a year and now is called "*Italy\_Online*". The best thing about the *Italy*-project is that I met **Ray EJGr.Ost\_Caspar Grützmacher**, without whom these two projects would have been not half as good as they are now, as he created the perfect textures and some 3D-objects for Bessarabia (the latter in cooperation with other guys).

Bessarabia already progressed, while we worked on *Italy*: **Laurent "rama" Cunin** prepared the altitude map for Bessarabia, **D13th\_Toppy** prepared the two basic files and **D13th\_Mytzu** helped in defining important locations and other historic stuff. Then, in March 2006, the works in the map editor (me & **Caspar**) and on textures (**Caspar**) started. 600+ bridges, >50 airfields, 24 perfect textures and a lot of rework happened... and now in the name of the team I wish you a lot of fun on the map!

Further thanks for support go to:

- Ian Boys, Vladimir Kochmarsky & Oleg Maddox
- Juraj, Mkubani, Peter "Letka\_13/Feroz" Brtko for 3D-models, inspiration and a lot of other stuff!
- Dragos Pusca & Victor Nitu from [www.worldwar2.ro](http://www.worldwar2.ro), Dragos Baldescu, Dan Antoniu for historical data & pictures and
- all others, who contributed with information, beta-testing, translations, coffee, love, beer, tolerance etc. pp.

## Bessarabia Readme

### ***Map: Further information***

Along the railway lines, stations are to be found including bigger ones in most major cities. Additionally, some cargo stations are there.

No military installations were placed to keep the map flexible, so mission builders can create fortifications, barracks etc. as they like.

Later, an update to this readme will be published at [www.yogysoft.de](http://www.yogysoft.de) including detailed informations on the airfields like "aerial pictures" with AI spawn points etc.

#### Online versions:

There are two online versions of the map, on which only parts are filled with ground objects. Only bridges were kept over the whole area in order to keep roads usable for AI. The map "Odessa-Online" can be used for the August-October 1941 timeframe, while the map "Iasi-Online" can be used for actions between May and August 1944.

### ***Further Reading***

Books:

English

- 1) Denes Bernad: From Barbarossa to Odessa, parts 1 and 2
  - 2) Christer Bergstrom, Andrey Mikhailov: Black Cross Red Star, Vol.1
  - 3) Denes Bernad: Rumanian Air Force. The Prime Decade, 1938-1947
  - 4) Hans Kissel: Die Katastrophe in Rumänien 1944, Darmstadt 1964\*
  - 5) W. Rehm: Jassy. Schicksal einer Division oder einer Armee?, Neckar-gemünd 1959
  - 6) Dmitriy Loza: Attack of the Airacobras, University Press of Kansas, 2001  
Deutsch
  - 7) Helmut Buchner: Stormbird, Hikoki ca. 2000
  - 8) Lipfert: Das Tagebuch des Hauptmann Lipfert, Stuttgart
  - 9) Barbas: Geschichte des Jagdgeschwaders 52 (I. und II. Gruppe), ?
  - 10) Rudel: Mein Kriegstagebuch, ?
  - 11) Pokryshkin: Himmel des Krieges, Berlin
- \* incl. einem Bericht des Luftflottenkommando 4 über die Ereignisse in Rumänien im August 1944 (datiert Januar 1945)

Internet:

<http://www.worldwar2.ro/>

good site for Romanian stuff

<http://www.weltkrieg.ru/battles/Odessa-I/>

Odessa 1941, use a translator

<http://www.weltkrieg.ru/battles/Odessa-II/>

<http://www.weltkrieg.ru/battles/Odessa-III/>

[http://en.wikipedia.org/wiki/Battle\\_of\\_T%C3%A2rgul\\_Frumos](http://en.wikipedia.org/wiki/Battle_of_T%C3%A2rgul_Frumos)

[http://en.wikipedia.org/wiki/Battle\\_of\\_Romania\\_%281944%29](http://en.wikipedia.org/wiki/Battle_of_Romania_%281944%29)

[http://de.wikipedia.org/wiki/Operation\\_Jassy-Kischinew](http://de.wikipedia.org/wiki/Operation_Jassy-Kischinew)

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### ***Orders of battle*** **Operation "München", July 1941**

#### **VVS**

5.BAP	Akerman	SB-2	35
131.IAP	<i>outside map</i>	I-16	67
210.BAP	<i>outside map</i>	Su-2	32
132.BAP	<i>outside map</i>	SB	56
232.BAP	<i>outside map</i>	SB	20
60.RAP	<i>outside map</i>	SB	73
8.IAP-ChF	Odessa	I-16	41
		I-15, 153	41
229.ShAP	Odessa	I-153	29
317.RAP	Odessa	SB-2	40
83.RAE	Odessa	MBR-2	16
67.IAP	Bolgrad	I-16	64
68.IAP	Kolosovka	I-16	61
146.AIP	Tarutino	I-16	20
		Mig-3	57
221.BAP	Kotovsk	Su-2	18
45.BAP	Tiraspol	SB	54
4.IAP	Grigorypol, Kishinev	I-16, MiG-3	71, 60
55.IAP	Beltsy, Semenovka	I-16, MiG-3	54, 62

#### **Luftwaffe (IV. Fliegerkorps)**

Stab/KG 27	Focsani-Sud	He 111H	5
I./KG 27	Focsani-Sud	He 111H	30
II./KG 27	Focsani-Sud	He 111H	24
III./KG 27	Zilistea	He 111H	28
II./KG 4	Zilistea	He 111H	24
Stab/JG 77	Bacau	Bf 109E	2
II./JG 77	Roman	Bf 109E	39
III./JG 77	Roman	Bf 109F-4	35
I.(J)/LG 2	Roman	Bf 109E	40
Stab/JG 52	<i>outside map</i>	Bf 109F	4
III./JG 52	"	Bf 109F	43

#### **ARR (Gruparea Aeriana de Lupta)**

1st Bomber Flotilla 71.,72.,76.,78.,79.,80.Escad.	He111H-2 and others	80
2nd Bomber Flotilla 74.,75.,82.,18.Escadrilya	others	40
2nd Observation Flotilla 11.,12.,13.,14.Escadrilya	others	40
1st Fighter Flotilla 51.,52.,56.,57.,58.,41.,59.,60.Es.	Bf109E, IAR80 and others	80
1st Long Range Escadrilya	Blenheim Mk. I	15

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### Siege of Odessa (22.08.1941-16.10.1941)

#### **VVS**

69.IAP	Odessa	I-16, I-153	20
42.OShAE	" (later only)	IL-2	10
VVS-ChF	Odessa	MBR-2 SB-2	10 20
VVS-BAPs	<i>outside map Nikolaev...</i>	SB-2, DB3	60

#### **Luftwaffe (IV. Fliegerkorps)**

KG 27	Balti	He-111H	75
KG 55	<i>central Ukraine (outside)</i>	He-111H	75
II.&III./JG77	<i>outside map (Nikolaev)</i>	Bf109E & F	50
StG77	<i>Balti, later SW of Kiev</i>	Ju87-B2	70

#### **ARR (Gruparea Aeriana de Lupta)**

1st, 2nd, 4th, 5th & 6th Bomber Group	He-111H-2, SM79 & others	80
4th, 6th, 7th and 8th Fighter Group	Bf109E, IAR80 & PZL.11	80
1st Long Range Squadron & other	Blenheim Mk. I IAR39 & others	40

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### Battles near Iasi (late May 1944)

#### **VVS (5. Air Army in Balti)**

2.ShAK	Botosani	IL-2	238
7.IAK	Stefanesti	P-39	290
2.GBAK	<i>outside map Gruzkov, NE of Balti</i>	Pe-2	150
		A-20	104
1.GShaK	Bagrinessti (E of Balti)	IL-2	153
		Yak-1	106
312.NBAD	Ordashey	Po-2	60
511.ORAP	Balti	Pe-2	21
4.IAK	Ketrish	La-5F(50% FN)	118
		Yak-1, 7, 9	91

#### **Luftwaffe (I. Fliegerkorps)**

SG2	Husi & Bacau	Ju-87D-5	82
		Ju-87G	12
		Fw-190F-8	45
SG10	Leipzig & Bacau	Fw-190F-8	104
IV./SG9	Bacau, later Trotus	Hs-129	50
JG52	Leipzig, Iasi, Roman	Bf-109G-6/late	76
I./KG4	Focsani	He-111H	35

#### **ARR (1st Romanian Aircorps)**

2. Fighter Grupul: 65., 66., 67. Escadrilyas	Husi & Tecuci	IAR-81C	35
4. Fighter Grupul: 45., 46. & 49. Escad.	?	IAR-81C	35
7. Fighter Grupul: 53., 57. & 58. Escad.	Bacau	Bf-109G	35
9. Fighter Grupul: 46., 48. & 56. Escad.	Tecuci	Bf-109G	35
3. Stuka Grupul: 73., 81. & 85. Escad.		Ju-87D-5	35
6. Stuka Grupul: 74., 84. & 86. Escad.		Ju-87D-3	35
8. Assault Grupul: 41., 42. & 60. Escadrilyas	Tecuci, Kishinev	Hs-129B2	40
5. Bomber Grupul: 77., 79. & 80. Escad.	Tecuci	Ju-88A-4	25
15., 19. & 21. Observation Escadrilyas	Manzar	IAR-39	30
2. Long Range Recon Escadrilya	?	Ju-88D-1	10

#### Remark concerning the battle of Targul Frumos:

On the Axis side, during the battle of Targul Frumos, only the Romanian 1<sup>st</sup> Air Corps was involved in the aerial war.

For the VVS, the 5<sup>th</sup> Air Army supported the 2<sup>nd</sup> Ukrainian Front. In early May, its main units were the same like above.



## Bessarabia Readme

### Iasi-Kishinev-Operation late August 1944

#### **VVS**

<b>5. &amp; 17. Air Armies for 2. &amp; 3. Ukrainian Front</b>		
6., 187.IAP	Yak-7B	100
975.,659.,611.,192.IAP	Yak-1B	200
897.,866., 845.,427.,283.,269.,267.IAP	Yak-9D,T	350
486., 297., 240., 193., 164., 113., 92., 31.IAP	La-5F(50%FN)	400
2.ShAK	Il-2	450
39.RAP	Pe-2	30
218.BAD	A-20G	90
	A-20C	50

#### **Luftwaffe (I. Fliegerkorps)**

Stab, I, II./SG2 & III./SG10	Focsani	Ju87D-5	32
		Fw190F-8/G-3	61
14./SG9	Focsani	Hs129B-2	11
II./JG52	Manzar, Galatz	Bf-109G-6/late	20
I./JG53	Iasi & Husi, later Focsani	Bf-109G-6/late	16
III./JG77	"	Bf-109G-6/late	24
I./KG4	Focsani	He111H	31

#### **ARR (1st Romanian Air corps)**

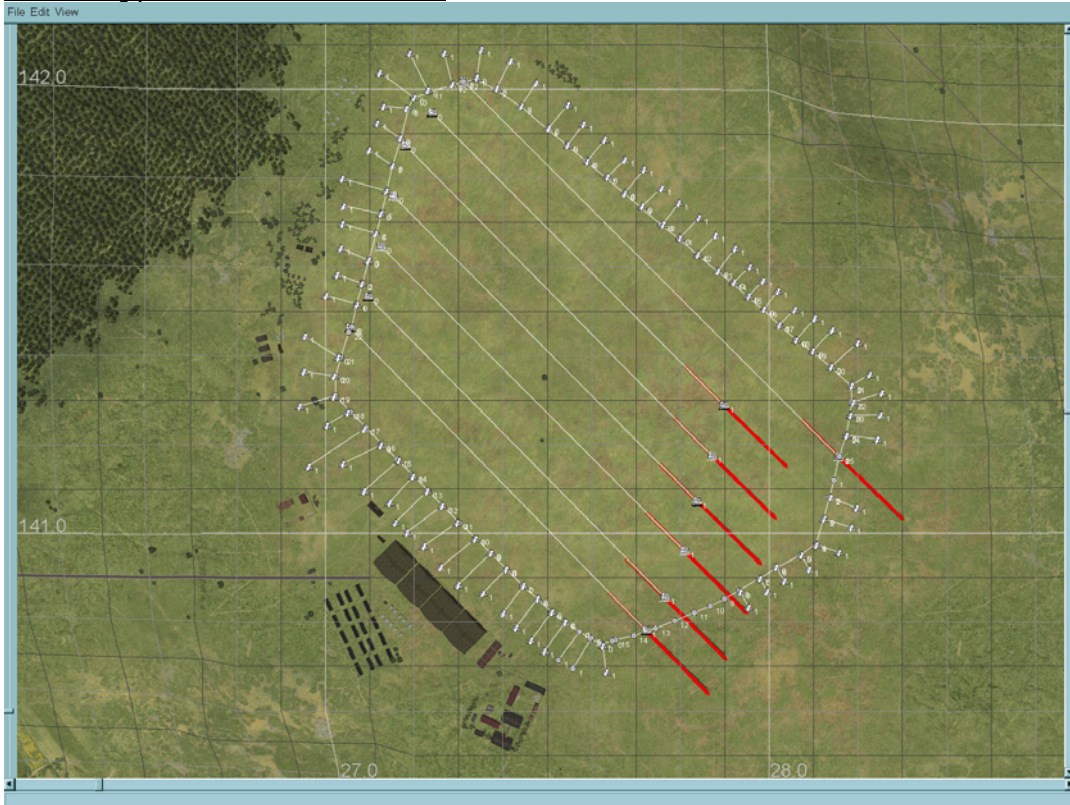
2. Fighter Grupul: 65., 66. & 67. Escad.	Husi & Tecuci	IAR-81C	35
4. Fighter Grupul: 45., 46. & 49. Escad.	?	IAR-81C	35
7. Fighter Grupul: 53, 57. & 58. Escad.	Bacau	Bf-109G	35
9. Fighter Grupul: 46., 48. & 56. Escad.	Tecuci	Bf-109G	35
3. Stuka Grupul: 73., 81. & 85. Escad.	?	Ju-87D-5	35
6. Stuka Grupul: 74., 84. and 86. Escad.	?	Ju-87D-3	35
8. Assault Grupul: 41., 42. and 60. Escadrilyas	Tecuci, Kishinev	Hs-129B-2	40
5. Bomber Grupul: 77., 79. & 80. Escad.	Tecuci	Ju-88A-4	25
15., 19. & 21. Observation Escadrilyas	Manzar	IAR-39	30
2. Long Range Recon Escadrilya	?	Ju-88D-1	10

#### Remark:

For the VVS, no exact data on a level below air armies was found. Some data is there for Orders of Battle in terms of numbers as well as for types in service with individual units. From that data, the OoB given here is interpolated.

# Bessarabia Readme

Round type, i.e. Bacau North:

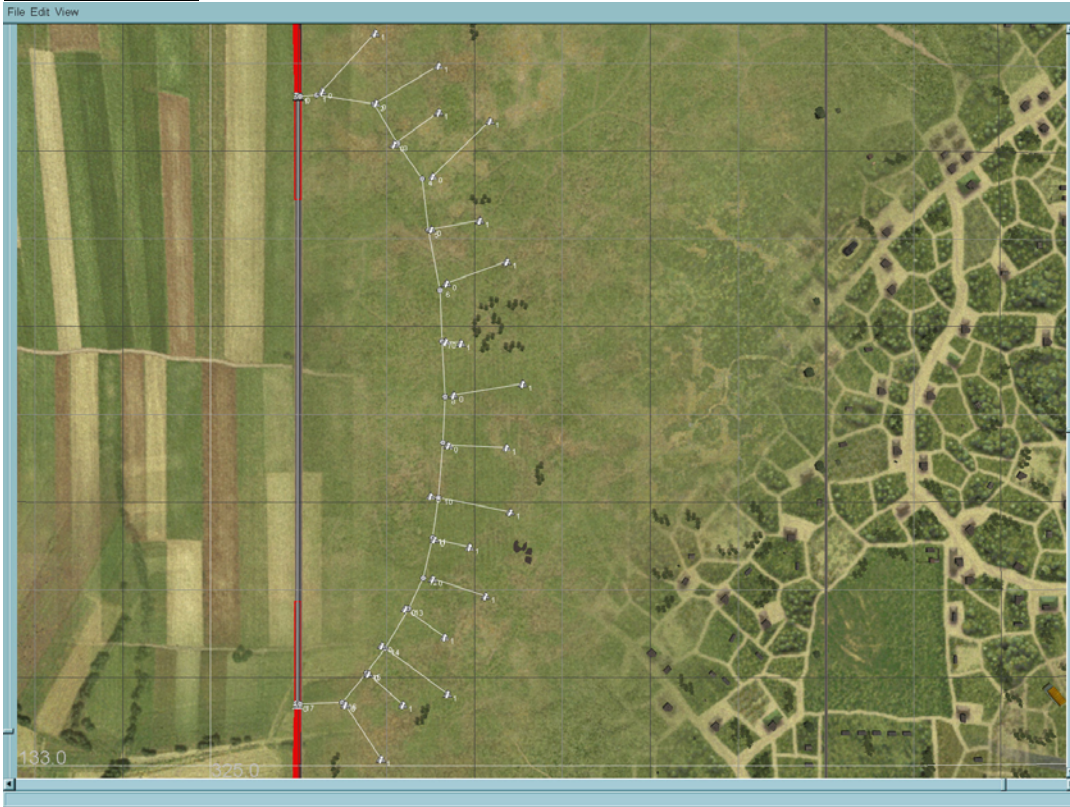


Long with two dispersals, i.e. Vradiyeka

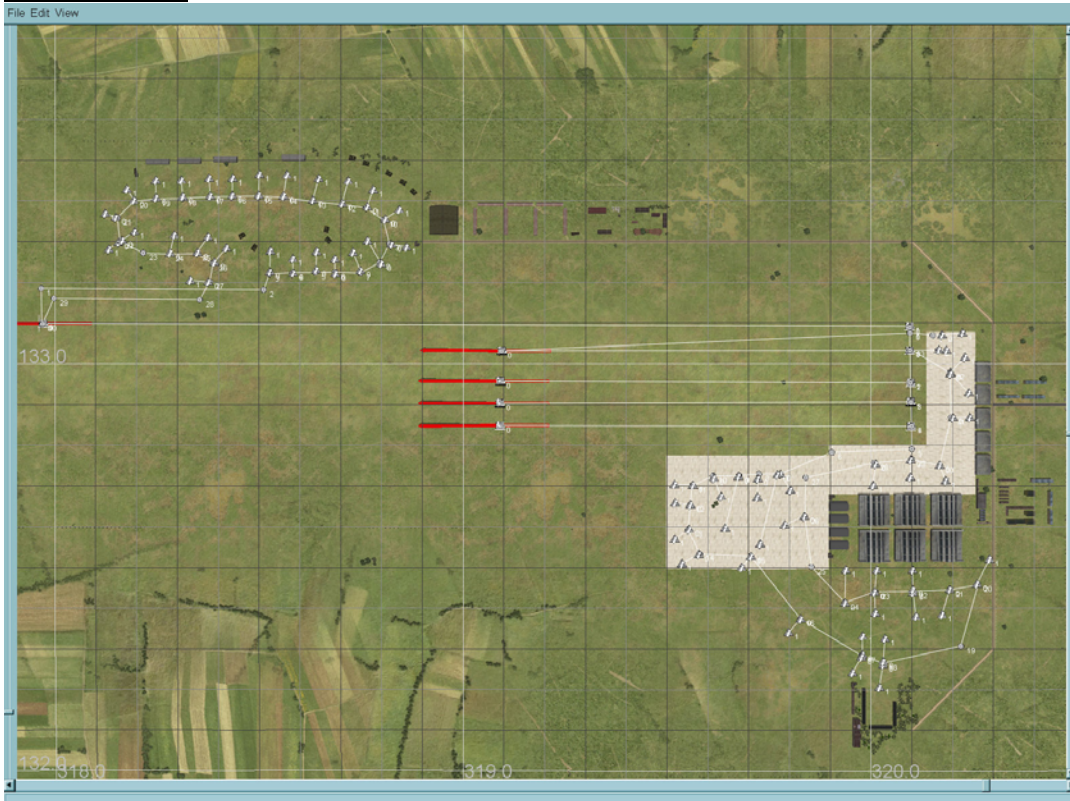


# Bessarabia Readme

## Odessa-Road



## Odessa-East

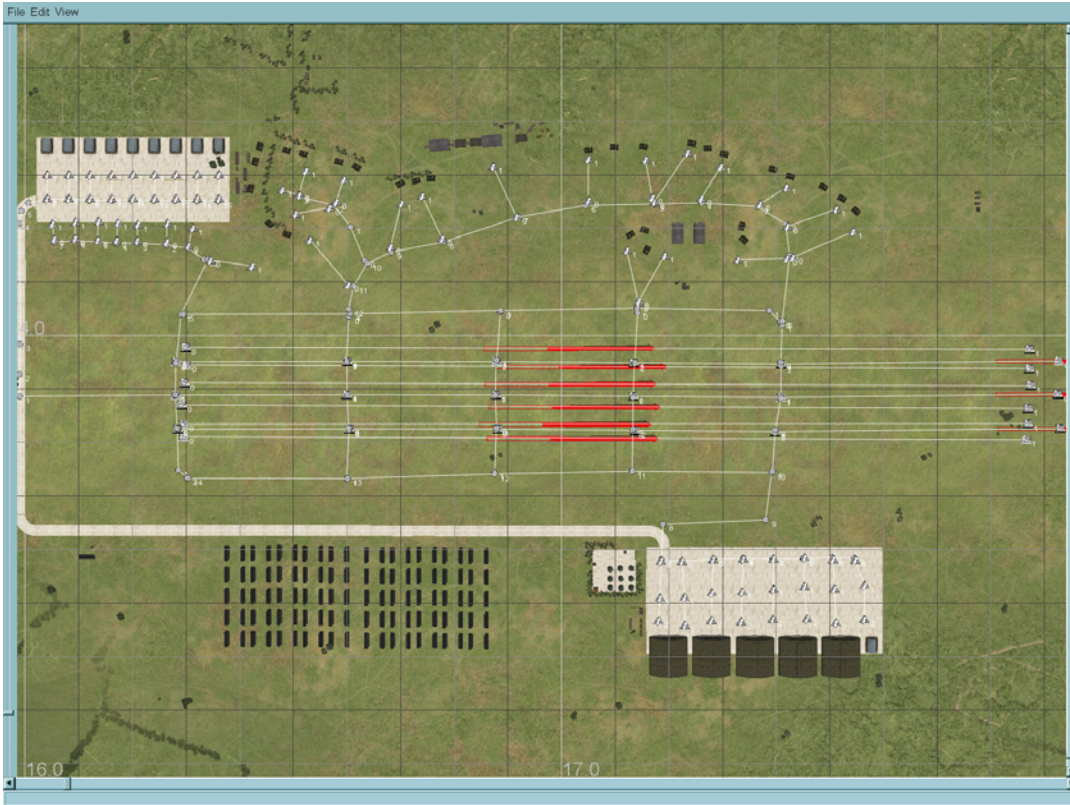


# Bessarabia Readme

## Triangular Std-IL2-shape, Ismail and Isbrieni

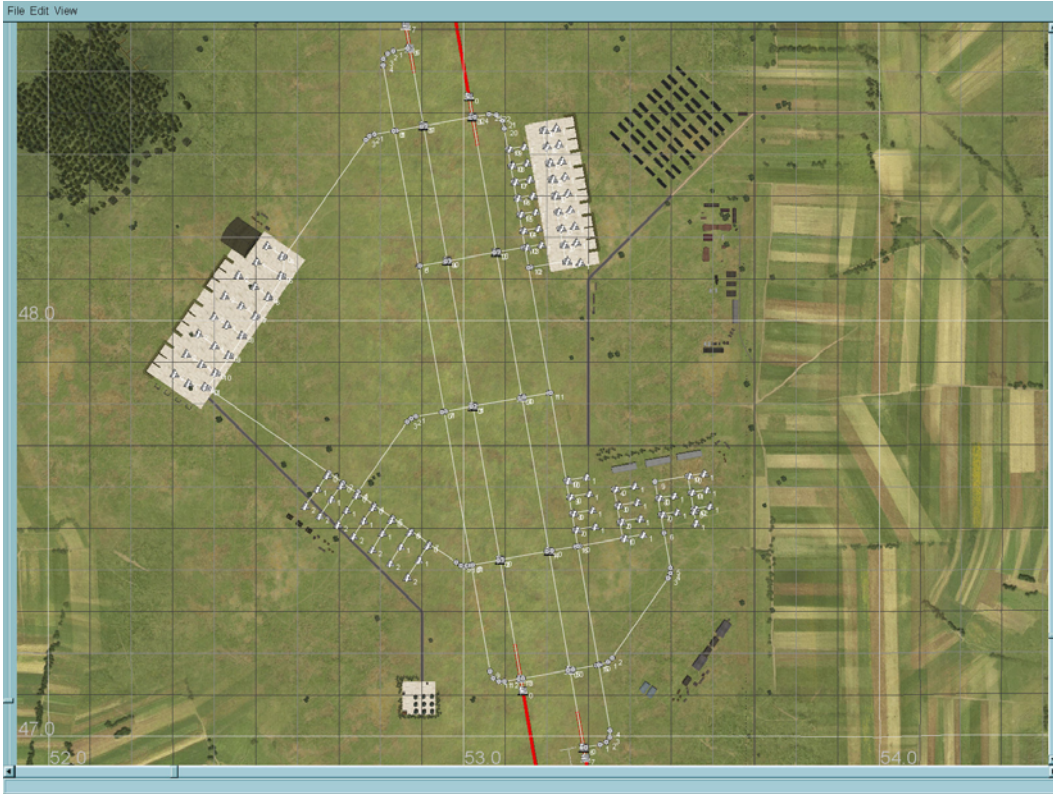


## Zilistea

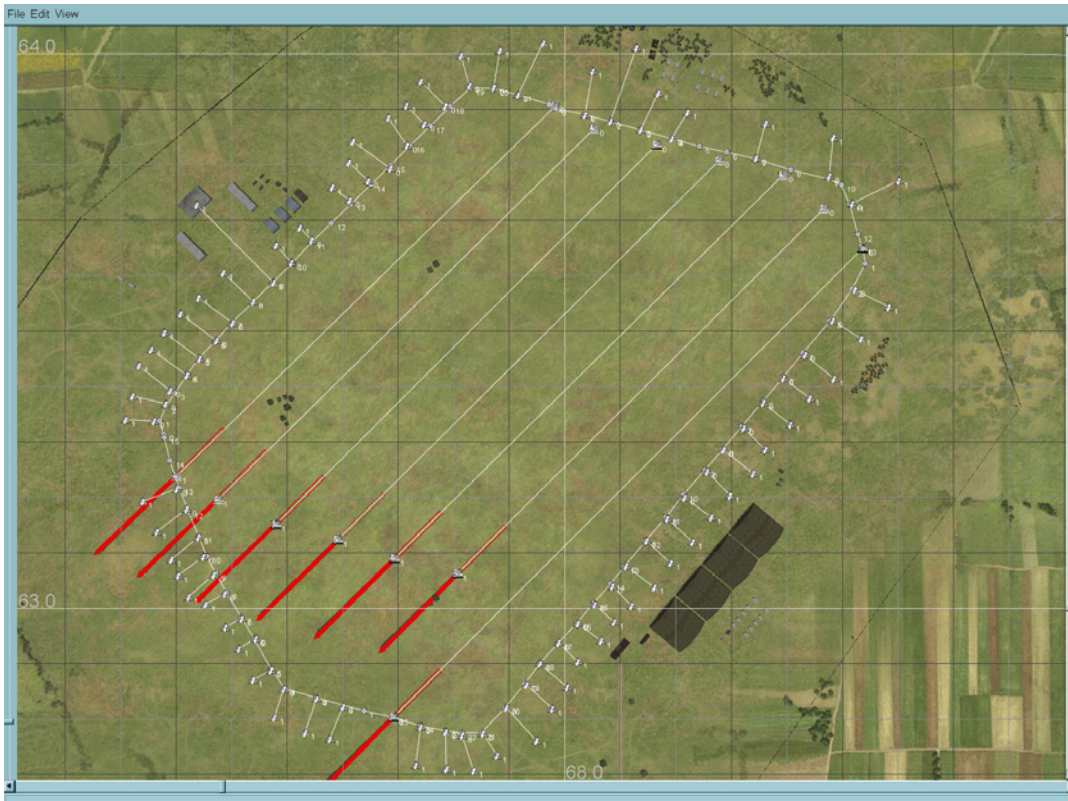


# Bessarabia Readme

## Focsani-North



## Round Type, i.e. Tecuci



# Bessarabia Readme

## Long type 2 dispersal, i.e. Barlad

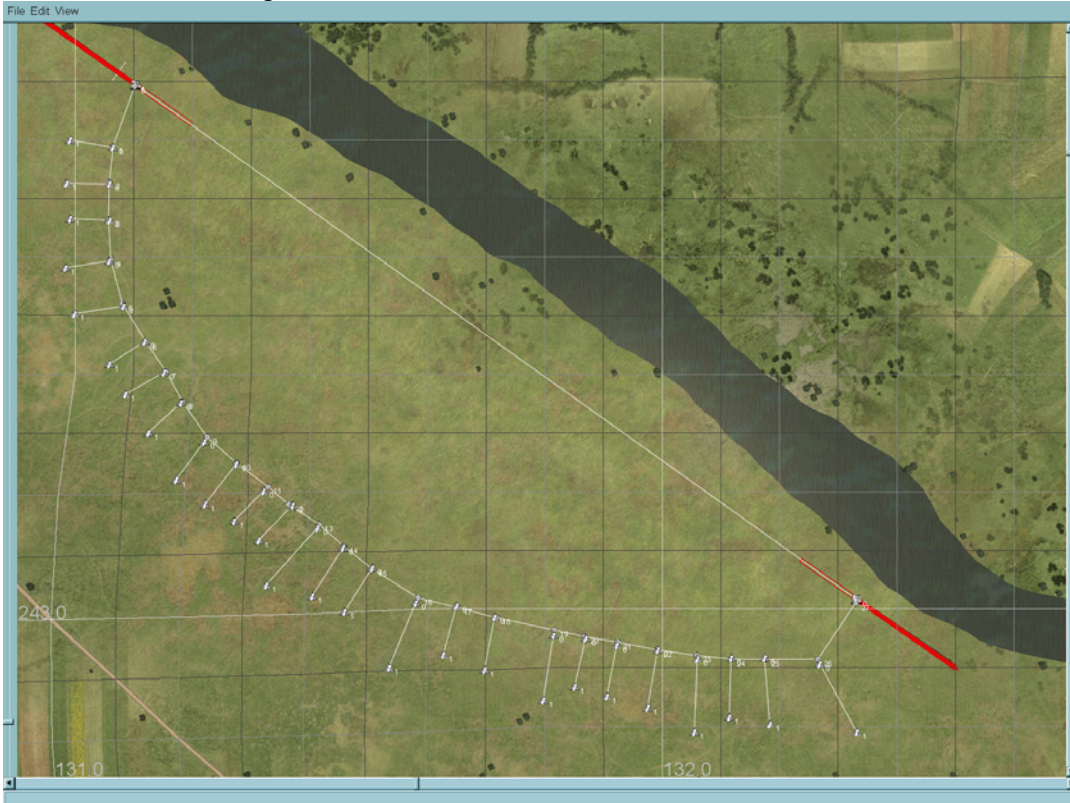


## 2 opposite dispersals, i.a. Stefanesti

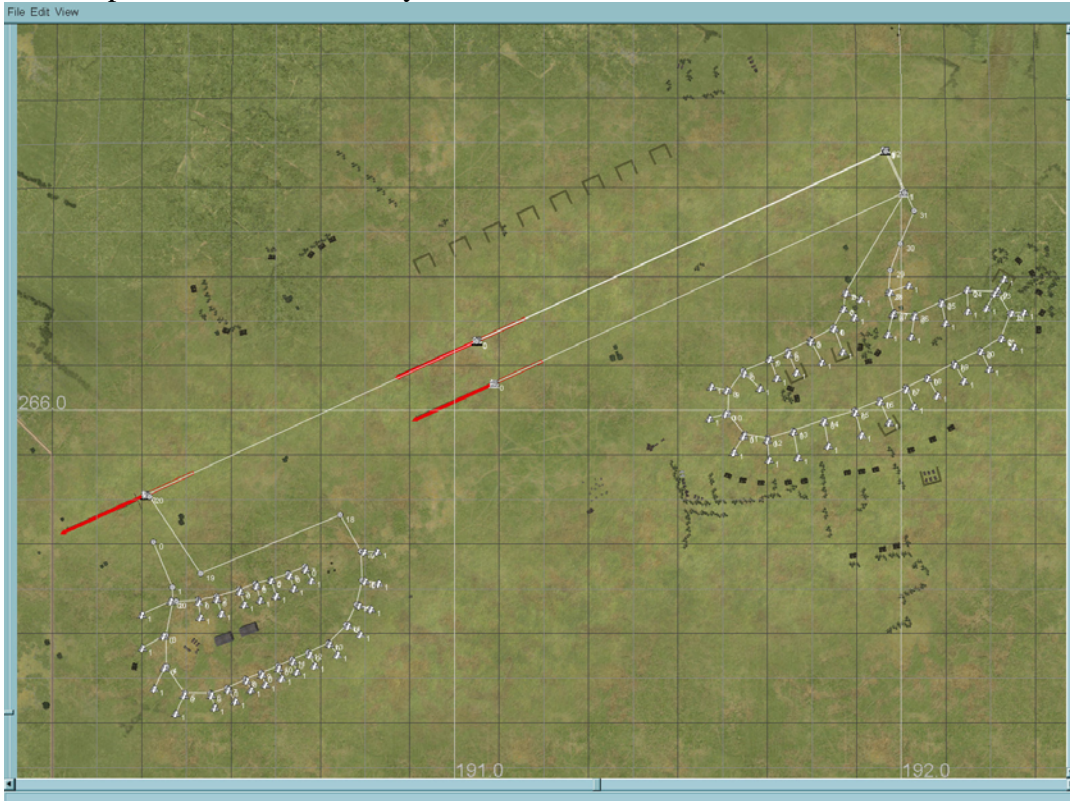


# Bessarabia Readme

## Small airfield, i.e. Zgardesti



## Two dispersals onesided, i.e. Rybnitsa



Erlangen/Germany, 22.06.2009

# Il-2 Sturmovik 1946

## Slovakia Map **Readme**



### **Historical background**

In 1944, the tide of the Second World War returned back to the borders of Slovakia. In the spring, bomber formations of the 15<sup>th</sup> USAAF from southern Italian bases started to roar over Central Europe, targeting Axis aircraft industry and oil refineries in Silesia, Slovakia, northern Austria and Hungary. In August 1944, operation “Bagration” brought the Red Army to within 40km of the Slovak northeastern border. Encouraged by the Soviet advance, the partisan activity increased considerably in the mountainous parts of the country. The German decision to occupy Slovakia in order to secure the transportation links in their rear launched the Uprising, which had been prepared by the Slovak Army command since the beginning of the year. This Uprising was crushed after two months of fighting and a costly breakthrough of the Soviet 38<sup>th</sup> Army through the Carpathian Mountains into northeastern Slovakia marked the end of 1944. Although Slovakia was a relatively non-important battlefield compared to Hungary or Poland at that time, the harsh terrain and weather conditions together with strong German resistance created a hard task for Red Army and Czechoslovak Army Corps to break through German defenses westwards in the beginning of 1945. Slovakia was liberated only in April 1945, at the same time as when the battle for Berlin was signaling the end of WWII.



## USAAF air raids

(June – August 1944)

The domestic unit responsible for the air defense of Slovakia was the Slovak Emergency squadron (*Pohotovostna letka*), which was under the command of the German 8<sup>th</sup> Jagddivision. *Pohotovostna letka* was based on the former 13th Fighter Squadron (Letka 13), famous from its successful career on the Eastern front. From March 1944, *Pohotovostna letka* was stationed at Piestany airbase and equipped with fifteen newly purchased Bf 109 G-6/R3s.

In the fall of 1943, Central Europe came within operation range of the newly established 15<sup>th</sup> USAAF operating from southern Italy. In March 1944, a few bombs accidentally fell on Slovak territory when a box of 150 B-24s attacked Vienna. The war was fully brought to Slovakia on 16<sup>th</sup> June 1944 when 77 Liberators of the 376<sup>th</sup> and 449<sup>th</sup> Bomb Groups attacked the Apollo refinery in Bratislava, the capital of Slovakia.



Burning Apollo refinery and B-24s above Bratislava, 16<sup>th</sup> June 1944

Since the Slovak Army command was preparing the Uprising, Slovak pilots were advised not to engage Americans often passing through the Slovak airspace. This changed after the air raid on the Apollo refinery when the head of the German Air Mission in Slovakia accused Slovak pilots of cowardice. Therefore, a few days later, on 26<sup>th</sup> June 1944, *Pohotovostna letka* attacked the Liberators of the 459<sup>th</sup> Bomb Group on their approach to Vienna. In the following fight, one B-24 was shot down but escorting P-51 and P-38 fighters took a high

toll on the attackers – three pilots were shot down and died and another four Bf 109s were written off after combat damage and belly landings. *Pohotovostna letka* was annihilated as an effective combat force but the bombing offensive went on. On 7<sup>th</sup> July, the 454th Bomb Group attacked the armament factory near the city of Dubnica as a target of opportunity. Another attack on Slovak industry occurred on August 20<sup>th</sup>, when 76 bombers of the 304th Bomb Wing dropped 178 tons of bombs on the State Oil Refinery in Dubova, 23km east of the city of Banska Bystrica.

Combat boxes of heavy bombers frequently crossed Slovak airspace when heading to oil refineries in Czech and Silesia or turning above Bratislava before attacking targets around Vienna. German and Hungarian fighter units from JG 27, JG 300, JG 302, JG 51, ZG 76, ZG 1 and VO101 kept on clashing with the USAAF bombers and their fighter escorts and fierce aerial battles often occurred in the Slovak airspace.



Bomb carpet on State Oil Refinery Dubova, 20th August 1944

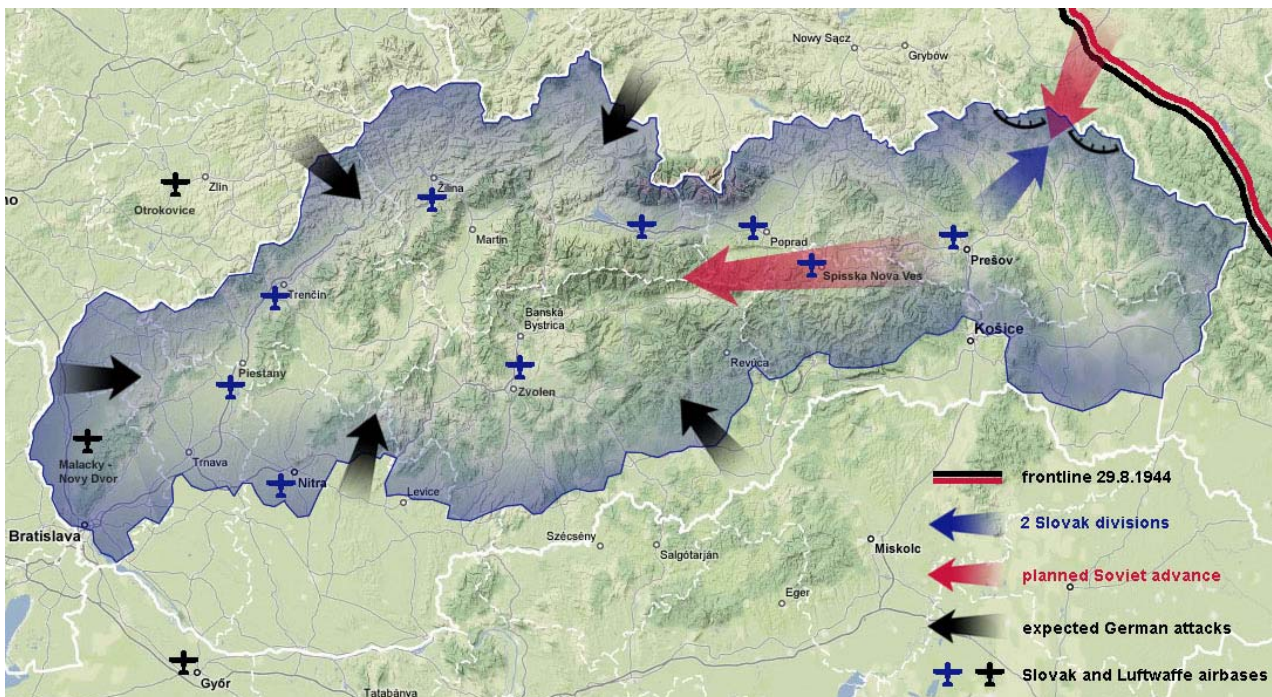
In total, there were 21 bombing raids conducted by the 15<sup>th</sup> USAAF on Slovak territory until the last one in March 1945. Besides the refineries, other selected targets were the Danube harbor in Bratislava, important railway stations, and airbase Malacky – Novy Dvor that was operated by the Luftwaffe. During that time, 53 US airplanes were lost, 106 airmen died and more than 370 were taken POW. The 205<sup>th</sup> Group of the RAF, under the command of 15<sup>th</sup> USAAF, conducted specialized missions of mining the Danube River to disrupt the oil transport from Romania. This group lost four airplanes and suffered 21 casualties.

## Slovak National Uprising

(September – October 1944)

In 1944 it was becoming clear that the defeat of the Axis would only be a matter of time. Several former allies of Germany had already switched sides, usually when the front line was approaching their countries. In early 1944, both the Czechoslovak exile government in London and the Soviets agreed on an armed uprising in Slovakia when appropriate time comes, although each side was following their own political intentions.

The military plan of the Uprising was to use two divisions of the Slovak Army to open the passes in the Carpathian mountain ridges for the Red Army and to defend the Slovak territory against expected German attacks until the Soviets would come. During the spring and summer 1944, airplanes and material were quietly transferred to the Tri Duby airbase, which was expected to be at the center of the Uprising. The preparations were not finished yet, when Germans, provoked by increasing partisan activity at the end of August, decided to occupy Slovakia by force. The Uprising had to start at once.



Military plan of Slovak Uprising; its purpose was to allow quick liberation of Slovakia by the Red Army

However, many things from the very beginning went wrong. Part of the Army did not join the Uprising and remained loyal to the pro-German government in Bratislava. The Germans also immediately disarmed two Slovak divisions in the east and strengthened the defensive positions in the Carpathian Mountains against the Soviet offensive. During the initial confusion, a vast number of the Slovak airplanes located in the eastern part flew over the front to the Soviets instead of boosting the air power of the Uprising by moving to Tri Duby airbase. Eleven valuable Ju 87 D-5,

four Bf 109 E, three Letov S-328, one Avia B-534, and a He 111 were lost due to poor organization. Germans at airbases in Piestany, Vajnory, and Spisska Nova Ves captured these airplanes before they could be flown to Tri Duby. In the end, rebels possessed just one airbase – Tri Duby at the center of the Uprising – and their air fleet was short of any modern planes.

### Birth of the Combined Squadron



Aerial view at Tri Duby airbase, summer 1944

The bizarre collection of airplanes, which gathered at Tri Duby airfield, was obsolete even by 1940 standards. It consisted of five reconnaissance Letov S-328, four biplane fighters Avia B-534, two Bf 109 E-4, two transport SM-84bis, one Ju 52/3m (a personal airplane of the Slovak president) and over forty various biplane trainers like Praga E-35, He 72D Kadett, Fw 44 Steiglitz or Klem 35D. Nevertheless, from available assets a Combined squadron (*Kombinovana letka*) was established under the command of npor. Mikulas Singlovic.

As a first measure, 45 airplanes that were considered useless for upcoming battle were flown some 70km east to an auxiliary airfield at Muran and camouflaged there. The anti-aircraft defense of the airbase was set up: 18<sup>th</sup> AA battery with four modern 88mm guns took position south of Tri Duby near Hajniky village and protected the airbase and the city of Zvolen. 10<sup>th</sup> battery with Czechoslovak 83.5mm AA guns dug

in south of Sielnica village and covered the airspace above Tri Duby and Banska Bystrica. In the vicinity of the landing zone, three 20mm Oerlikons from 22<sup>nd</sup> battery were positioned against low-flying enemy aircraft.

On 30<sup>th</sup> August, several airplanes of *Kombinovana letka* took off to conduct recon flights and to obtain actual information about the German advance, since the Wehrmacht was already attacking from all directions. Airplanes were armed only with 7.92mm machineguns and 20kg bombs and began to attack targets of opportunity, usually German vehicle columns. During the next days, Letov S-328s and Avia B-534s repeatedly attacked German positions in the Strecno narrow, east of Zilina, where two Slovak Army battalions and a partisan unit consisting of French ex-POWs blocked the advance of *Kampfgruppe von Ohlen* and *Kampfgruppe von Junck* to the east. From 2<sup>nd</sup> to 5<sup>th</sup> September, one Letov S-328 and one Avia B-534 were stationed on the auxiliary airfield at Drazkovec, east of Turciansky Sv. Martin, to minimize the flight time to the frontline. But after few days, German superiority in heavy weapons and heavy air attacks conducted by Ju 87s taking off from Piestany airbase broke the defense in the narrow valley of Vah, forcing the rebels to withdraw to the line between Vrutyky and Turciansky Sv. Martin. Pilots from *Kombinovana letka* were trying to provide air support despite poor weather conditions, which resulted in their first casualty – on September 8<sup>th</sup>, por. let. Michal Ilovsky, at the controls of an Avia B-534, crashed into the ground between the villages Piargy and Dolny Turcek.

Encounters in the air started to appear as well. On 2<sup>nd</sup> September, an Avia B-534, piloted by rtm. let. Frantisek Cyprich, intercepted and shot down a Hungarian Ju 52/3m only 10km north of the

Tri Duby airbase. The unarmed Junkers was heading from the city of Győr to Krakow and its crew was not aware of any hostilities in Slovakia. It was the last reported aerial victory of a biplane in WWII.

German anti-aircraft fire often damaged the slow canvas-covered biplanes. Mechanics were doing their best to assemble one flyable machine from two damaged ones; the attrition rate was high. It was therefore a most welcomed event when on 6<sup>th</sup> September at 17:55, two Slovak Bf 109 G-6s, piloted by rtk. let. Frantisek Hanovec and rtk. let. Rudolf Bozik, landed at Tri Duby. These two pilots had flown over the front line from the Soviet side, where they had fled to at the beginning of the Uprising. At that very moment, a German Fw 189 A-2 hovered above the airbase on a reconnaissance mission. The two Gustavs took off at once and the experienced Eastern front veterans gave the enemy no chance: the *Fliegendes Auge* was shot down around Kremnica. Another "Uhu" was shot down on 7<sup>th</sup> September, when Letov S-328, shortly after take-off, became the subject of a surprising attack from an Fw 189. The rear gunner with its twin 7.92mm machinegun successfully repelled the attacker who crash-landed afterwards.



Pilot of Letov S-328 ready for combat flight, September 1944

Because of the strong German pressure on the ground represented by *Kampfgruppe SS Schill* advancing from Topolcany to Prievidza, ground attack flights of *Kombinovana letka* were aimed at their supply columns, artillery positions, and infantry. On 5<sup>th</sup> September, a Letov S-328, manned by rtm. let. Imrich Stossel and rear gunner Rostislav Kazansky, was hit by small arms fire while strafing the Wehrmacht columns north of Nitra. The airplane returned to its home base with R. Kazansky shot through his head. His life was saved thanks to a quick surgical operation in the Zvolen hospital.



Rtk. let. Rudolf Bozik lands at Tri Duby after shooting down Fw 189 A

The active role of Slovak pilots wasn't unnoticed by Luftwaffe. Germans were present in Slovakia at Malacky – Novy Dvor airbase, 60km southwest from Piestany, where *III. Kampfbeobachter Schule* training unit was stationed. After the Uprising had started, the number of Luftwaffe airplanes at their bases soon reached one hundred: among them Ju 87 D-5, Ju 88 A-4, He 111, Fw 189 A-2, Si 204 E and Bf 109 G-14.

The first attack of the Luftwaffe against Tri Duby occurred on 31<sup>st</sup> August at 18:30. Seven Ju 88 A-4 dropped bombs hitting the runway while three escorting Messerschmitts strafed the base and set four airplanes ablaze on the ground. Two days later, a group of Ju 87 and Ju 88 destroyed the rebels' radio broadcasting station in Banska Bystrica. On September 10<sup>th</sup>, the Luftwaffe conducted its biggest air attack against the Tri Duby airbase. At 17:15, a strong formation, consisting of seventeen Ju 87, eight Ju 88 and four He 111 accompanied by six Bf 109 G-14, approached Tri Duby from different directions. The raid lasted 50 minutes



Hungarian Ju 52/3m shot down south from Banska Bystrica

and its results were devastating: seventeen airplanes were destroyed, including one Bf 109 G-6, one Avia B-534 and three Letov S-328s. The southern hangar was left ablaze and 250kg bombs heavily damaged the runway and temporarily disabled the heavy 88mm AA battery south of the base. Five soldiers including the head mechanic of the *Kombinovana letka*, rtm. Jozef Krist, and fifteen civilians employed at the airbase were killed.

Despite suffering damage and casualties, Tri Duby recovered and continued with operations. On 12<sup>th</sup> September, another Ju 88 on a recon mission was damaged by a Slovak Bf 109 G-6 above the airfield and belly-landed north of the Brezno n/Hronom. As the German troops pushed to the center of Uprising, archaic biplanes kept on attacking Wehrmacht ground units in all “hot” areas at Vrutky – Turciansky Sv. Martin, Novaky – Prievidza, Ruzomberok, Kralovany, Detva, Banska Stiavnica, Dobra Niva, and in the Hron river valley. Rudolf Bozik, at the controls of a Bf 109 G-6, shot down another Ju 88 and Fw 189. However, the lack of ammunition for Messerschmitts and



Against the odds: crew of Letov S-328 preparing to take-off, October 1944

frequent jams of onboard weapons were severely limiting its operations. Shrinking forces of the *Kombinovana letka* continued with operations until 24<sup>th</sup> October when the Germans captured Zvolen. Airplanes not flyable were burned and pilots either flew over the front line to the Soviet side or joined the Slovak troops who were withdrawing north and heading to the mountains.

The combat record of the Combined squadron was rather impressive: pilots conducted 350 combat flights, achieved 7 aerial victories, and scored many destroyed ground targets. Pilots operated without ground control and often in poor weather against the technically and numerically superior enemy. The losses of the flying personnel were 1 killed and 2 wounded airmen.

## Czechoslovak Lavochkins in Uprising

After the Luftwaffe raid from 10<sup>th</sup> September it was evident that despite its effort, those few biplanes and one remaining Gustav of *Kombinovana letka* could not effectively support their own troops and fight the enemy in the air. Therefore, an arrival of four grey-camouflaged La-5FNs to Tri Duby airbase on September 15<sup>th</sup>, piloted by Czechoslovak pilots belonging to the 1<sup>st</sup> Czechoslovak Fighter Regiment, was truly welcomed.

The 1<sup>st</sup> Czechoslovak Fighter Regiment (1. ceskoslovensky stihaci pluk-1<sup>st</sup> CSSP) was established in the USSR after an agreement between the Czechoslovak exile government and the Soviets in 1943 as a part of Czechoslovak troops in the East. Its pilots were veterans from the Czechoslovak RAF Fighter squadrons and also included two Slovak pilots who flew to the other side when *Letka 13* was fighting the VVS above Crimea in 1943. After the Uprising broke out, the regiment was moved close to the frontline and prepared to fly to Slovakia as soon as conditions would allow.

Since Tri Duby airbase was considered too vulnerable to German air attacks, it was decided that La-5 fighters would be stationed some 8km southeast on a meadow named Dolne Lazy, south of Zolna. After confirming this, the La-5s returned in the evening of 17<sup>th</sup> September in full force—twenty-one fighters under the command of skpt. Frantisek Fajtl. The airplanes were parked and camouflaged under trees surrounding Hucava creek on the south border of the airfield.



Czechoslovak pilots at Zolna airfield shortly before the attack against the Piestany base, 18<sup>th</sup> September 1944

First combat action of the 1<sup>st</sup> CSSP was planned for the next day: nothing less than an attack on Piestany airbase which was widely used by the Luftwaffe. A reconnaissance flight performed in the morning by F. Cyprich revealed about 30 enemy airplanes at the base. Eight pilots took off at 18:10 and headed west at a fast, low-level flight. The air defense of Piestany base was caught completely by surprise and by the time the La-5FNs regrouped and returned back,

smoke billowed above the base from six Bf 109s destroyed. Facing such a sudden threat, the Germans decided to withdraw completely to Malacky - Novy Dvor. A high concentration of German airplanes didn't go unnoticed to Allied recon: on 20<sup>th</sup> September 1944, 113 B-24H Liberators of the 15th USAAF bombed the Novy Dvor airbase. The bombing demolished the runway, hangars and destroyed or damaged 35 Luftwaffe airplanes on the ground.

Thanks to these events, the rebels' air force achieved temporary air superiority over the free Slovak territory. The Germans were forced to use more distant airbases near Polish Krakow and Hungarian Győr and for the rest of September their aerial activity was rather limited. The primary tasks for the Lavochkins were now attacks against ground targets with 20mm cannons and 50kg bombs. As the *Kampfgruppe SS Schill* steadily advanced up the Nitra River, many combat flights were conducted there to slow down the German advance. On 19<sup>th</sup> September, one Ju 88 and Fi 165 C-3 Storch were shot down when they ran into a pair of La-5s en route to bomb German mortar positions east of Prievidza. But losses mounted: one La-5FN landed with a damaged engine in Hungarian territory and the pilot, after setting the airplane on fire, was captured. Another Lavochkin, after suffering damage from AA fire north of Prievidza, barely returned to Tri Duby and had to be written off. On 20<sup>th</sup> September, ppor. Frantisek Vaculik, a veteran from 312<sup>th</sup> RAF Fighter Squadron was killed during a ground attack east of Nitrianske Pravno.



La-5FN towed with help of civilians on muddy airfield Zolna, end of September 1944

During the following days pairs of Lavochkins prowled over the areas of Turciansky Sv. Martin – Sucany and Nitrianske Pravno – Jasenovo and kept on attacking targets of opportunity. Several German trucks and cars were destroyed as well as a locomotive near Nitrianske Pravno. A few close bomb hits were scored against German tanks. Por. Loucky was wounded by machinegun fire when he attacked a German armored car in a deep valley in Velka Fatra. He returned back to Zolna with considerable blood loss. Five fighters attacked German tanks that were parked in Ruzomberok and an ammunition storage was bombed.

At the end of September autumn weather started to ground the Czechoslovak fighters with its morning fog and low clouds. Low altitude flying in poor visibility above the mountains while looking for targets was very risky. Nevertheless, on 26<sup>th</sup> September, La-5FN fighters hit several German vehicle columns between Horne Hamre and Velke Pole, west of Zarnovica. Other ground targets were hit in Handlova and Zarnovica but the Wehrmacht continued with its advance; through the Hron Valley and Turiec, their units were steadily closing in on the heart of the Uprising – Banska Bystrica. If there had not been a Soviet Carpathian offensive going on in northeast Slovakia, which tied up several German divisions, the Uprising would not have survived a month.



La-5FNs during the short deployment at Rohozna airfield, October 1944

The lack of gasoline and ammunition, which had to be transported from the Soviet side every night to Tri Duby appeared to be another limiting factor. Several rainy days turned the ground on Zolna airfield into mud. Looking for alternatives, the backup airfield at Muran was found to be unsuitable for fighters of La-5FN size and weight. In the end, on 5<sup>th</sup> October, seven La-5FNs moved to the airfield at Rohozna, a few kilometers southeast of Brezno. The landing strip, built of wooden logs originally intended for

railway construction, left much to be desired; it was hard, narrow and too short. Fighters had to land with magnetos switched off to shorten the landing as much as possible. Finally, after one La-5FN crashed after take-off and was totally destroyed (the pilot survived and was evacuated later), the fighters moved back to Zolna.

In the first week of October, *Kampfgruppe SS Schill* managed to break through Slovak defenses in the upper Turiec and made contact with the 178<sup>th</sup> Division Tatra which was advancing up the Hron River valley. Since the distance from Zolna to the frontline was getting shorter, pilots were able to do several combat flights per day. Territory between Handlova – Sv. Kriz – Hronska Breznica –



Mechanics checking the ammunition for 20mm Shvaks, Zolna airfield

Kremnica – Stubnianske Teplice became the primary area of operations. Pilots provided the air cover for own ground troops, attacked enemy tactical positions in the frontline, and performed free hunts in the German rear, seeking and destroying vehicles and horse carts. While attacking a Slovak armored train near to Hronska Breznica, seven Ju 87s were intercepted by a pair of La-5FNs which broke their formation and shot down one Junkers. Nevertheless, the train and the railway suffered damage. On 7<sup>th</sup> October, when

attacking a vehicle column heading to Blaufuss village, the airplane of por. Bohuslav Mraz was hit by AA fire and he was killed in the wreck of his “white 74.” The next day, two Lavochkins got information that there were five Stukas above Sv. Kriz. However, the information was false and the Lavochkins instead encountered five Bf 109 G-6 from II./JG 51 Mölders. Thanks to the excellent skills of the Czechoslovak pilots they damaged two enemy planes before the Germans decided to disengage from the dogfight. In the afternoon a pair of La-5s shot down two Bf 109s which both crashed northwest of Topolcianky.

Because the conditions on the Zolna airfield were getting worse, the regiment’s commander decided to move half of the fighters to Tri Duby airbase. At that time, along with the general offensive of German troops against the rebels' territory, the Luftwaffe decided to deliver a fatal blow to Tri Duby airbase, the Combined Squadron, and the Czechoslovak Fighter Regiment. On 18<sup>th</sup> October at 11:30, eleven Fw 190 F-8 fighter-bombers of SG 77 from Krakow appeared above Tri Duby base, dropped bombs and attacked with on-board weapons. La-5FNs deployed there could not take-off in time; as the liberated territories shrank every day, there were less air observer positions and Luftwaffe attacks were coming with no warning. However, two La-5FNs that were patrolling near Brezno quickly returned and engaged the Focke-Wulfs which were occupied with strafing the ground targets. One Fw 190 was shot from short range and plummeted in flames north of Kovacova. Another two Fw 190s were damaged and one fatally crashed when landing at Krakow. During the dogfight, one La-5FN



La-5FN taking off from the hangar, Tri Duby airfield, October 1944



flown by ppor Hlucka was hit into the elevator but managed to land at Zolna. If the runway had not been so muddy at Zolna, more Czechoslovak pilots would have engaged in the fight. Fortunately, the Focke-Wulfs spent most of their ordnance on dummy targets - non-flyable airplanes positioned around the runway.



Deserted Tri Duby airbase after the 1. CSSP left, 25<sup>th</sup> October 1944

The last days of the Fighter Regiment operation were filled with frequent combat flights against the advancing enemy. Vehicle columns of 18<sup>th</sup> Div. "Horst Wessel" were repeatedly attacked in the areas of Revuca – Lubeník, Muran, Lucenec – Mytna and Pila – Podkrivan. A German armored train was damaged by cannon fire between Podturen – Kralova Lehota. However, stopping the enemy was beyond the capabilities of the limited forces of the

Fighter Regiment. Its numbers shrank from 21 to 11 flyable airplanes. When the situation on the ground fronts became unbearable on 25<sup>th</sup> October, all remaining fighters including one surviving Gustav of the Combined Squadron left Tri Duby and headed east. The Bf 109 G-6, piloted by rtk. let. G. Kubovic was shot down while crossing the German – Soviet frontline but the La-5FNs landed in the Soviet rear, scattered from Poland to Romania.

Achievements of the 1<sup>st</sup> Czechoslovak Fighter Regiment which fought for 40 days in the enemy encirclement were: 9 confirmed and 3 probable victories, 7 damaged airplanes, 6 airplanes destroyed on the ground and countless damaged and destroyed ground targets. Czechoslovak pilots conducted 563 combat flights, used 625 bombs, and spent 50,000 20mm cannon rounds. 10 La-5FN fighters were lost and three pilots were killed in combat.

## Allied help to Uprising

### Soviet Air Bridge

Despite the fact that the Slovak National Uprising had been planned for a long time and the Soviet military and political apparatus had knowledge about it for a long time beforehand, the Soviet attitude during the critical days of late August 1944 was very reserved. The Soviet General Staff considered the Uprising plan unreal. But after the Uprising started, the Soviets decided to help even if they were not technically ready for that kind of large-scale type of supply operation. The Soviets eventually stopped speculating whether the Uprising would or would not end up like the unsuccessful Warsaw uprising and decided to take part in this operation. Two objectives were considered - winning over Germany and their future political plans in Slovakia.

The Soviet General Staff ordered Marshal Konev, the 1<sup>st</sup> Ukrainian Front Commander, to provide an air transport of material supplies along with transport of the 2<sup>nd</sup> Czechoslovak Para Brigade to Slovakia. Marshal Konev charged Marshall Golovanov, the commander of the Soviet long-distance air force to provide for this. For this difficult operation, Golovanov picked an elite long-distance flight unit – the 4th Guards Briansk Bomber Unit. They decided on night flights because

of the heavy AAA and German fighters over the front line. The unit was equipped with American B-25 Mitchell bombers and for the job, those most experienced crews with experience in night flying training were chosen. There were plenty of crews to choose from because of the supply flights for partisans in Yugoslavia, as well as experience from long-distance bombing raids. During the air supply operations (from September till the end of October 1944) Mitchells conducted 498 flights (352 successful) delivering 2,112 parachute containers (259 tons) to Tri Duby and Rohozna airfields. Altogether, approximately 260 anti-tank guns, 560 machine guns, 23 AA guns, 21,000 submachine guns, 630 rifles, 5 mortars, 1,100 kg of explosives and 1,700,000 pieces of ammunition were delivered. This was very significant help for the Uprising. Air supplies did not stop after the defeat and continued, in smaller scale, after the withdrawal of rebel forces to the mountains. It is worth noting that none of these Russian aircrews were lost.

After heavy fights in the Carpathian-Dukla area, the 2<sup>nd</sup> Czechoslovak Para Brigade units was moved to Slovakia in Li-2 and C-47 transport planes of the 5<sup>th</sup> Orel Bomber Unit. During September and October 1944, a total of 2074 soldiers had been transported, of which 1928 were Para Brigade soldiers. Almost 700 wounded had been transported back to the USSR. The airplanes had landed at Tri Duby airfield at night time and transported 351 tons of material. Bad weather and German night fighters prowling around Tri Duby at night caused considerable delay of air troop transfers in these critical days of the Uprising. This resulted in heavy personnel and material losses totaling 19 transport planes, 74 Soviet airmen, 66 paratroopers, and 14 Slovak partisans.

### **Help from the Western Allies**

In 1944, Slovakia was a part of the operational area of the 15<sup>th</sup> USAAF equipped with heavy B-17G and B-24H bombers based in southern Italy. Their targets were weapon factories, oil refineries, railroad junctions and military facilities. During the air raids, the 15<sup>th</sup> USAAF lost 53 bombers and 8 fighters over Slovakia. Airmen who survived were mostly captured and imprisoned in Bratislava and later on in a military POW camp in Grinava. All American and English airmen captured in Slovakia were held in this camp. After the Uprising started, pilots along with their guards escaped to free territory ended up in Banska Bystrica.



American airmen shot down over Slovakia are waiting for B-17 arrival at Tri Duby airfield, 17<sup>th</sup> September 1944

On September 17<sup>th</sup> 1944, two B-17Gs of the 483<sup>rd</sup> Bomber Group flew their first supply mission to Slovakia. Crews were reduced to half to make space for the supplies. The bombers were protected by 25 P-51 Mustang fighters and 16 more Mustangs joined the group later. One of the Mustangs crashed on a low pass and a second Mustang landed at the airfield due to engine trouble. The pilot returned home on board a B-17 along with a group of 13 American and 2 British airmen who had fled from the Slovak POW camp. Altogether, 8 tons of military supplies (bazookas, submachine guns, ammunition, and medical supplies) were delivered along with 6 officers of OSS (Office of Strategic Services).



Unloading military supplies at Tri Duby airfield, 17<sup>th</sup> October 1944

On October 10, 1944, another six B-17Gs with 16 tons of material and 14 members of the OSS and British SOE (Special Operations Executive) landed at Tri Duby airfield. While patrolling above Tri Duby airfield, one of the Mustangs had mistaken one of the La-5FNs for an Fw 190 and started shooting. Luckily, he missed. On the return flight, the B-17s took on board another 25 shot down airmen. During the taxiing, one of the bombers got stuck in the mud but thanks to an enormous effort of soldiers and partisans it was pulled out. It returned safely, alone, at night.

The OSS and SOE mission in Slovakia had an unfortunate end. After the Uprising defeat and withdrawal to the mountains, they were taken prisoner by the Germans. Later they were interrogated and shot in the Mauthausen concentration camp.

The help from the US and British was rather limited since Slovakia was out of their sphere of influence. However, even these two supply and transport flights raised strong objections from the Soviet side. Slovakia was already falling, geographically and politically, into the Soviet sphere of influence.

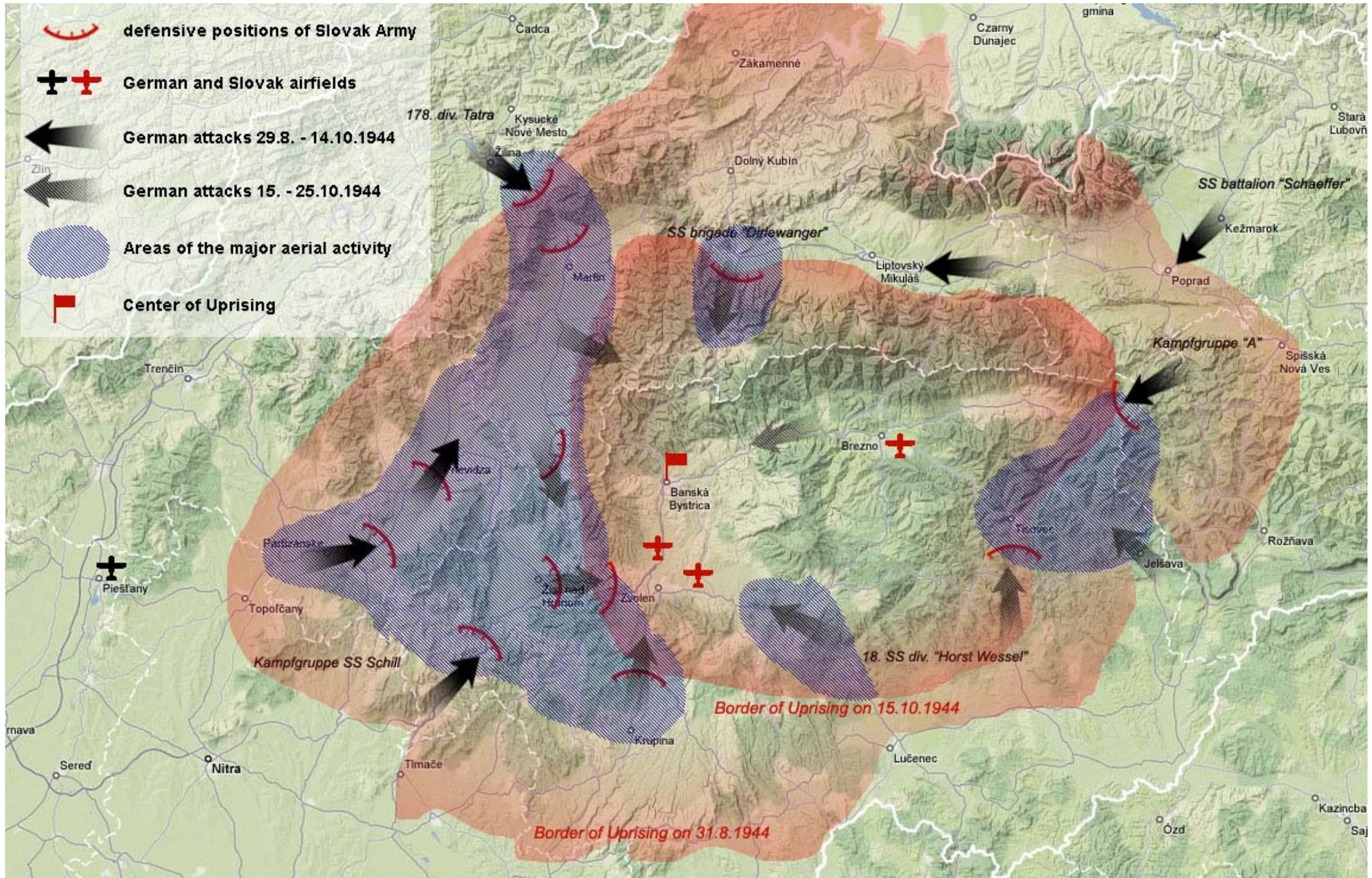
### Resources:

- J. Stanislav, V. Klabník: Slovenské letectvo 3, 1944-1945. Magnet Press Slovakia, 2003.
  - P. Kaššák, M. Hrodegh: Konečná zastávka: Slovensko! KPVHS, 2007
  - J. Tibenský a kol.: Slovensko – dejiny, Obzor, 1971
  - P. Šumichrast, V. Hochmuth, J. Anďal: HT Model špeciál – Bf 109 G-6 SVZ, 2002
- <http://www.muzeumsnp.sk/>

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*Readme prepared by: Juraj Vanovčan & Peter Baláž. Title screenshot by Michal Pajkoš.  
Translation and grammar corrections: Jeff "CzechTexan" Kozlovsky, Richard Doležal.*

# Slovak National Uprising, 29.8. – 25.10.1944



## **Slovakia map in II-2 Sturmovik**

There are four versions of the Slovakia map available: Slovakia 1944, Slovakia summer (online), Slovakia winter (online) and Slovakia no names.

“Slovakia 1944” is a fully historical map with airbases modeled according to reality in early autumn 1944. Town and village names include Hungarian names in southern Slovakia, which was a part of Hungary at that time, and German names for Protektorät Böhmen und Mähren (now Czech Republic). “Slovakia 1944” is suitable for recreating the aerial battles between the 15<sup>th</sup> USAAF and the Luftwaffe, Hungarian Royal Air Force and Slovak Air Force in the summer of 1944, but before all for the Slovak National Uprising in autumn 1944.

“Slovakia summer (online)” represents the early 1939 period (before the breakup of Czechoslovakia) with pre-war borders and settlement names. “Slovakia summer (online)” has a reduced object count by circa 30% for smooth on-line game play. Field airbases Muran, Rohozna, Zolna and Drazkovce, which were only used during the Slovak Uprising in fall 1944, are not present. “Slovakia summer (online)” map can be used for recreations of the short Slovak-Hungarian conflict in March 1939. For this purpose and for any other hypothetical scenarios, three fictional airbases have been added to Hungary, Poland, and Moravia territories.

“Slovakia winter (online)” map simulates early 1945, when Red Army, Czechoslovak Army Corps and Romanian Army liberated Slovakia. It is otherwise equal to Slovakia summer (online).

“Slovakia no names” is a map without borders and settlement names, with all airbases and reduced object count like “Slovakia summer/winter (online)”. It can be used for combat scenarios simulating other territories like southern Germany, Ardennes, and so on.

### **Airbases**

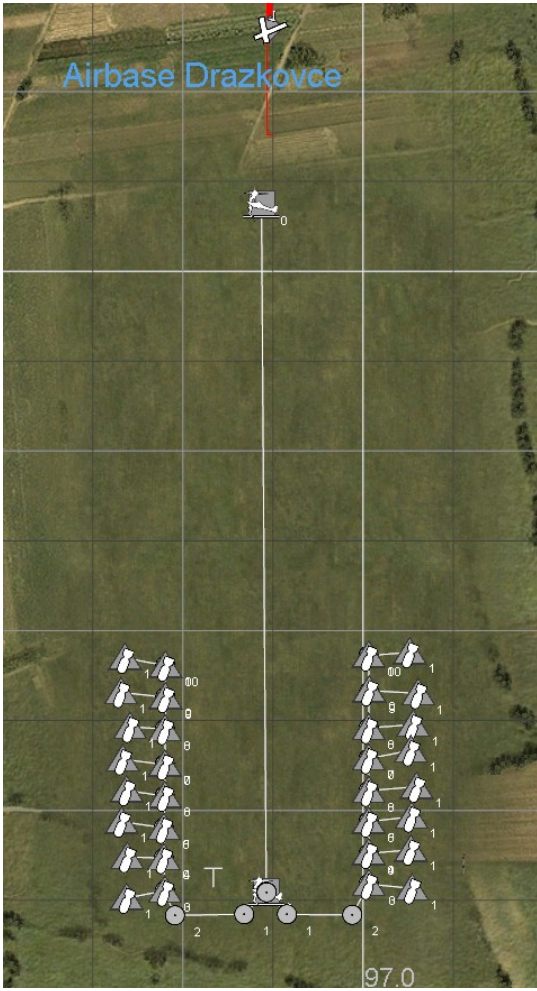
Airbases on the map are historically sized, that means that some of them cannot be used for bigger airplanes or jets. For their actual wartime usage, please refer to the historical info above.

Airbases with sufficient size for bombers: Piestany, Tri Duby, Zolna, Trencianske Biskupice, Mokrad, Tatry, Spisska Nova Ves.

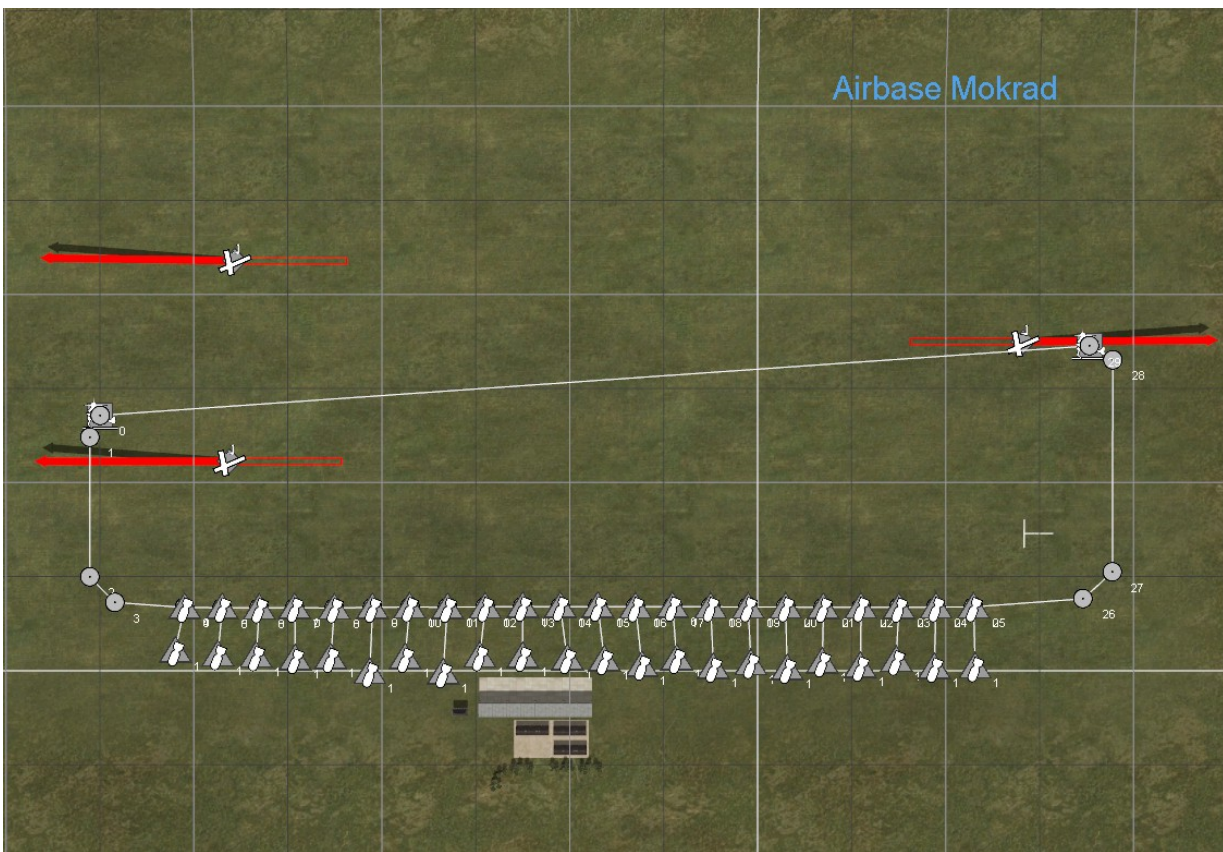
Airbases with small size suitable for fighters only: Nitra, Zilina, Drazkovce, Rohozna, Muran. Only AI biplanes and small AI fighters can land on the Muran airfield.

Hypothetical airbases in Poland, Hungary, and Moravia are big enough for twin-engined fighters and light bombers.

Historical orientation of take-offs and landings: recommended direction of landing is marked by the position of landing “T”. In some cases, because of nearby hills or city, AI can take-off and land only from one direction to prevent collisions.



Alternate Airbase Drazkovce (loc. J-11 num 2,3)



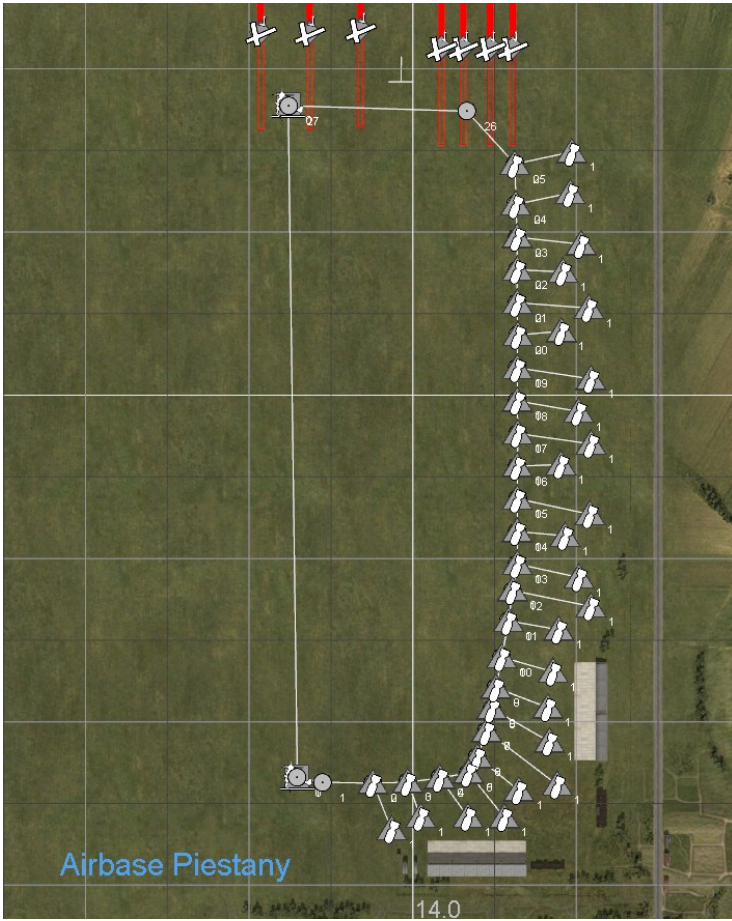
Airbase Mokrad (loc. P-11 num 2)



Alternate Airbase Muran (loc. R-7 num 9)



Airbase Nitra (loc. D-2 num 7,8)

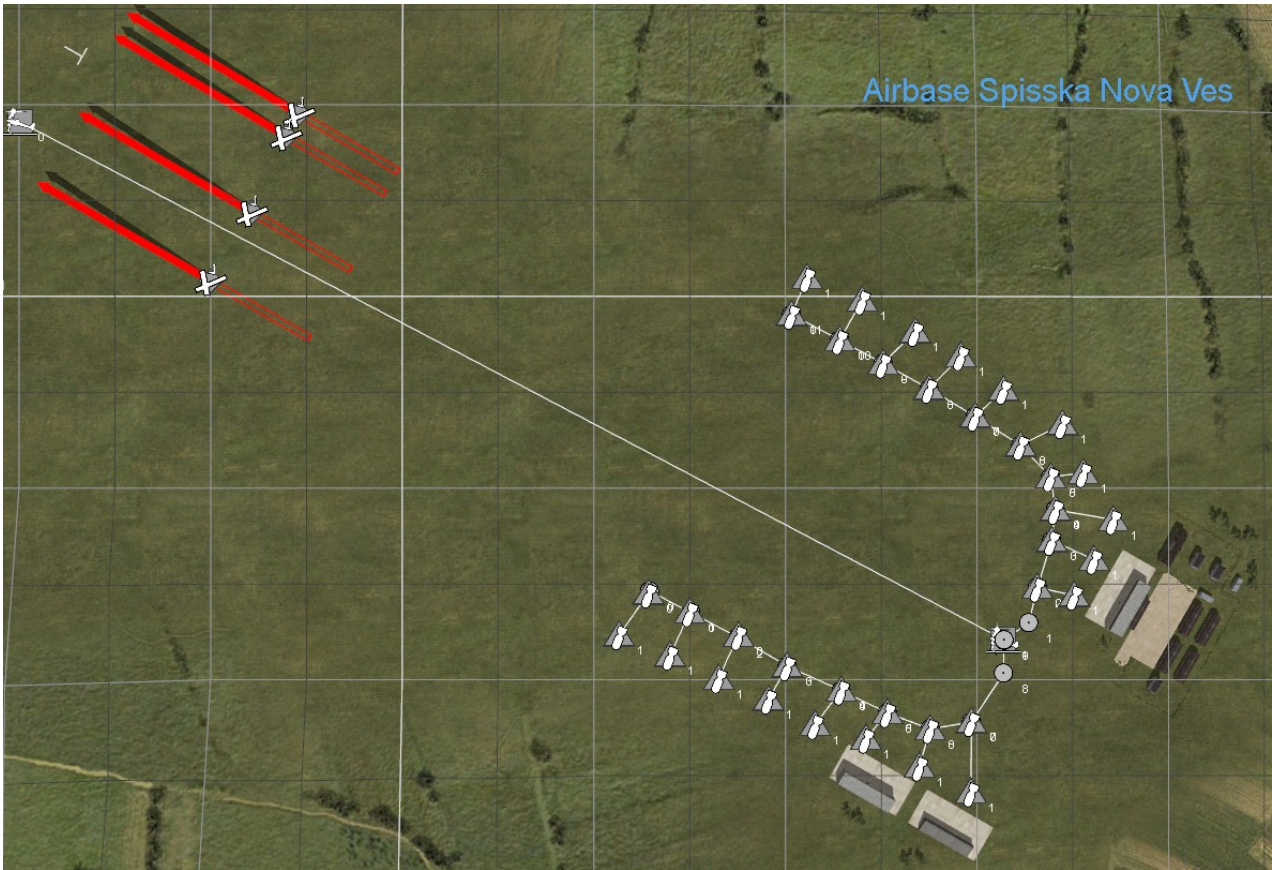


Airbase Piestany (loc.B-5 num 8)



Alternate Airbase Rohozna (loc. P-8 num 1)





Airbase Spisska Nova Ves (loc. V-9 num 7,8)



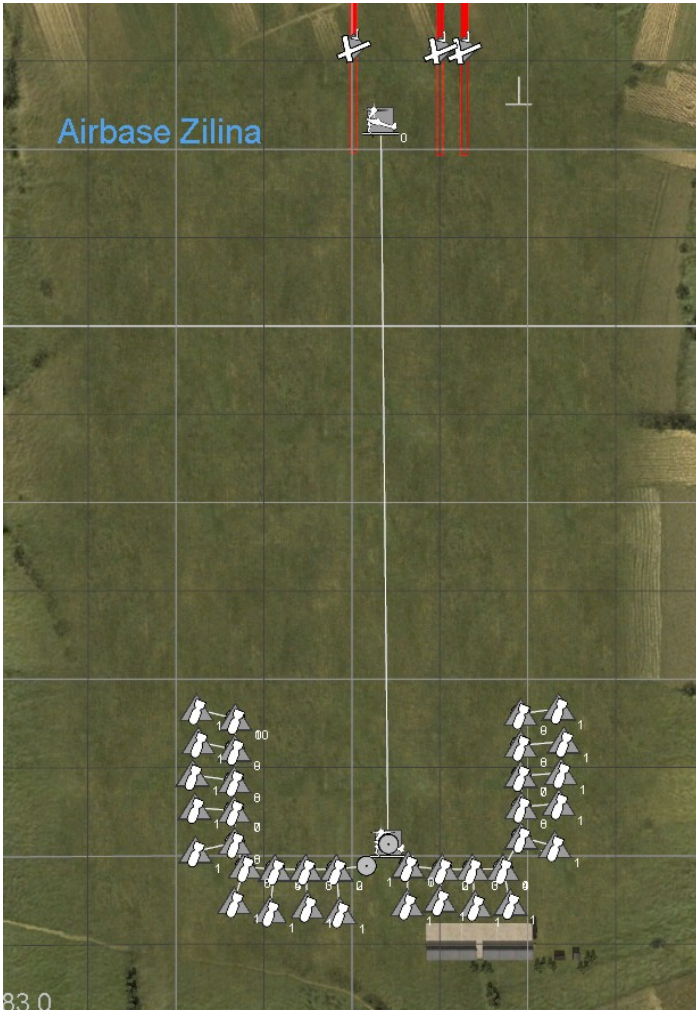
Airbase Tatry (loc. T-11 num 1)



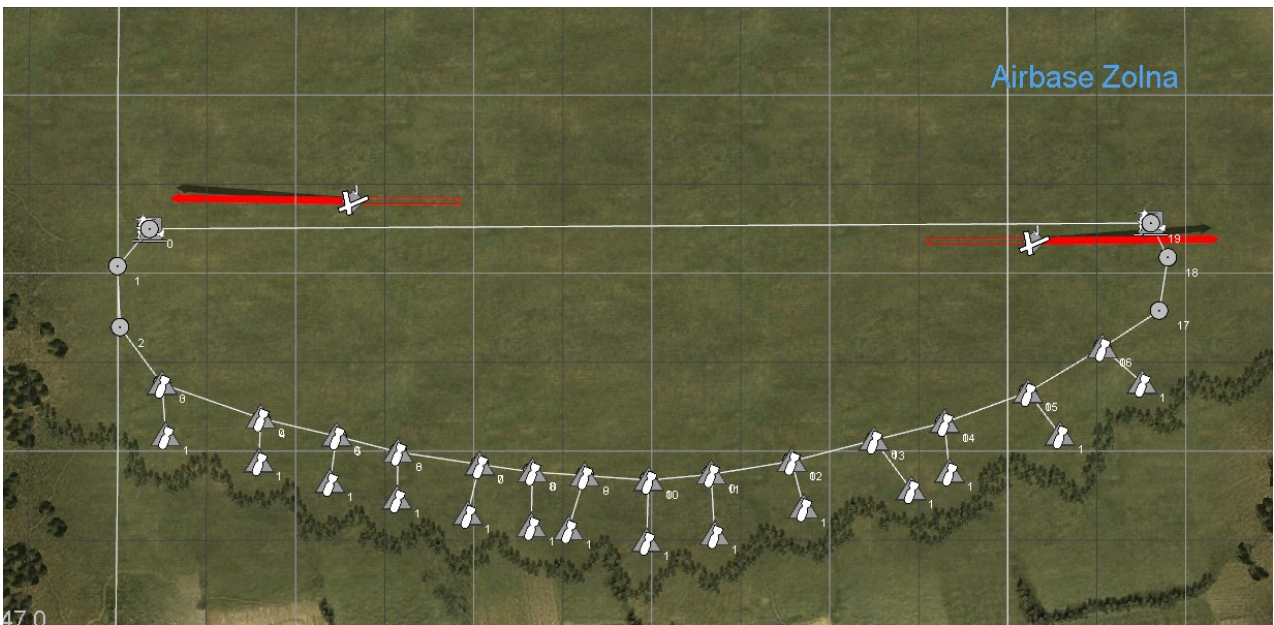
Airbase Tr. Biskupice (loc. C-8 num 9)



Airbase Tri Duby (loc. L-6 num 1,4)



Airbase Zilina (loc. I-12 num 4,5)



Airbase Zolna (loc. L-5 num 8,9)



Hypothetical Airbase Hungary (loc. T-1 num 8)



Hypothetical Airbase Moravia (loc. B-13 num 1,2)



Hypothetical Airbase Poland (loc. Q-13 num 6)

### Known anomalies

There are some anomalies present on the Slovakia map which are caused either by limitations of the IL-2 engine or from other reasons.

- In some places - like narrow mountain valleys near the rivers - railways and roads are intentionally positioned on each other because of limited space. Both trains and vehicle units can use them without limits. In case of a collision, the train will push the vehicles off the road.
- Interrupted railway by a mountain near the Strecno valley (J12) – this represents a railway tunnel, a place of initial fights between the Slovak Army and Wehrmacht in early September 1944. Road vehicles can only by-pass the bridge from the south.
- Occasional trees on the roads/railways present no obstacles for moving units.
- High positioned lakes in the Vysoke Tatry mountains (Q-S/11-12) and water dams for the mining industry in the Stiavnicke vrchy area (I-J/3-4) give unusual views “under the textures” when viewed from a shallow angle. This is a limitation of the IL-2 engine.
- During the morning/evening time, some objects like castles positioned on hills cast long shadows. It is a part of the IL-2 engine. Shadows for all objects except trees can be switched off by changing the parameter “LandShading=3” to “LandShading=2” under the OpenGL section in the conf.ini file.

### Performance optimization tips

The Slovakia map is rather PC demanding, especially the full version with all objects. To run it reasonably on an average PC, there are several ways to improve the frame rate:

- Do not use extremely high AA/AF settings
- Do not use the high visibility option for clear and good weather, which was introduced in the 4.09 patch. Use the parameter LandGeom=2 (max. visibility 36km) instead of LandGeom=3 (max. visibility 72km) in the OpenGL section of the conf.ini file

- Switch off the shadows for all objects except trees by changing the parameter “LandShading=3” to “LandShading=2” under the OpenGL section in the conf.ini file
- Use Texture compression option in the IL-2setup settings
- Consider using the “Slovakia online” map

## **CREDITS**

### ***Map work***

General work: Ian Boys, Juraj Vanovčan

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Textures: Robert Tenk, Juraj Vanovčan, Ray Grützmacher

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Ground objects support and documentation: Michal Pajkoš, Matouš Michlíček, Marek Fronc, Richard Doležal

Special thanks to: Kuzma Lykov and Vladimir Kochmarsky, Dr. Peter Šumichrast (Slovak Institute of Military History), Martin Vrábel & Letka 13 squadron members, Jörg Wiedemann, Peter Mock, Martin & Michal Vanovčan, Peter Kompiš, Peter Škrátek, IL-2 community and our patient families ☺

# Il-2 Sturmovik 1946

Slovakia Map: **Sightseeing Guide**



## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide

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**Note:** This preview does not cover all castles, chateaux, monasteries, mansions and other building objects present on the Slovakia territory.

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**Banska Stiavnica New Chateau**  
*Banská Štiavnica Nový zámok*  
16th century  
Location: **J-4 num 1**



**Banska Stiavnica Old Chateau**  
*Banská Štiavnica Starý zámok*  
16th century  
Location: **J-4 num 1**



**Bojnice Chateau**  
*Bojnický zámok*  
13th century (last rebuilding 19th century)  
Location: **G-8 num 3**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Hlohovec Chateau**  
*Hlohovský zámok*  
12th century (last rebuilding 18th century)  
Location: **B-3 num 7**



**Hronsky St. Benadik Monastery**  
*Benediktínsky kláštor Hronský Sv. Beňadik*  
11th century  
Location: **G-3 num 3**



**Ilava Castle**  
*Ilavský hrad*  
13th century  
Location: **E-10 num 5**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Kezmarok Chateau**  
*Kežmarský zámok*  
15th century  
Location: **U-11 num 8**

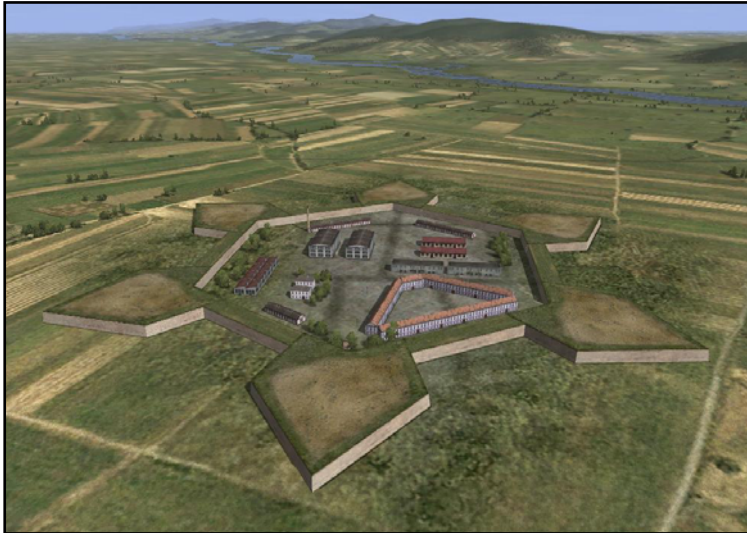


**Krasna Horka Castle**  
*Hrad Krásna Hôrka*  
14th century  
Location: **V-6 num 6**



**Kremnica Castle**  
*Hrad Kremnica*  
13th century  
Location: **J-7 num 2**

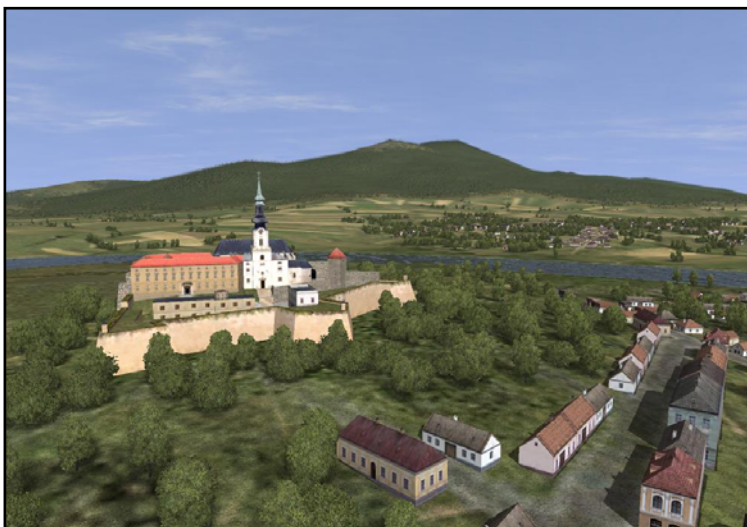
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**Leopoldov (Mestecko) Fort**  
*Pevnosť Leopoldov*  
17th century  
Location: **A-4 num 3**



**Modry Kamen Castle and Mansion**  
*Modrý Kameň – hrad a kaštieľ*  
13th century  
Location: **M-1 num 8**



**Nitra Castle**  
*Nitriansky hrad*  
13th century (last rebuilding 18th century)  
Location: **D-2 num 7**

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**Orava Castle**  
*Oravský hrad*  
13th century  
Location: **M-13 num 3**



**Podolinec Monastery**  
*Kláštor Piaristov Podolíneč*  
17th century  
Location: **V-13 num 1**



**Slovenska Lupca Castle**  
*Lupčiansky hrad*  
13th century  
Location: **M-7 num 7**

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**Trencin Castle**  
*Trenčiansky hrad*  
10th century  
Location: **D-9 num 1**



**Velka Bytca Castle**  
*Hrad Bytča*  
13th century (last rebuilding 16th century)  
Location: **G-12 num 9**



**Vizovice Chateau**  
*Zámok Vizovice*  
16th century  
Location: **B-12 num 9**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Zvolen Castle**  
*Zvolenský hrad*  
14th century  
Location: **K-5 num 6**



**Beckov Castle (ruin)**  
*Hrad Beckov*  
13th century  
Location: **B-8 num 3**



**Blatnica Castle (ruin)**  
*Hrad Blatnica*  
13th century  
Location: **J-9 num 8**



## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Brumov Castle (ruin)**  
*Hrad Broumov*  
13th century  
Location: **C-11 num 6**



**Bzovik Monastery**  
*Kláštor Bzovík*  
12th century  
Location: **K-2 num 9**



**Cabrad Castle (ruin)**  
*Hrad Čabrad'*  
13th century  
Location: **K-1 num 9**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Cachtice Castle (ruin)**  
*Čachtický hrad*  
13th century  
Location: **A-7 num 3**



**Divin Castle (ruin)**  
*Hrad Divín*  
13th century  
Location: **N-4 num 3**



**Filakovo Castle (ruin)**  
*Fil'akovský hrad*  
13th century  
Location: **Q-2 num 1**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Gymes Castle (ruin)**  
*Hrad Gýmeš*  
13th century  
Location: **E-3 num 7**



**Holumnica Castle (ruin)**  
*Holumnický hrad*  
15th century  
Location: **V-12 num 7**



**Hricov Castle (ruin)**  
*Hrad Hričov*  
13th century  
Location: **H-12 num 7**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Hrusov Castle (ruin)**  
*Hrad Hrušov*  
13th century  
Location: **F-4 num 6**



**Klastorisko Monastery (ruin)**  
*Kláštorská – kartuziánsky kláštor*  
14th century  
Location: **U-9 num 8**



**Lednica Castle (ruin)**  
*Hrad Lednica*  
13th century  
Location: **E-11 num 4**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Levice Castle (ruin)**  
*Levický hrad*  
13th century  
Location: **H-1 num 4**



**Lietava Castle (ruin)**  
*Hrad Lietava*  
13th century  
Location: **H-12 num 3**

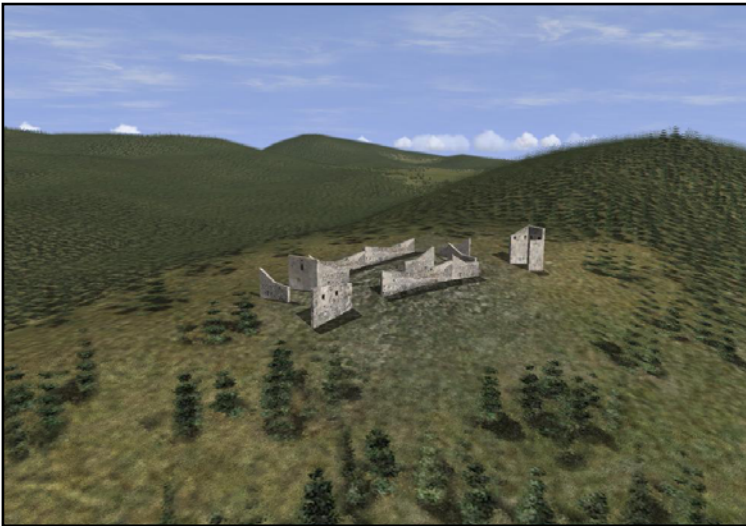


**Likava Castle (ruin)**  
*Hrad Likava*  
14th century  
Location: **M-11 num 4**

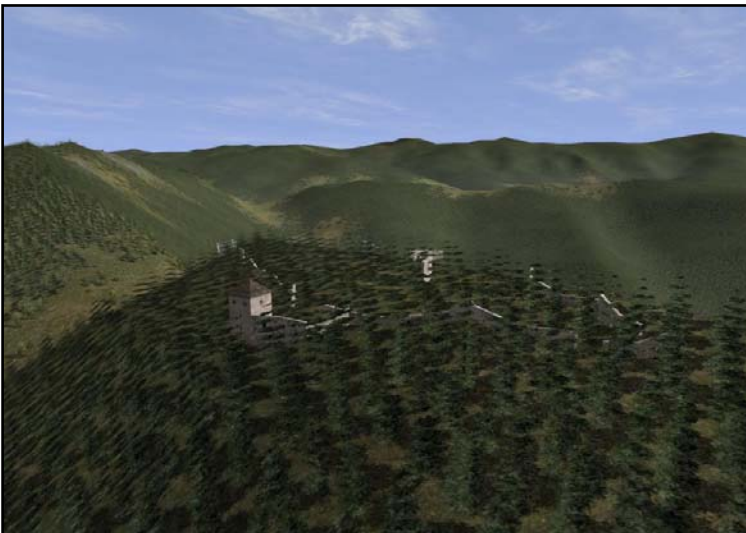
## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Liptovský Hradok Castle (ruin)**  
*Hrad Liptovský Hradok*  
14th century  
Location: **P-10 num 7**



**Lukov Castle (ruin)**  
*Hrad Lukov*  
13th century  
Location: **A-13 num 9**



**Muran Castle (ruin)**  
*Muránsky hrad*  
13th century  
Location: **R-7 num 9**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Oponice Castle (ruin)**  
*Oponický hrad*  
13th century  
Location: **D-4 num 3**



**Povazsky Castle (ruin)**  
*Považský hrad*  
13th century  
Location: **G-11 num 7**



**Pusty Castle (ruin)**  
*Pustý hrad*  
13th century  
Location: **K-5 num 6**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Reviste Castle (ruin)**  
*Hrad Revište*  
13th century  
Location: **H-5 num 3**



**Sasov Castle (ruin)**  
*Hrad Šášov*  
13th century  
Location: **J-5 num 4**



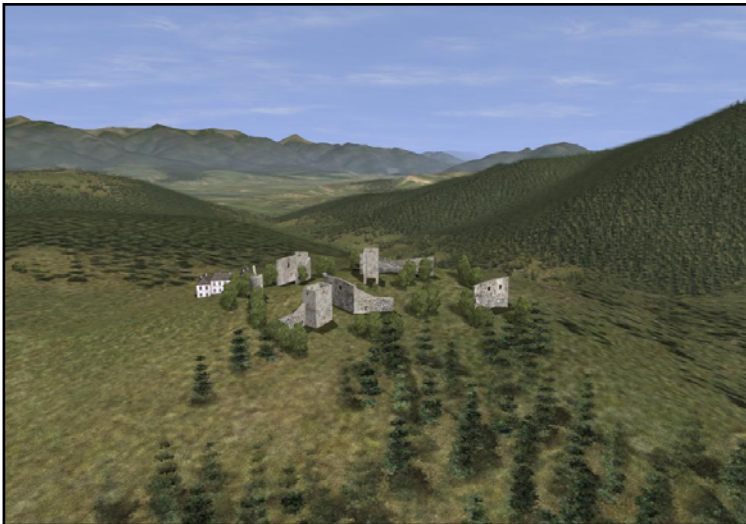
**Sivy Kamen Castle (ruin)**  
*Hrad Sivý kameň*  
14th century  
Location: **H-6 num 8**



## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Skalka Monastery (ruin)**  
*Kláštor Skalka*  
13th century  
Location: **D-9 num 4**



**Sklabina Castle (ruin)**  
*Hrad Sklabiňa*  
13th century  
Location: **K-10 num 7**



**Stary Hrad Castle (ruin)**  
*Stary Hrad (Starhrad)*  
13th century  
Location: **J-12 num 1**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Strecno Castle (ruin)**  
*Hrad Strečno*  
14th century  
Location: **J-12 num 1**



**Sulov Castle (ruin)**  
*Súľovský hrad*  
15th century  
Location: **H-12 num 4**



**Tematin Castle (ruin)**  
*Hrad Tematín*  
13th century  
Location: **C-6 num 7**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Topolcany Castle (ruin)**  
*Topoľčiansky hrad*  
13th century  
Location: **C-6 num 6**



**Uhrovec Castle (ruin)**  
*Hrad Uhrovec*  
13th century  
Location: **F-7 num 5**



**Viglas Chateau (ruin)**  
*Vígľašský zámok*  
14th century  
Location: **M-5 num 4**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Vrsatec Castle (ruin)**  
*Hrad Vršatec*  
13th century  
Location: **D-11 num 3**



**Zniev Castle (ruin)**  
*Hrad Zniev*  
13th century  
Location: **I-9 num 8**



**Banska Stiavnica Calvary Church**  
*Kalvária Banská Štiavnica*  
18th century  
Location: **J-4 num 2**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Diviaky Mansion**  
*Kaštieľ Diviaky*  
17th century  
Location: **I-9 num 3**



**Dolna Micina Mansion**  
*Kaštieľ Dolná Mičiná*  
16th century  
Location: **L-6 num 9**



**Drazovce St. Michael's Church**  
*Kostol Sv. Michala Dražovce*  
12th century  
Location: **D-3 num 1**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Francova Lhota View Tower**  
*Rozhľadňa Francova Lhota*  
20th century  
Location: **D-12 num 5**



**Krupina-Vartovka Watch Tower**  
*Vartovka Krupina (strážna veža)*  
16th century  
Location: **K-3 num 2**



**Levoca City Walls**  
*Levoča – mestské hradby*  
14th century  
Location: **V-10 num 5**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Levoča St.Mary's Hill - Holy Shrine**  
*Levoča – Mariánska hora – Pútnický kostol*

**20th century**

**Location: V-10 num 9**



**Mala Skalka St.Benedikt's Church**

*Malá Skalka – Kostol Sv.Benedikta*

**13th century**

**Location: D-9 num 4**



**Markusovce Mansion, Summer-house and Castle**

*Markušovce – kaštieľ, letohrádok a hrad*  
**13th century (castle)**

**Location: V-9 num 6**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Nitra Calvary Chapel**  
*Nitra - Kalvária*  
18th century  
Location: **D-2 num 4**



**Nové Mesto nad Váhom Fortified Church**  
*Nové Mesto nad Váhom opevnený kostol Narodenia Panny Márie*  
13th century  
Location: **B-7 num 8**



**Okolicne Monastery**  
*Františkánsky kláštor Okoličné*  
15th century  
Location: **O-11 num 3**



## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



**Stipa Monastery**  
*Kláštor Štípa*  
17th century  
Location: **A-13 num 6**



**Stipa Windmill**  
*Štípa – veterný mlyn*  
19th century  
Location: **A-13 num 6**



**Topolcianky Mansion**  
*Kaštieľ Topolčianky*  
15th century  
Location: **F-3 num 9**

## II-2 Sturmovik 1946: Slovakia Map Sightseeing Guide



### **Vlachovice St.Michael's Fortified Church**

*Opevnený kostol Sv.Michaela Vlachovice*  
16th century

Location: **C-11 num 7**

# Il-2 Sturmovik 1946

## Slovakia Map: **Industry Guide**



## II-2 Sturmovik 1946: Slovakia Map Industry Guide

### Contents

	location on map	page
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Dubova State Oil Refinery	N-8 num 1	3
Ozd Iron Works (Hungary)	T-1 num 8	3
Podbrezova Iron Works	O-8 num 1	4
Povazska Bystrica Ammunition and Arms Factory	F-11 num 9	4
Slavicin Arms Factory	C-11 num 4	4
<b>Other industrial objects</b>		
Banska Bystrica Furniture and Match Factory	L-7 num 4	5
Hnusta Chemical Factory	R-5 num 4	5
Horne Srnie Cement Works	D-10 num 2	5
Hronec Iron Foundry	O-8 num 1	6
Kvetna Glass Works	A-9 num 2	6
Lednicke Rovne Glass Works	E-11 num 3	6
Lietavska Lucka Cement Works	I-12 num 1	7
Nemsova Glass Works	D-10 num 2	7
Nove Mesto nad Vahom Lime Kiln	B-7 num 4	7
Poltar Glass Works	P-3 num 9	8
Poprad Machine Factory	T-10 num 8	8
Ruzomberok Pulp and Paper Mill	M-11 num 1	8
Rybarpole Textile Mill	M-11 num 1	9
Simonovany Bata Shoemaking Works	F-6 num 2	9
Slavicin Footwear Factory	B-11 num 6	9
Slavosovce Paper Mill	T-7 num 2	10
Svit Viscose Fibres Factory	S-10 num 9	10
Trencin Textile Mill	D-9 num 1	10
Turciansky Sv.Martin Pulp Mill	J-11 num 2	11
Valasske Klobouky Woolen Factory	C-11 num 9	11
Varin Lime Kiln	I-12 num 6	11
Vizovice Liqueur Distillery	B-12 num 9	12
Vsetin Electrotechnical Factory	C-14 num 3	12
Vsetin Sawmill	C-14 num 3	12
Zilina Tar Factory	I-12 num 7	13
Zilina Chemical Factory	I-12 num 7	13
Zilina Textile Mill	I-12 num 7	13
Zilina Pulp and Paper Mill	I-12 num 7	14
Zlatno Glass Works	Q-5 num 1	14
Zlin Footwear and Tyres Factory	A-12 num 8	14
Zvolen Iron and Plate Works	L-5 num 4	15
<b>Mines, quarries and other objects</b>		
Cigel Coal Mine	H-7 num 2	15
Dobsina Asbestos Mine and Paper Mill	U-8 num 4	15
Handlova Coal Mine	I-7 num 4	16
Jelsava Magnesite Mine	S-6 num 6	16
Kremnica Ore Mine	J-7 num 2	16
Lubenik Magnesite Mine	S-6 num 6	17
Novaky Coal Mine	G-7 num 3	17
Rakos Ore Mine	S-5 num 8	17
Roznava Ore Mine	V-6 num 7	18
Ruzomberok Limestone Quarry	M-10 num 7	18
Slavec Limestone Quarry	U-5 num 9	18

## II-2 Sturmovik 1946: Slovakia Map Industry Guide

Stranavy Limestone Quarry	I-12 num 3	19
Vrutky – Dubna Skala Crushed Stone Quarry	J-11 num 7	19
Laskomer Transmitter Station	K-7 num 6	19

**Note:** This preview does not cover all industrial factories and objects present on Slovakia territory during the WWII.



**Dubnica Arms Factory**  
*Škodove závody Dubnica*  
Location: **E-10 num 1**  
Altitude: 20 m



**Dubova State Oil Refinery**  
*Štátna rafinéria Dubová*  
Location: **N-8 num 1**  
Altitude: 0 m



**Ozd Iron Works (Hungary)**  
*Železiarne Ozd*  
Location: **T-1 num 8**  
Altitude: 50 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Podbrezova Iron Works**  
*Železiarne Podbrezová*  
Location: **O-8 num 1**  
Altitude: 0 m



**Povazska Bystrica Ammunition Factory**  
*Zbrojovka Považská Bystrica*  
Location: **F-11 num 9**  
Altitude: 0 m



**Slavicin Arms Factory**  
(Protectorate Bohmen und Mahren)  
*Zbrojovka Slavičín*  
Location: **C-11 num 4**  
Altitude: 120 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Banska Bystrica Furniture Factory**  
*Nábytkáreň Banská Bystrica*  
Location: **L-7 num 4**  
Altitude: 0 m



**Hnúšť'a Chemical Factory**  
*Slovenské lučobné závody Hnúšť'a*  
Location: **R-5 num 4**  
Altitude: 20 m



**Horne Srnie Cement Works  
and Quarry**  
*Cementáreň a lom Horné Srnie*  
Location: **D-10 num 2**  
Altitude: 30 m

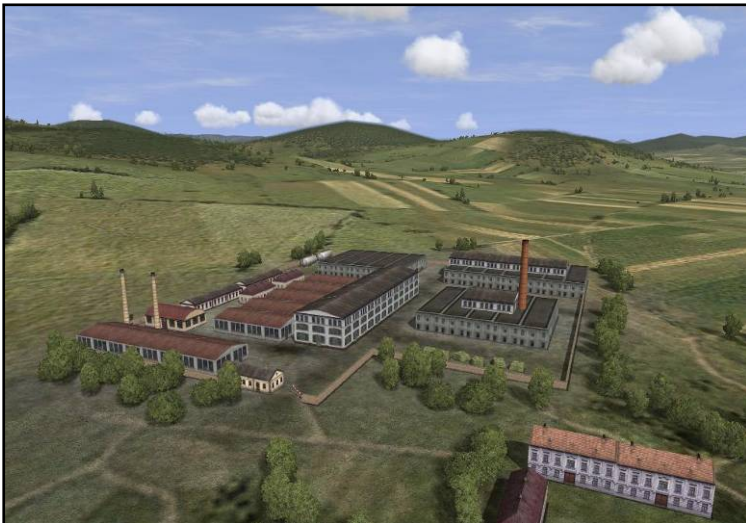
## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Hronec Iron Foundry**  
*Hrončiansky komplex - zlievareň Hronec*  
Location: **O-8 num 1**  
Altitude: 0 m



**Kvetna Glass Works**  
*Sklená huta Květná*  
Location: **A-9 num 2**  
Altitude: 220 m



**Lednicke Rovne Glass Works**  
*Slovenské sklené huty Lednické Rovne*  
Location: **E-11 num 3**  
Altitude: 0 m



## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Lietavska Lucka Cement Works**  
*Cementáreň Lietavská Lúčka*  
Location: **I-12 num 1**  
Altitude: 70 m



**Nemsova Glass Works**  
*Skláreň Nemšová*  
Location: **D-10 num 2**  
Altitude: 30 m

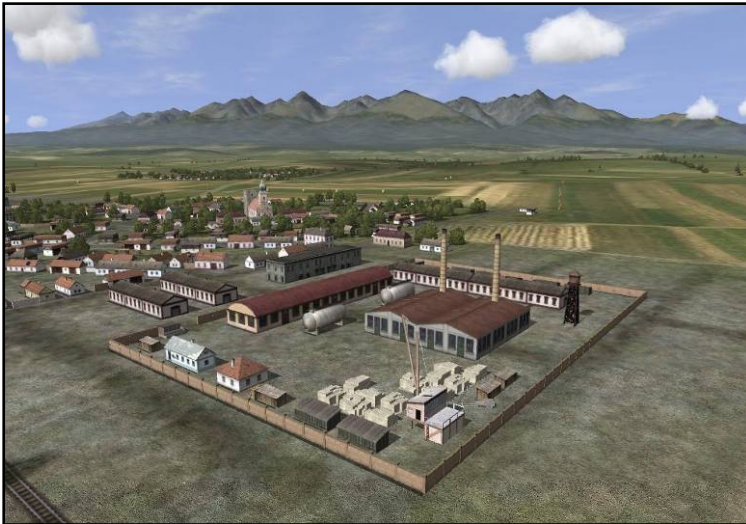


**Nove Mesto nad Vahom Lime Kiln**  
*Vápenka Nové Mesto nad Váhom*  
Location: **B-7 num 4**  
Altitude: 30 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Poltar Glass Works**  
*Skláreň Poltár - Zelené*  
Location: **P-3 num 9**  
Altitude: 30 m



**Poprad Machine Factory**  
*Strojáreň Vagónka Poprad*  
Location: **T-10 num 8**  
Altitude: 80 m



**Ruzomberok Pulp and Paper Mill**  
*Celulózka a papiereň Ružomberok*  
Location: **M-11 num 1**  
Altitude: 0 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Rybarpole Textile Mill**  
*Textilná továreň Rybárpole*  
Location: **M-11 num 1**  
Altitude: 0 m



**Simonovany Bata Footwear Factory**  
*Baťove závody, Šimonovany-Baťovany*  
Location: **F-6 num 2**  
Altitude: 10 m



**Slavicin Footwear Factory**  
*Fabrika na obuv firmy Pivečka*  
Location: **B-11 num 6**  
Altitude: 150 m

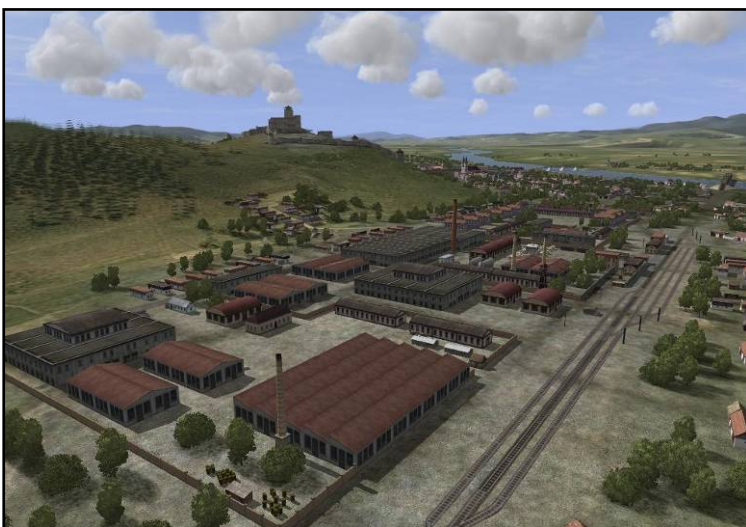
## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Slavosovce Paper Mill**  
*Papiereň Slavošovce*  
Location: **T-7 num 2**  
Altitude: 140 m



**Svät Viskóza Viscose Fibres Factory**  
*Slovenská viskózová továreň Svät*  
Location: **S-10 num 9**  
Altitude: 120 m



**Trenčín Textile Mill**  
*Textilná továreň Trenčín*  
Location: **D-9 num 1**  
Altitude: 20 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Turciarsky Sv. Martin Pulp Mill**  
*Celulóžka Turčiansky Sv. Martin*  
Location: **J-11 num 2**  
Altitude: 10 m



**Valasske Klobouky Woolen Factory**  
*Fabrika na spracovanie vlny Valašské Klobouky*  
Location: **C-11 num 9**  
Altitude: 180 m



**Varin Lime Kiln**  
*Vápenka Varín*  
Location: **I-12 num 6**  
Altitude: 20 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Vizovice Liqueur Distillery**  
*Likérka R.Jelínek Vizovice*  
Location: **B-12 num 9**  
Altitude: 40 m



**Vsetin Electrotechnical Factory**  
*Elektrotechnická továrň Josef Sousedík*  
Location: **C-14 num 3**  
Altitude: 100 m



**Vsetin Sawmill**  
*Píla a zápalkáreň Vsetín*  
Location: **C-14 num 3**  
Altitude: 110 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Zilina Tar Factory**  
*Ruetgers - dechtáreň Žilina*  
Location: **I-12 num 7**  
Altitude: 20 m



**Zilina Chemical Factory**  
*Hungaria - chemická továreň Žilina*  
Location: **I-12 num 7**  
Altitude: 20 m



**Zilina Textile Mill**  
*Žilinská súkenná továreň, účastinná spoločnosť*  
Location: **I-12 num 7**  
Altitude: 20 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Zilina Pulp and Paper Mill**  
*Žilinská továrňa na celulózu,  
účastinárska spoločnosť Žilina*  
Location: **I-12 num 7**  
Altitude: 20 m



**Zlatno Glass Works**  
*Skláreň Zlatno*  
Location: **Q-5 num 1**  
Altitude: 140 m



**Zlin Footwear and Tyres Factory**  
*Baťa Zlín – továreň na obuv  
a pneumatiky*  
Location: **A-12 num 8**  
Altitude: 20 m



## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Zvolen Iron and Plate Works**  
*Union železiareň a plecháreň Zvolen*  
Location: **L-5 num 4**  
Altitude: 10 m



**Cigel Coal Mine**  
*Uhoľná baňa Cigel'*  
Location: **H-7 num 2**  
Altitude: 220 m



**Dobsina Asbestos Mine and Paper Mill**  
*Azbestová baňa a papiereň Dobšiná*  
Location: **U-8 num 4**  
Altitude: 130 m

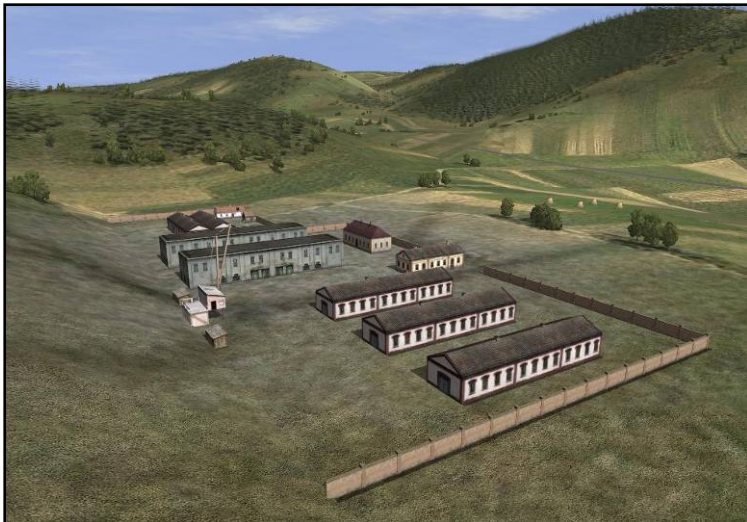
## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Handlova Coal Mine**  
*Uhoľné bane Handlová*  
Location: **I-7 num 4**  
Altitude: 190 m



**Jelsava Magnesite Mine**  
*Magnezitový priemysel účastinná spoločnosť Jelšava*  
Location: **S-6 num 6**  
Altitude: 20 m



**Kremnica Ore Mine**  
*Rudná baňa Kremnica*  
Location: **J-7 num 2**  
Altitude: 320 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Lubenik Magnesite Mine**  
*MIAG Magnezitová baňa Lubeník*  
**Location: S-6 num 6**  
**Altitude: 40 m**



**Nováky Coal Mine and Chemical Factory**  
*Uhoľná baňa a Chemické závody Nováky*  
**Location: G-7 num 3**  
**Altitude: 20 m**



**Rakos Ore Mine**  
*Rudná baňa Rákoš*  
**Location: S-5 num 8**  
**Altitude: 70 m**

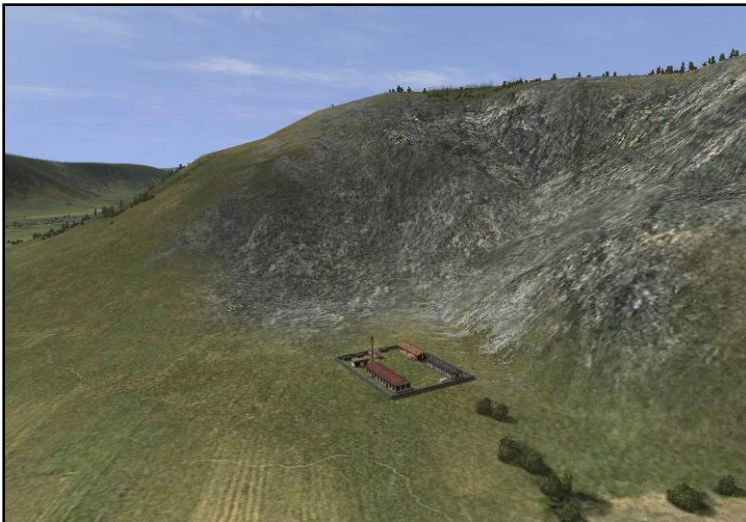
## II-2 Sturmovik 1946: Slovakia Map Industry Guide



**Rožňava Ore Mine**  
*Rudné bane Rožňava*  
Location: **V-6 num 7**  
Altitude: 20 m



**Ružomberok Dolomite Quarry**  
*Dolomitový lom Ružomberok*  
Location: **M-10 num 7**  
Altitude: 40 m



**Slavec Limestone Quarry**  
*Vápencový lom Slavec*  
Location: **U-5 num 9**  
Altitude: 20 m

## II-2 Sturmovik 1946: Slovakia Map Industry Guide

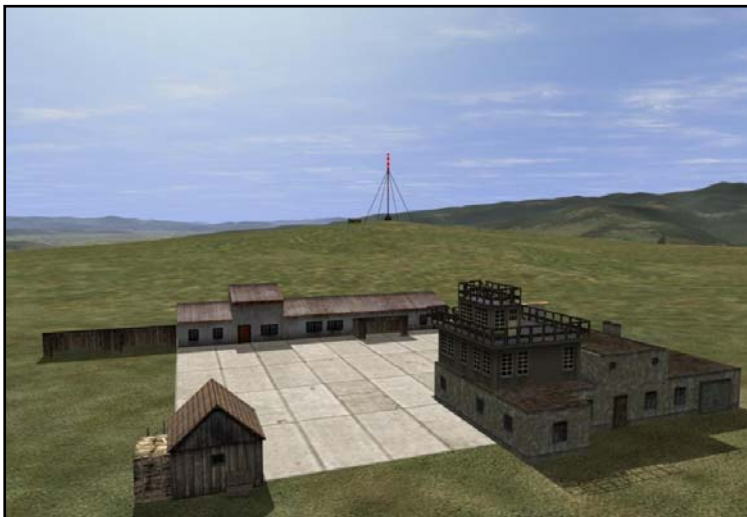


**Stranavy Limestone Quarry**  
*Vápencový lom Stráňavy*  
Location: **I-12 num 3**  
Altitude: 330 m



**Vrutky - Dubna Skala**  
**Crushed Stone Quarry**  
*Kameňolom Vrutky - Dubná Skala*  
Location: **J-11 num 7**  
Altitude: 40 m

\* \* \*



**Laskomer Transmitter Station**  
*Vysielač Laskomer (počas SNP Slobodný slovenský vysielač)*  
Location: **K-7 num 6**  
Altitude: 300 m

# **Il-2 Sturmovik 1946**

**Slovakia Map:**

**Industry & Sightseeing Object Distribution**



### Map Legend

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industry object (1 – 54)



sightseeing object (1 – 72)



airfield

**Note:** This preview does not cover all industrial and sightseeing objects present on the territory of Slovakia during the WWII.

**Special thanks to kirsha for compilation of map lists.**

\* \* \*

#### Industry objects

##### **List 1**

1. Dubnica Arms Factory
2. Horne Srnie Cement Works
3. Kvetna Glass Works
4. Lednicke Rovne Glass Works
5. Nemsova Glass Works
6. Slavicin Arms Factory
7. Slavicin Footwear Factory
8. Trencin Textile Mill
9. Valasske Klobouky Woolen Factory
10. Vizovice Liqueur Distillery
11. Vsetin Electrotechnical Factory
12. Vsetin Sawmill
13. Zlin Footwear and Tyres Factory

##### **List 2**

4. Lednicke Rovne Glass Works
14. Lietavska Lucka Cement Works
15. Stranavy Limestone Quarry
16. Varin Lime Kiln
17. Zilina Chemical Factory
18. Zilina Pulp and Paper Mill
19. Zilina Tar Factory
20. Zilina Textile Mill
26. Vrutky – Dubna Skala Crushed Stone Quarry
49. Povazska Bystrica Ammunition and Arms Factory
50. Zilina Brick Factory
52. Turciansky Sv.Martin Brewery

##### **List 3**

21. Dubova State Oil Refinery
22. Ruzomberok Limestone Quarry
23. Ruzomberok Pulp and Paper Mill
24. Rybarpole Textile Mill
25. Turciansky Sv.Martin Pulp Mill
26. Vrutky – Dubna Skala Crushed Stone Quarry
51. Ruzomberok Brick Factory
52. Turciansky Sv.Martin Brewery

##### **List 4**

27. Hronec Iron Foundry
28. Podbrezova Iron Works
53. Gasparovo Match Factory

##### **List 5**

29. Dobsina Asbestos Mine and Paper Mill
30. Poprad Machine Factory
31. Svit Viscose Fibres Factory
54. Spisska Nova Ves Brick Factory

##### **List 6**

32. Nove Mesto nad Vahom Lime Kiln

##### **List 7**

33. Cigel Coal Mine
34. Handlova Coal Mine
35. Novaky Coal Mine
37. Kremnica Ore Mine
55. Simonovany Bata Footware Works

## II-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution

### List 8

21. Dubova State Oil Refinery
36. Banska Bystrica Furniture and Match Factory
37. Kremnica Ore Mine
38. Zvolen Iron and Plate Works
56. Laskomer Transmitter Station

### List 9

27. Hronec Iron Foundry
28. Podbrezova Iron Works
39. Hnusta Chemical Factory
40. Poltar Glass Works
41. Zlatno Glass Works
53. Gasparovo Match Factory

### List 10

29. Dobsina Asbestos Mine and Paper Mill
42. Jelsava Magnesite Mine
43. Lubenik Magnesite Mine
44. Ozd Iron Works (Hungary)
45. Rakos Ore Mine
46. Roznava Ore Mine
47. Slavec Limestone Quarry
48. Slavosovce Paper Mill

\* \* \*

### Sightseeing objects

#### List 1

1. Beckov Castle
2. Brumov Castle
3. Francova Lhota View Tower
4. Ilava Castle
5. Lednica Castle
6. Lukov Castle
7. Mala Skalka St.Benedikt´s Church
8. Skalka Monastery
9. Stipa Monastery
10. Stipa Windmill
11. Trencin Castle
12. Vizovice Chateau
13. Vlachovice St.Michael´s Fortified Church
14. Vrsatec Castle

#### List 2

15. Diviaky Mansion
16. Hricov Castle
17. Lietava Castle
18. Povazsky Castle
19. Sulov Castle
20. Velka Bytca Castle
21. Zniev Castle
26. Stary hrad Castle
27. Strecno Castle

#### List 3

22. Blatnica Castle
23. Likava Castle
24. Orava Castle
25. Sklabina Castle
26. Stary hrad Castle
27. Strecno Castle

#### List 4

28. Liptovsky Hradok Castle
29. Okolicne Monastery

#### List 5

30. Holumnica Castle
31. Kezmarok Chateau
32. Klastorisko Monastery
33. Levoca City Walls
34. Levoca St.Mary´s Hill - Holy Shrine
35. Markusovce Mansion, Summer-house and Castle
36. Podolinec Monastery



## II-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution

### List 6

1. Beckov Castle
37. Cachtice Castle
38. Drazovce St.Michal's Church
39. Gyemes Castle
40. Hlohovec Chateau
41. Leopoldov Fort
42. Nitra Calvary Chapel
43. Nitra Castle
44. Nove Mesto nad Vahom Fortified Church
45. Oponice Castle
46. Tematin Castle
47. Topolcany Castle

### List 7

48. Bojnice Chateau
49. Hronsky St.Benadik Monastery
50. Hrusov Castle
51. Levice Castle
52. Reviste Castle
53. Sivy Kamen Castle
54. Topolcianky Mansion
55. Uhrovec Castle
56. Banska Stiavnica Calvary Church
57. Banska Stiavnica New Chateau
58. Banska Stiavnica Old Chateau
61. Kremnica Castle
65. Sasov Castle

### List 8

56. Banska Stiavnica Calvary Church
57. Banska Stiavnica New Chateau
58. Banska Stiavnica Old Chateau
59. Bzovik Monastery
60. Cabrad Castle
61. Kremnica Castle
62. Krupina – Vartovka Watch Tower
63. Modry Kamen Castle and Mansion
64. Pusty Castle
65. Sasov Castle
66. Slovenska Lupca Castle
67. Viglas Chateau
68. Zvolen Castle
73. Dolna Micina Mansion

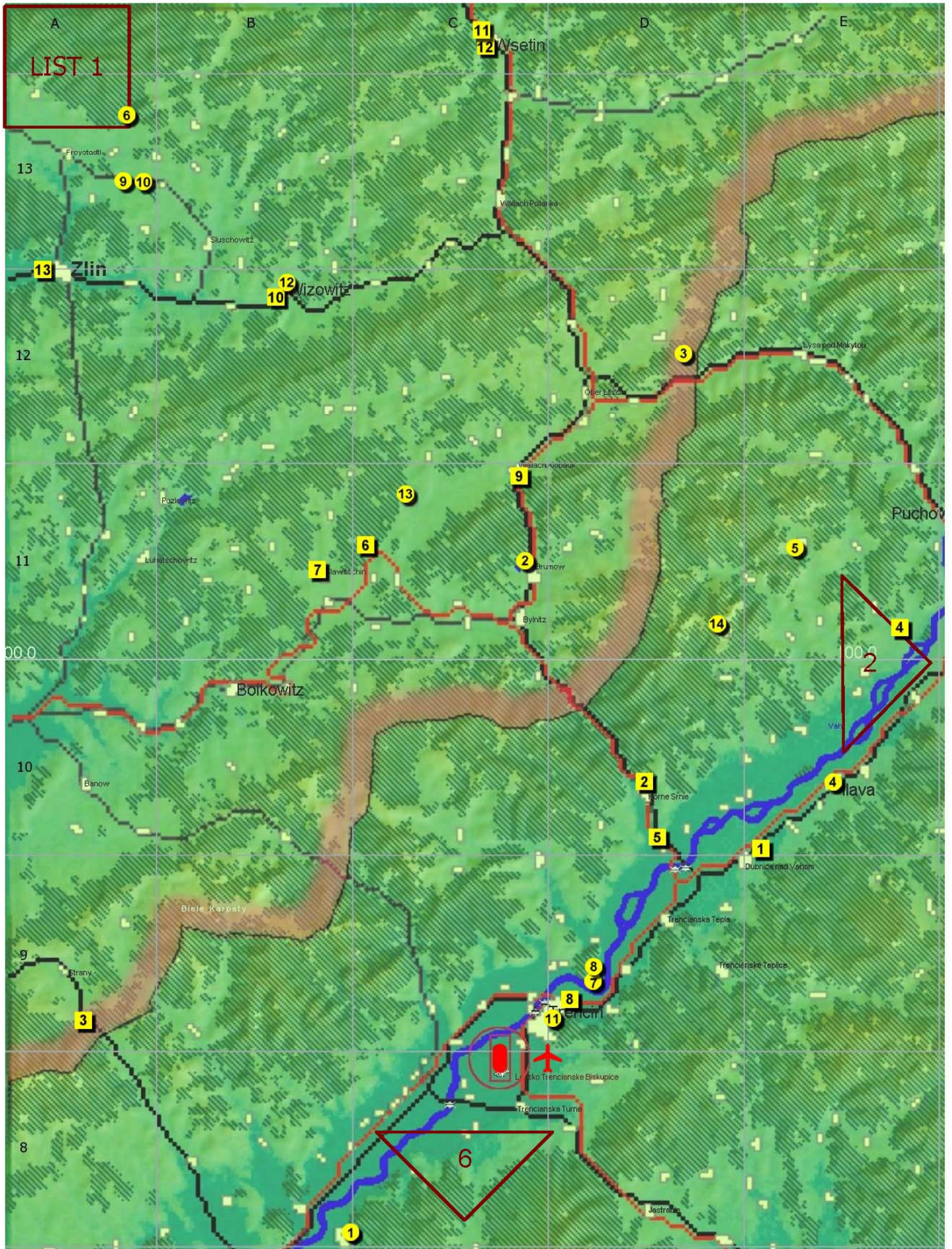
### List 9

69. Divin Castle
70. Filakovo Castle
71. Muran Castle

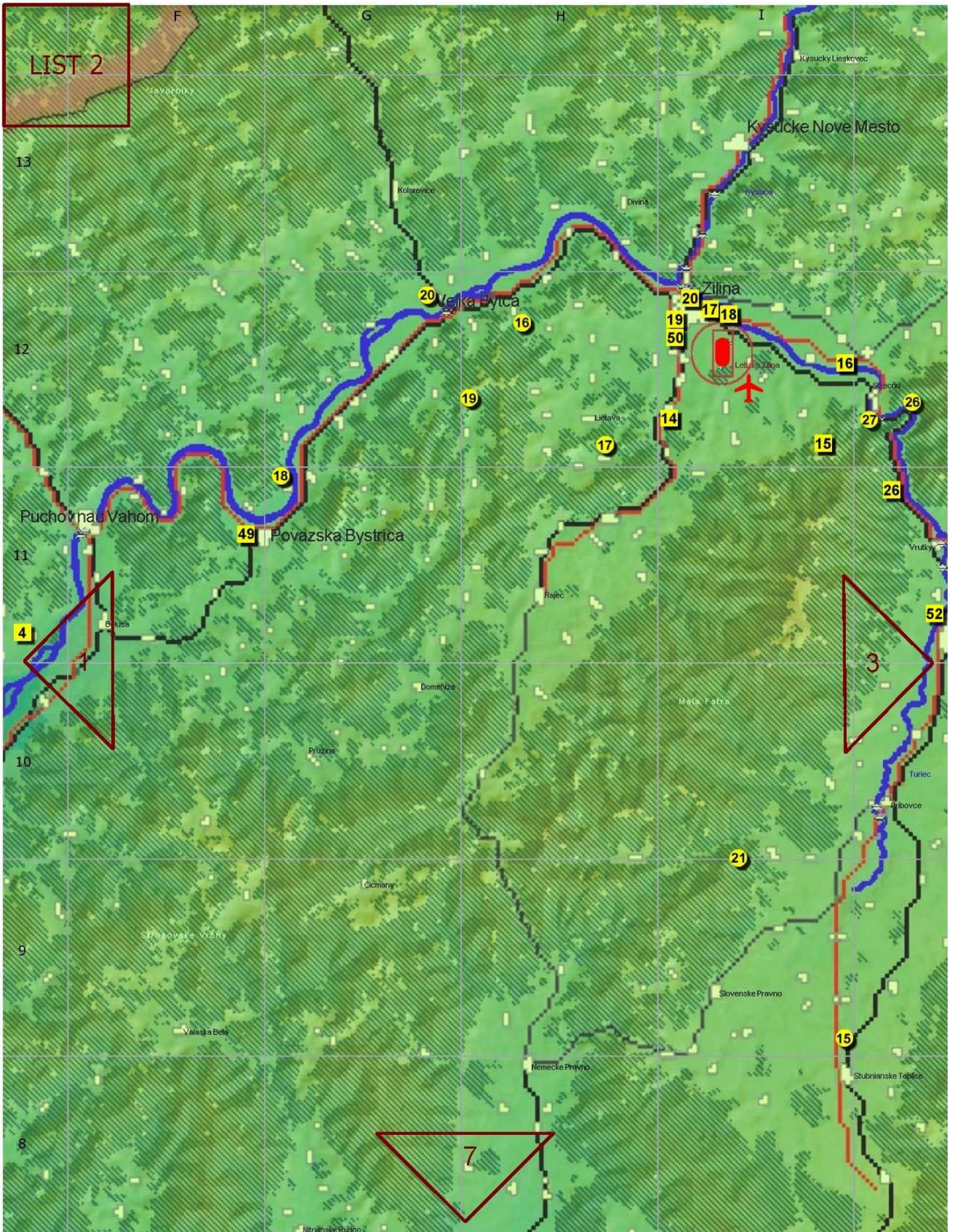
### List 10

71. Muran Castle
72. Krasna Horka Castle

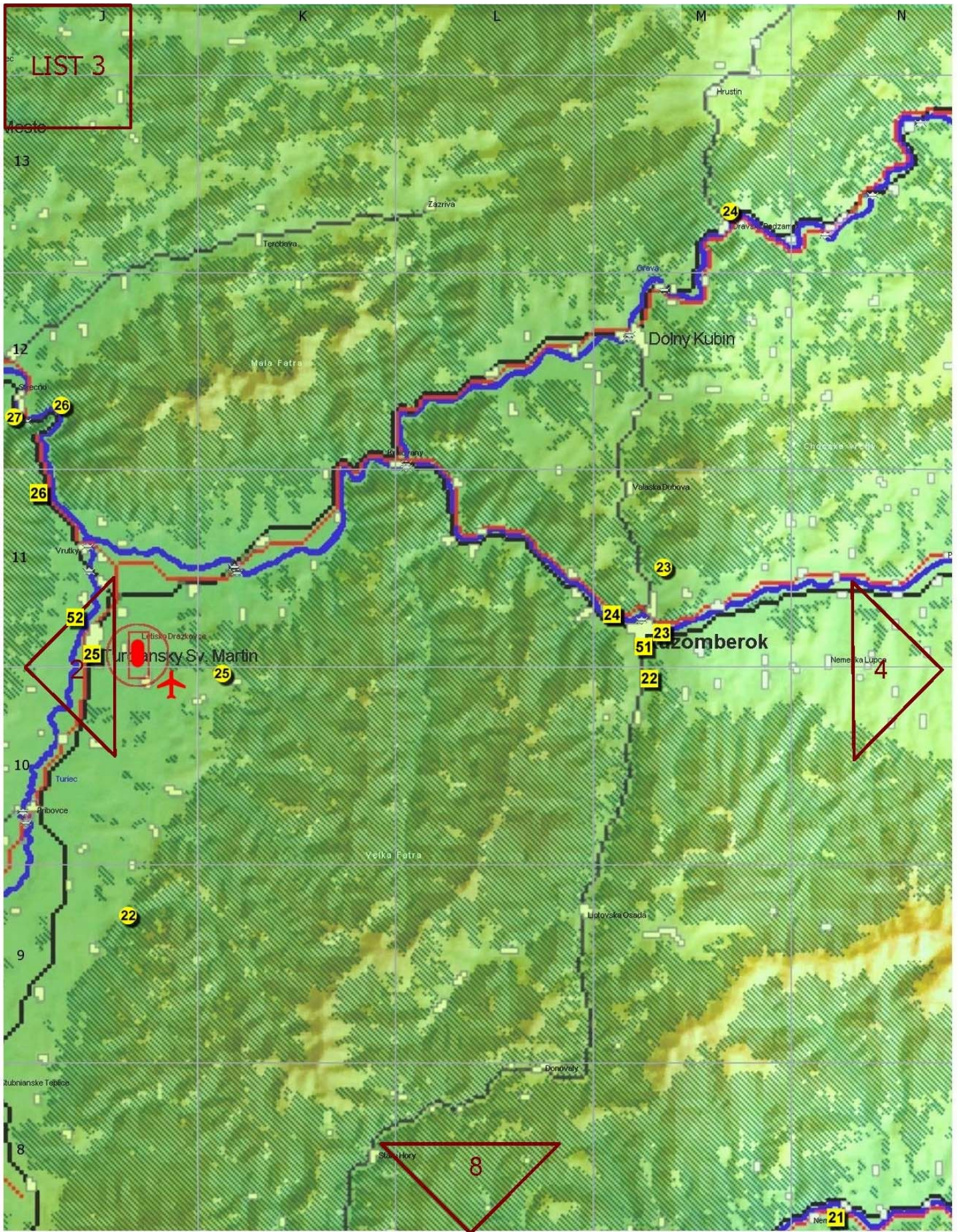
## II-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



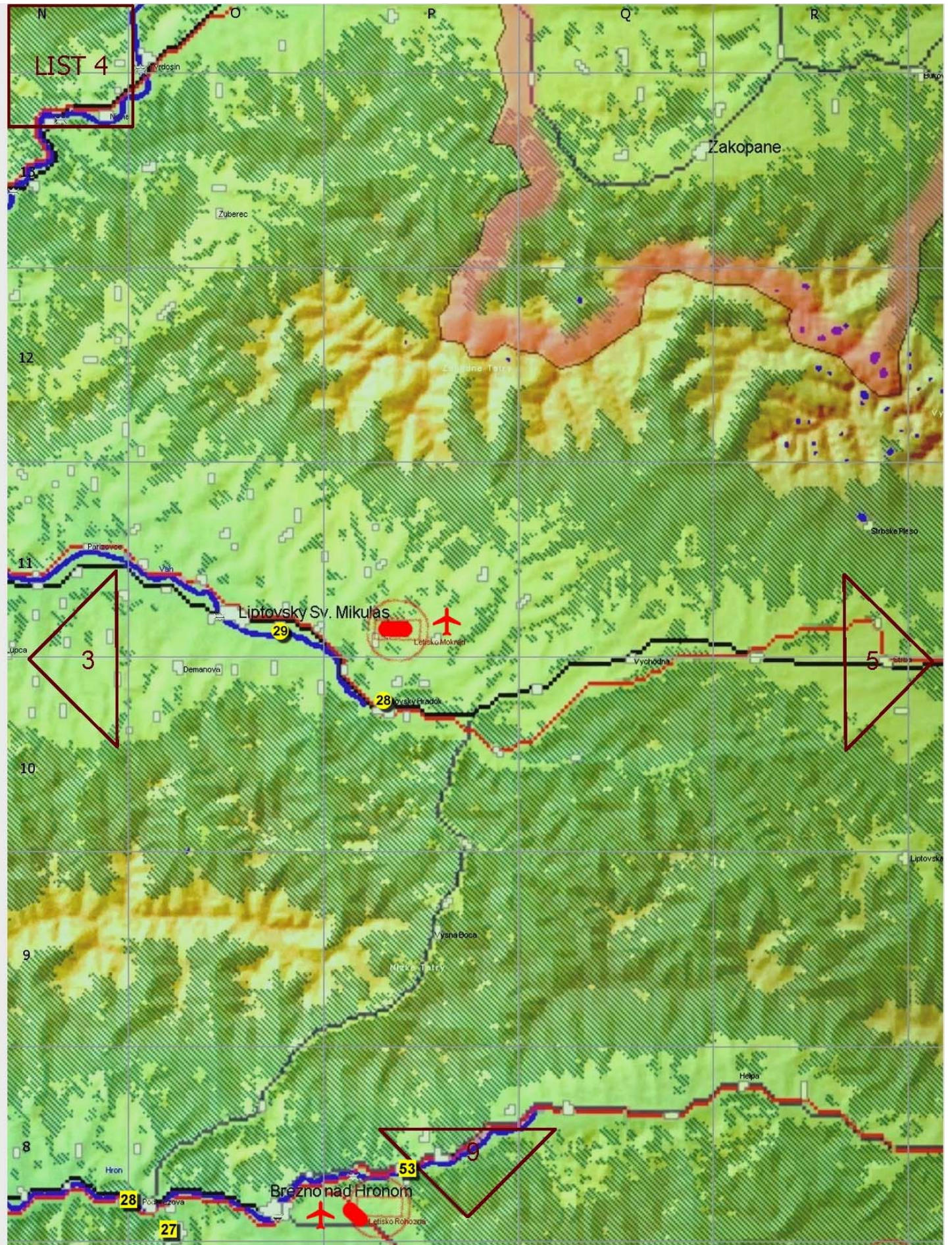
## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



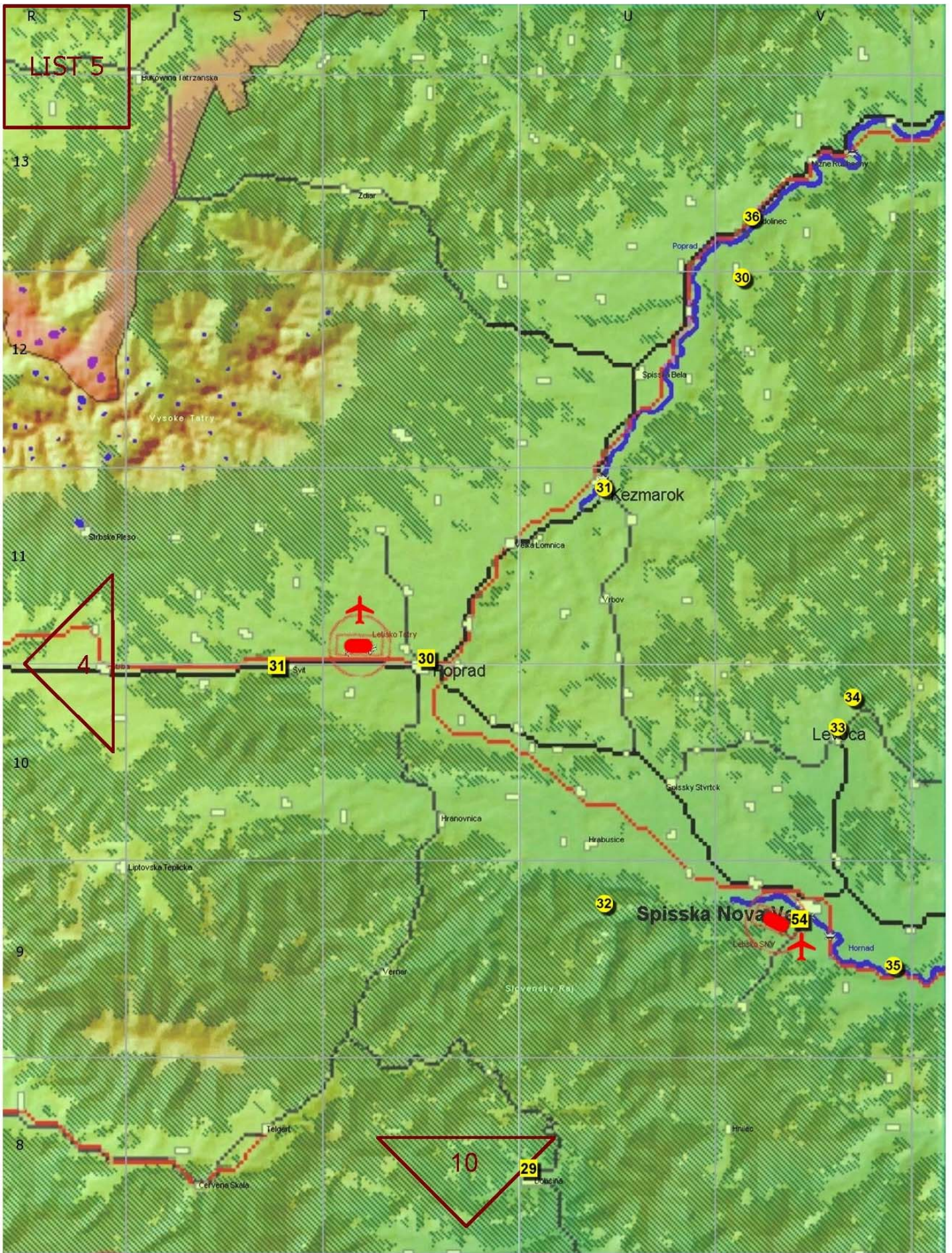
## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



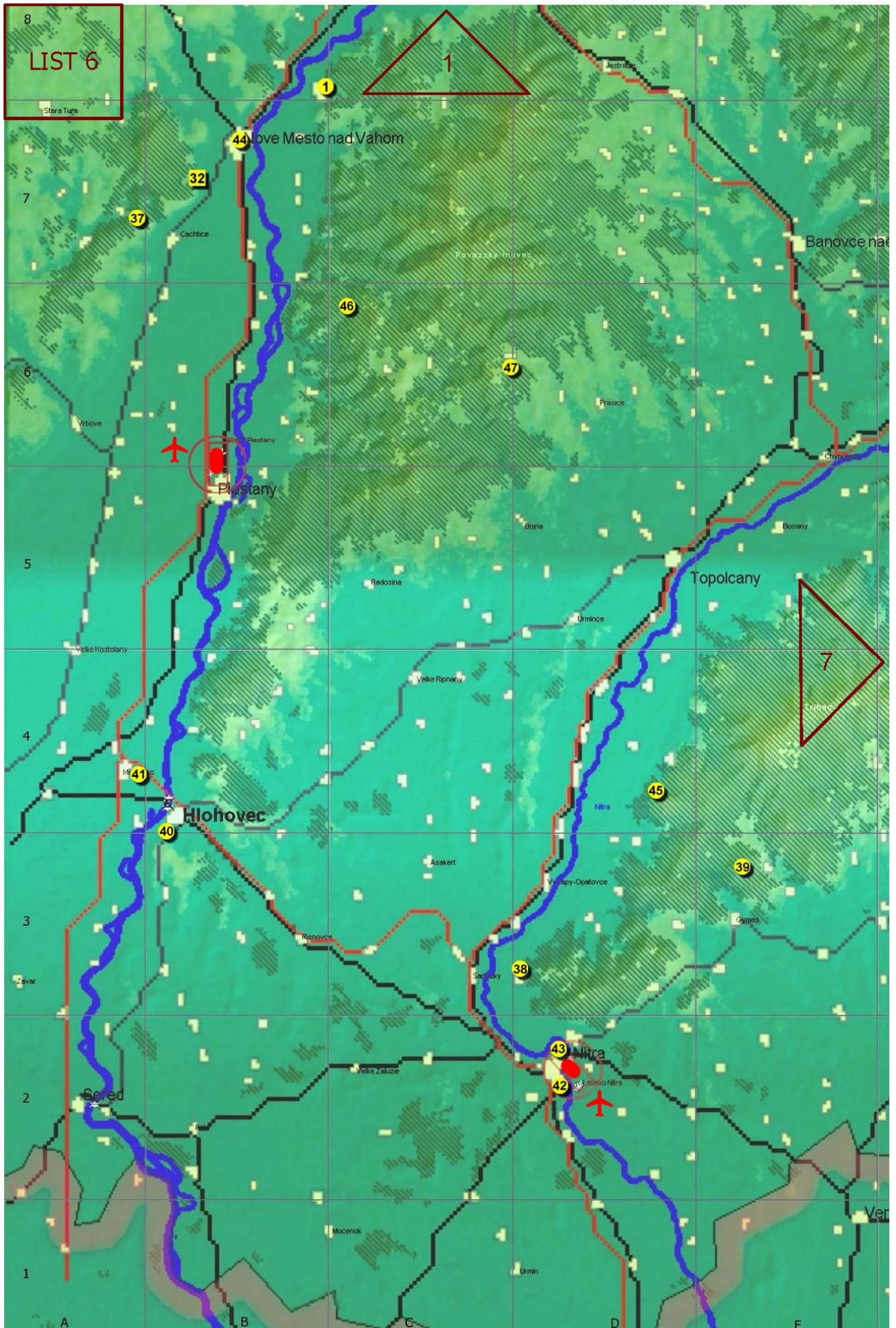
## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



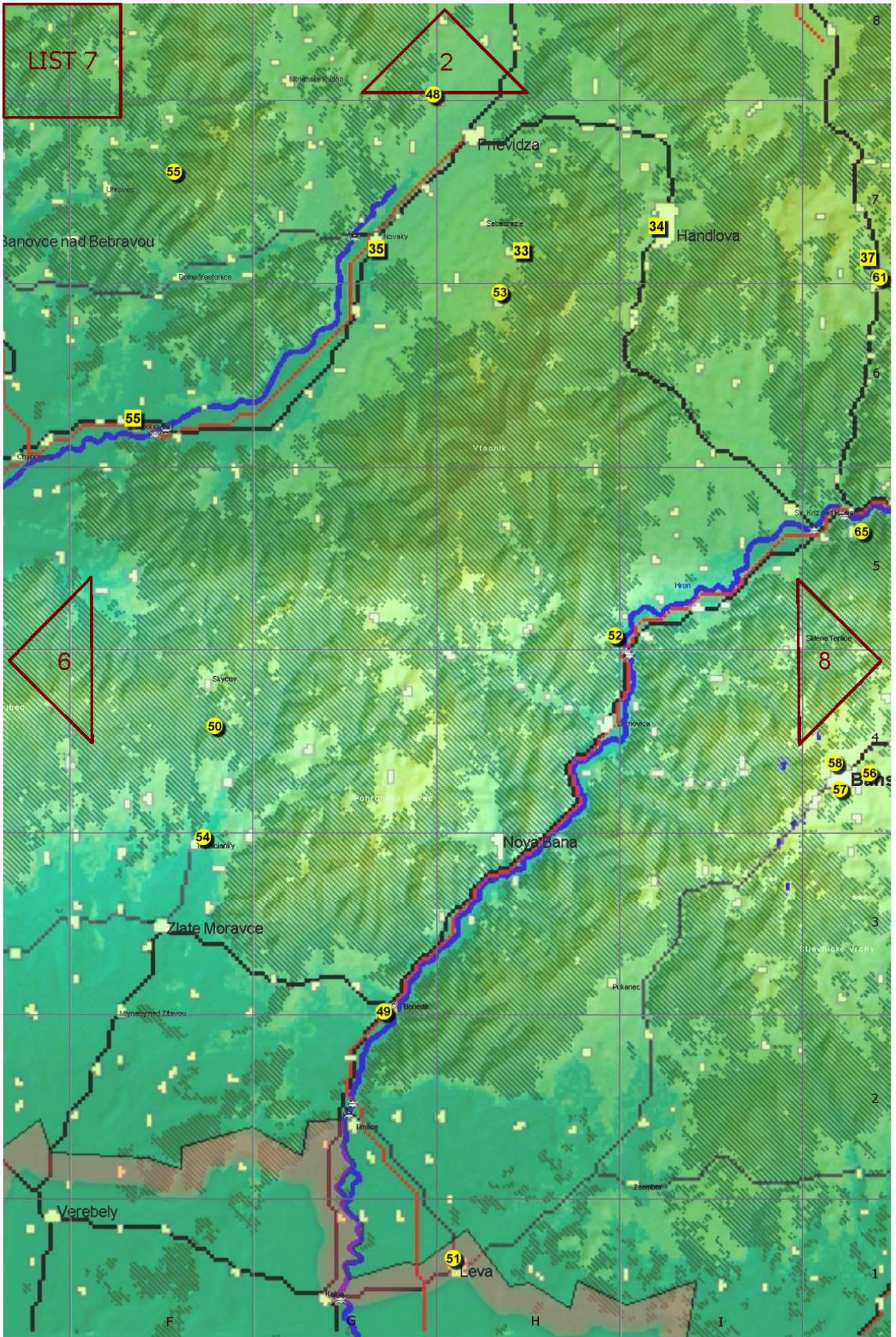
# Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution

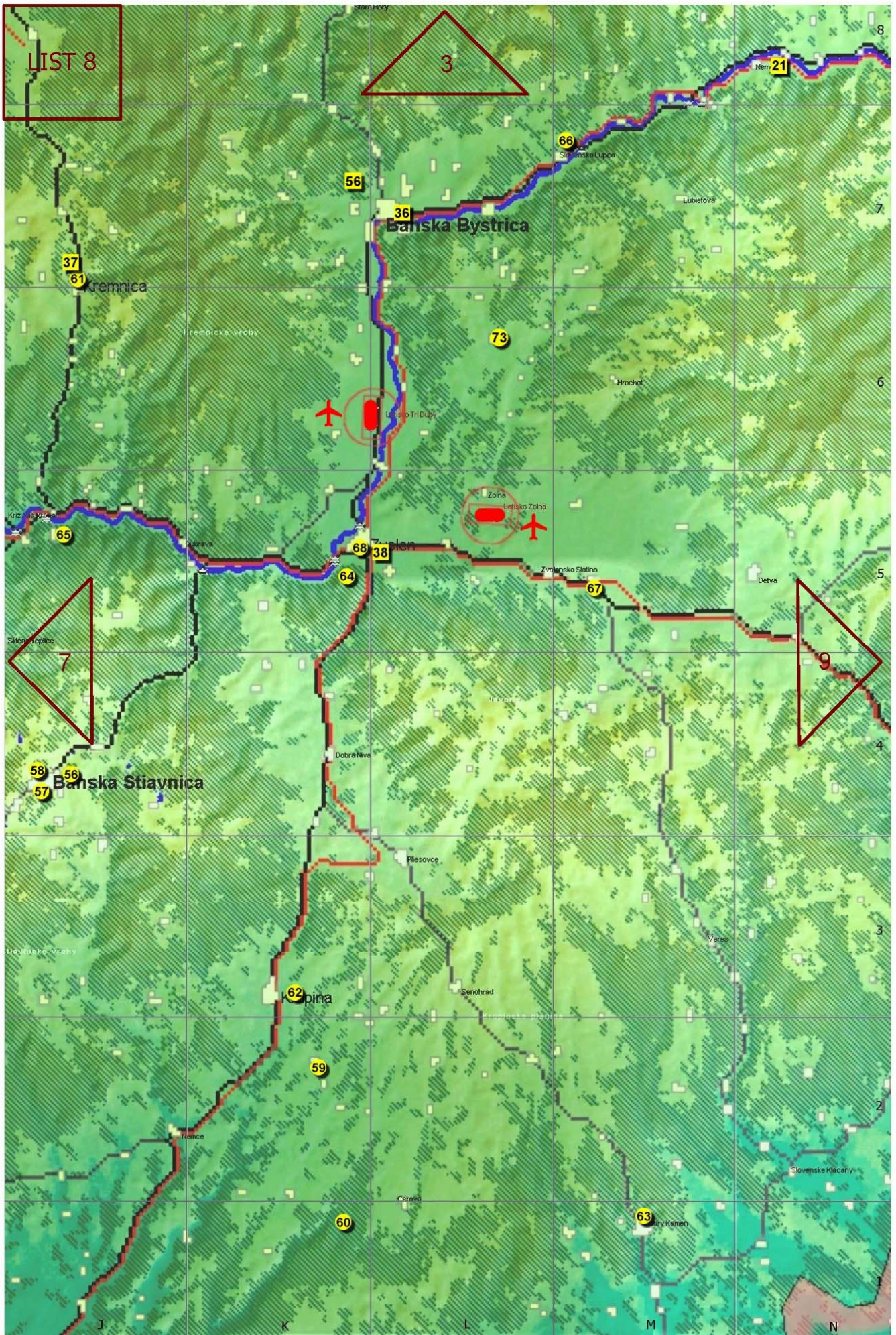


## II-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution

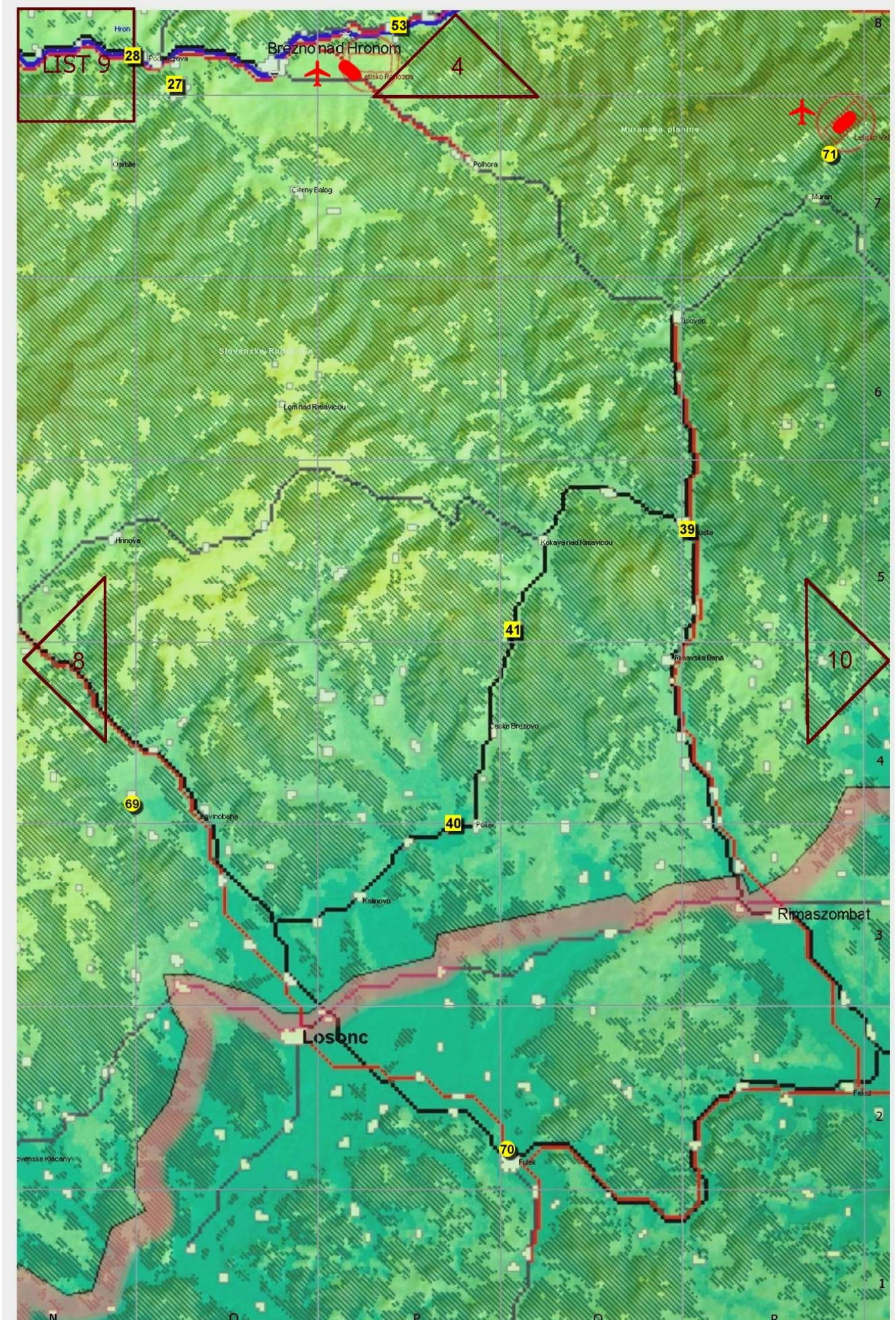




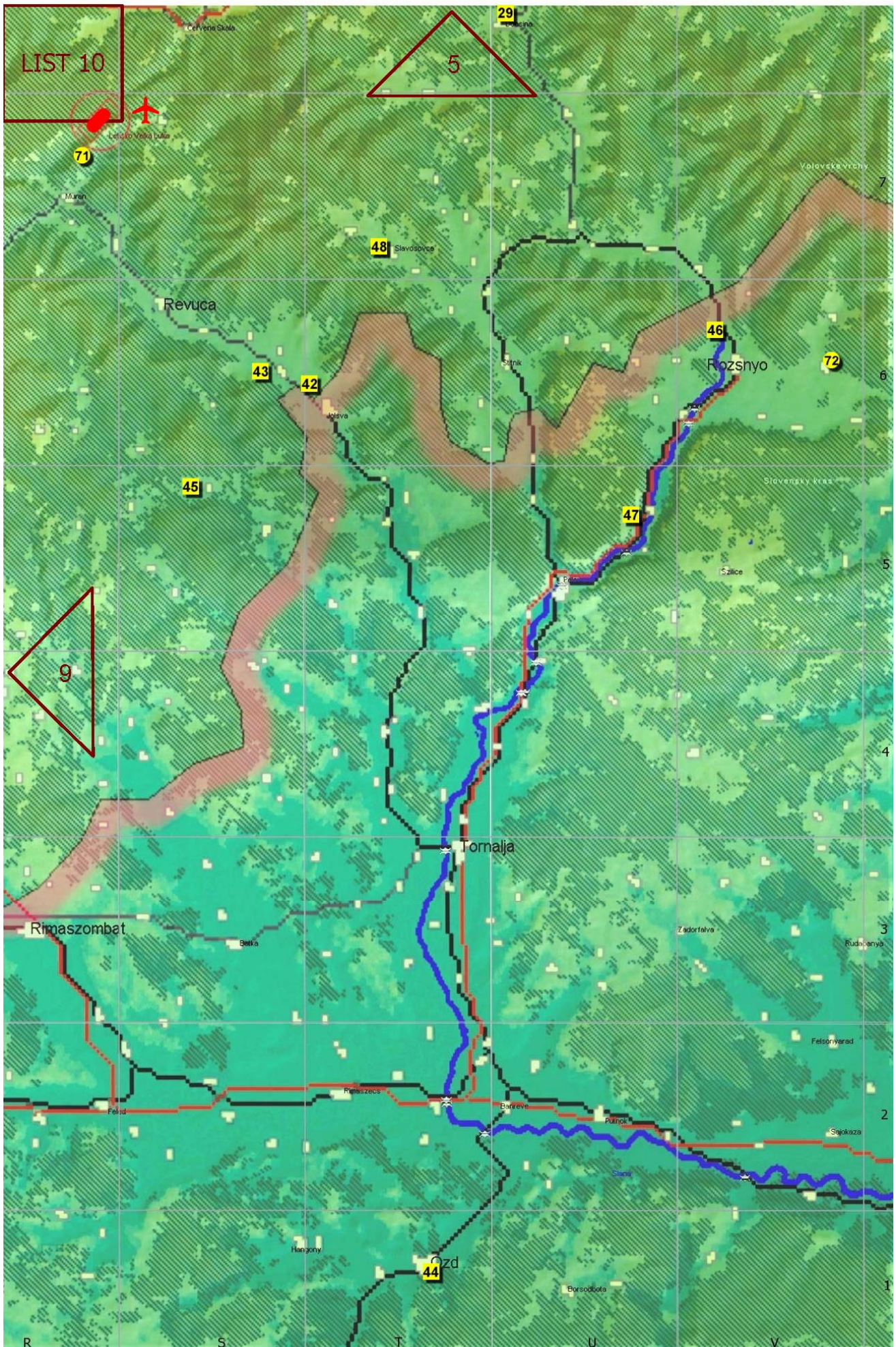
## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



## Il-2 Sturmovik 1946: Slovakia Map Industry & Sightseeing Object Distribution



Torpedo Speed: **40** [knots]  
 Torpedo Range: **4000** [m]  
 Torpedo T\_lock: **5.0** [s]

Launch Table for Marazio-Unia Sight  
 Deflection Angle Delta [°] as a function of  
 Beta (Angle Off Bow) [°] and VN (Ship Speed) [knots]  
 for 4 Aircraft to Ship Typical Distances  
 This Table was made with [Torpedosight](#)



Aircraft Speed VA: **300** [km/h]  
 Aircraft Altitude HA: **100** [m]

Aircraft-Ship  
 Distances  
 (Dist) **500** [m]  
**750** [m]  
**1000** [m]  
**1500** [m]

Angle Off Bow Beta [°]	Dist [m]	Ship Speed (VN) [knots]																	Dist [m]				
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34					
10	500	0,0	0,5	0,5	1,0	1,0	1,0	1,5	1,5	2,0	2,0	2,5	2,5	3,0	3,0	3,5	4,0	4,0	4,5	4,5	5,0	5,0	
	750	0,5	0,5	1,0	1,5	1,5	2,0	2,0	2,5	3,0	3,0	3,5	3,5	4,0	4,0	4,5	4,5	5,0	5,0	5,5	5,5	6,0	6,0
	1000	0,5	0,5	1,0	1,5	1,5	2,0	2,0	2,5	3,0	3,0	3,5	3,5	4,0	4,0	4,5	4,5	5,0	5,0	5,5	5,5	6,0	6,0
	1500	0,5	1,0	1,0	1,5	2,0	2,5	2,5	3,0	3,5	3,5	4,0	4,5	4,5	5,0	5,5	5,5	6,0	6,0	6,5	6,5	7,0	7,0
20	500	0,5	1,0	1,0	1,5	2,0	2,0	2,5	3,0	3,0	3,5	3,5	4,0	4,0	4,5	4,5	5,0	5,0	5,5	5,5	6,0	6,0	
	750	0,5	1,0	1,5	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	7,5	8,0	8,0	8,5	8,5	9,0	9,0	
	1000	0,5	1,5	2,0	2,5	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0	9,5	9,5	10,0	10,0	10,5	10,5
	1500	1,0	1,5	2,5	3,0	4,0	4,5	5,5	6,0	6,5	7,5	8,0	8,5	9,5	10,0	10,5	11,5	12,0	12,0	12,5	12,5	13,0	13,0
30	500	0,5	1,0	1,5	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0	9,5	9,5	10,0	10,0	
	750	1,0	1,5	2,5	3,5	4,0	5,0	5,5	6,5	7,0	7,5	8,5	9,0	9,5	10,5	11,0	11,5	12,0	12,0	12,5	12,5	13,0	13,0
	1000	1,0	2,0	3,0	4,0	5,0	6,0	6,5	7,5	8,5	9,0	10,0	11,0	11,5	12,5	13,5	14,0	15,0	15,0	15,5	15,5	16,0	16,0
	1500	1,0	2,5	3,5	4,5	5,5	6,5	7,5	9,0	10,0	11,0	12,0	13,0	14,0	15,0	16,0	17,0	18,0	18,0	18,5	18,5	19,0	19,0
40	500	1,0	1,5	2,5	3,0	3,5	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0	9,5	10,0	10,0	10,5	10,5	11,0	11,0
	750	1,0	2,0	3,5	4,5	5,5	6,5	7,5	8,5	9,0	10,0	11,0	12,0	13,0	13,5	14,5	15,5	16,0	16,0	16,5	16,5	17,0	17,0
	1000	1,5	2,5	4,0	5,0	6,5	7,5	8,5	10,0	11,0	12,0	13,0	14,5	15,5	16,5	17,5	18,5	19,5	20,0	20,0	20,5	20,5	21,0
	1500	1,5	3,0	4,5	6,0	7,0	8,5	10,0	11,5	13,0	14,0	15,5	17,0	18,5	19,5	21,0	22,5	24,0	25,0	25,0	25,5	25,5	26,0
50	500	1,0	2,0	2,5	3,5	4,5	5,0	6,0	6,5	7,5	8,0	9,0	9,5	10,5	11,0	11,5	12,0	13,0	14,0	15,0	15,5	16,0	16,0
	750	1,5	2,5	4,0	5,0	6,5	7,5	9,0	10,0	11,5	12,5	13,5	14,5	16,0	17,0	18,0	19,5	20,5	21,5	22,5	23,5	24,5	25,5
	1000	1,5	3,0	4,5	6,0	7,5	9,0	10,5	12,0	13,5	15,0	16,0	17,5	19,0	20,5	22,0	23,5	25,0	26,0	27,0	28,0	29,0	30,0
	1500	2,0	3,5	5,5	7,0	8,5	10,5	12,0	14,0	15,5	17,0	19,0	20,5	22,5	24,0	26,0	27,5	29,5	31,0	32,0	33,0	34,0	35,0
60	500	1,0	2,0	3,0	4,0	5,0	6,0	7,0	8,0	8,5	9,5	10,5	11,5	12,0	13,0	14,0	15,0	16,5	17,5	18,5	19,5	20,5	21,5
	750	1,5	3,0	4,5	6,0	7,5	9,0	10,5	11,5	13,0	14,5	16,0	17,5	19,0	20,5	22,0	23,5	25,0	26,5	28,0	29,5	31,0	32,5
	1000	2,0	3,5	5,0	7,0	8,5	10,5	12,0	13,5	15,5	17,0	19,0	20,5	22,5	24,0	26,0	27,5	29,5	31,0	33,0	34,5	36,0	37,5
	1500	2,0	4,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	22,0	24,0	26,0	28,5	30,5	33,0	35,0	37,0	39,0	41,0	43,0	45,0
70	500	1,0	2,5	3,5	4,5	5,5	6,5	8,0	9,0	10,0	11,0	12,0	13,0	14,0	15,0	16,5	17,5	18,5	19,5	20,5	21,5	22,5	23,5
	750	1,5	3,5	5,0	6,5	8,0	10,0	11,5	13,0	14,5	16,5	18,0	19,5	21,5	23,0	25,0	27,0	29,0	31,0	33,0	35,0	37,0	39,0
	1000	2,0	4,0	5,5	7,5	9,5	11,5	13,5	15,0	17,0	19,0	21,0	23,0	25,5	27,5	30,0	32,5	35,0	37,5	40,0	42,5	45,0	47,5
	1500	2,0	4,5	6,5	8,5	11,0	13,0	15,0	17,5	19,5	22,0	24,5	27,0	29,5	32,0	34,5	37,0	40,0	42,5	45,0	47,5	50,0	52,5
80	500	1,0	2,5	3,5	5,0	6,0	7,0	8,5	9,5	11,0	12,0	13,5	14,5	16,0	17,0	18,5	20,0	21,5	23,0	24,5	26,0	27,5	29,0
	750	2,0	3,5	5,0	7,0	8,5	10,5	12,5	14,0	16,0	18,0	19,5	21,5	23,5	26,0	28,0	30,5	32,5	35,0	37,5	40,0	42,5	45,0
	1000	2,0	4,0	6,0	8,0	10,0	12,0	14,0	16,5	18,5	20,5	23,0	25,5	27,5	30,0	33,0	35,5	39,0	41,5	44,0	47,0	49,5	52,0
	1500	2,5	4,5	7,0	9,0	11,5	14,0	16,0	18,5	21,0	23,5	26,0	29,0	31,5	34,5	38,0	41,0	44,0	47,0	50,0	53,0	56,0	59,0
90	500	1,0	2,5	3,5	5,0	6,5	7,5	9,0	10,0	11,5	13,0	14,5	16,0	17,5	19,0	20,5	22,5	24,5	26,5	28,5	30,5	32,5	34,5
	750	2,0	3,5	5,5	7,0	9,0	11,0	13,0	14,5	16,5	18,5	21,0	23,0	25,5	28,0	30,5	33,0	36,0	38,5	41,0	44,0	47,0	50,0
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100	500	1,0	2,5	3,5	5,0	6,5	7,5	9,0	10,5	12,0	13,5	15,0	16,5	18,5	20,5	22,5	24,5	26,5	28,5	30,5	32,5	34,5	36,5
	750	2,0	3,5	5,5	7,0	9,0	11,0	13,0	14,5	16,5	18,5	21,0	23,0	25,5	28,0	30,5	33,0	36,0	38,5	41,0	44,0	47,0	50,0
	1000	2,0	4,0	6,0	8,0	10,5	12,5	15,0	17,0	19,5	22,0	24,5	27,0	30,0	33,0	36,5	40,0	44,0	48,0	52,0	56,0	60,0	64,0
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110	500	1,0	2,5	3,5	5,0	6,0	7,5	9,0	10,5	12,0	13,5	15,0	17,0	19,0	21,0	23,5	26,0	28,5	31,0	33,5	36,0	38,5	41,0
	750	1,5	3,5	5,0	7,0	8,5	10,5	12,5	14,5	16,5	19,0	21,0	23,5	26,0	29,0	32,0	35,0	38,5	41,5	45,0	48,5	52,0	55,5
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	750	1,5	3,0	5,0	6,5	8,0	10,0	12,0	13,5	15,5	18,0	20,0	22,5	25,0	27,5	30,5	33,5	37,0	40,0	43,0	46,0	49,0	52,0
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	1500	2,0	3,5	5,5	7,5	9,0	11,0	13,0	15,5	17,5	19,5	22,0	24,0	26,5	29,5	32,0	35,0	38,0	41,0	44,0	47,0	50,0	53,0
140	500	1,0	1,5	2,5	3,5	4,5	5,5	6,5	8,0	9,0	10,5	12,0	13,5	15,5	17,5	19,5	22,0	25,0	28,0	31,0	34,0	37,0	40,0
	750	1,0	2,5	3,5	5,0	6,0	7,5	9,0	10,5	12,0	14,0	15,5	17,5	19,5	21,5	24,0	26,5	29,0	32,0	35,0	38,0	41,0	44,0
	1000	1,5	2,5	4,0	5,5	7,0	8,5	10,0	11,5	13,5	15,0	17,0	19,0	21,0	23,0	25,5	28,0	31,0	34,0	37,0	40,0	43,0	46,0
	1500	1,5	3,0	4,5	6,0	8,0	9,5	11,0	13,0	14,5	16,5	18,5	20,5	22,5	24,5	26,5	29,0	32,0	35,0	38,0	41,0	44,0	47,0
150	500	0,5	1,5	2,0	3,0	3,5	4,5	5,5	6,0	7,5	8,5	9,5	11,0	12,5	14,0	15,5	17,5	19,5	22,0	25,0	28,0	31,0	34,0
	750	1,0	2,0	3,0																			