

METAPILOT · SEASON 2 · BOOK 2

MetaPilot

The Tutor

Wings of Steel: Fighters of the Ash-Gray Sky

WORLD WAR II



“Takeoff is optional.
Landing is survival.”

GraceFlight

MetaPilot

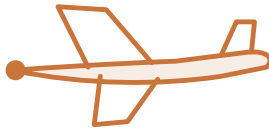
The Tutor

MetaPilot Season 2 · Book 2

MetaPilot 2

The Tutor

Wings of Steel: Fighters of the Ash-Gray Sky (WWII)



GGsF

MetaPilot 2: The Tutor (MetaPilot Season 2)

Wings of Steel: Fighters of the Ash-Gray Sky (WWII)

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The characters and events in this book are fictional, and the story is based on a virtual flight-simulation experience featuring World War II aircraft. The combat and bombing scenes in this book are simulations, made in a spirit of never forgetting the tragedy of the war in history. The training content is for experience and learning and does not replace real flight training.

Numbers such as speeds and altitudes in the text are reference values set for this book's training course and are separate from the operating limits of real aircraft. No specific app or product names are used in the text. Aircraft and equipment names are trademarks of their respective

owners or historical designations. For app information, see Appendix D of Book 1, The Guide, and Appendix D of this book.

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How to Read This Book

Kaya, who graduated from the Cessna in Book 1, now steps into **the sky of a battlefield**. She opens the box Tita sent, fits a fighter module onto her pink stick, and lives through, in a virtual simulation, the fear and the thrill the pilots of 1942 felt.

The story follows three aircraft through **15 lessons**. Each part ends with an **evaluation**, and passing all three completes Season 2.

- **Part One: Taming the Wild Horse · BF-109 fighter** (Lessons 1–7)
— torque and takeoff, landing, gunnery, formation flight → Part One Evaluation, “Operation High Wall.”
- **Part Two: The Steel Bathtub · IL-2 attack aircraft** (Lessons 8–11)
— the manual engine, cannons and rockets, low-level flight, toughness and landing → Part Two Evaluation, “Cut the Supply Line.”
- **Part Three: The Flying Greenhouse · He 111 bomber** (Lessons 12–15)
— twin engines, bomb aiming, defensive gunnery, landing on one engine → Part Three Evaluation, “Two Captains.”

Every lesson ends with an **at-a-glance** box that sums up the essentials, and the **comment section** of Kaya’s channel laughs, gasps, and heckles for you. Tricky moves carry a small ►①②③ mark in the text, and the **Videos** box at the end of each lesson shows that scene as a short clip (scan the QR or tap the title). The full list is in Appendix E.

The appendices hold **the aircraft at a glance**, **key numbers for the three aircraft**, **Kaya's one-line lessons**, and a **glossary**, plus the **video index**. Open them whenever you get confused in flight.

Takeoff is optional. Landing is survival. Come home alive.

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Cast CAST



The reader's persona · heroine of Season 2

Kaya

Freelance illustrator → combat flight creator

- Three days after getting her Cessna certificate, she opens Tita's box and walks into the sky of a battlefield on her own two feet — a heroine who grows as she goes.
- She edits her flight videos and posts them on her channel, 'MetaPilot Kaya.' At the start of the season: five subscribers (Mom, Ray, and three Bora Bora classmates).
- Spinning like a top from torque, twelve failed landings, getting thrown by a wild horse — she learns by crashing into everything, body first.

"Shooting, when I can barely land? ...Yeah, tell me about it."



The main character of Book 2, The Tutor

Ray

MetaPilot tutor · former fighter-pilot hopeful

- A master of compliments. Even when he corrects you, the praise comes first. "Your landing attitude was great. And it was great that the ground was there."
- An electric fan, a garden hose, a manspreader... he explains fighter engineering with everyday metaphors.

- A young man who turned back at the gate to the sky because of motion sickness and carries on his dream in a virtual world. He and Kaya are ‘fellow wannabes.’

“It felt like I’d turned back at the gate to the sky. So I came to this virtual world.”



The hero of Book 3, The Instructor

SeaGAL

Chief Instructor of the MetaPilot Academy

- His address opening Season 2 teaches that “takeoff is optional, landing is survival.”
- He judges the evaluations and hands over the certificate with one line — “Don’t forget the weight.” Gruff, but he means every word.

“A flight leader is judged by his decisions, not his kills.”



The fixer of Book 1, The Guide · heroine of Book 4,
The Flight Gear Manual

Tita

Owner of the TITAN PC café and hardware engineer

- She sent the Season 2 box (a fighter stick module, rudder pedals, and a book). Her notes are always one line. “Fighters are flown with the feet. —T”
- At the counter she’s all business and a little aloof, yet she fixes a pedal spring in thirty seconds. In the comments, she’s ‘TITAN_PCbang.’

“The spring is fine. The foot is not.”

Flight

The supporting cast around Kaya

The Bora Bora classmates & the comment section

The three-ship formation from the Season 1 graduation flight, and the channel’s subscribers

- No. 1, 2, and 4 from the graduation flight over Bora Bora. They’ve never seen each other’s faces, but they form up again for the Part One Evaluation.
- The subscribers in the comments laugh at Kaya’s flying, gasp, cheer — and send repair estimates (Repair_Bill_Bot).

PROLOGUE

Opening the Box

PROLOGUE · Welcome to the War

◆ 1. The Pink Wild Horse

Three days had passed since I framed my Cessna certificate. On my desk sat the box Tita had sent, [Season 2. Supplies], its lid open, and beside it stood my stick, which I'd finished assembling yesterday.

On top of the shiny pink grip, a new module — for fighters, apparently — had clicked into place. Twelve buttons, two triggers, and a little hat switch under my thumb. A red button I'd never once pressed in the Cessna was whispering, “Press me.” ▶①

“A pink fighter stick... pretty sure it's the only one in the world, right?”

Under my feet were the new rudder pedals. They looked a lot like the pedals I'd borrowed for the Cessna, but when I put my feet on them, the springs pushed back hard. A note stuck beside the pedals caught my eye.

‘Springs set stiff. Fighters are flown with the feet. If your feet cramp, you did it right. —T’

“...Cramping feet means I did it right?”

I read the note twice, got a bad feeling, and took my feet off the pedals.

◆ 2. The Battlefield Invites You

At the very bottom of the box lay a book with a rugged cover. 『The Battlefield Invites You』. On the cover, a propeller fighter roared and spat fire; tucked into the first page was a note from Ray.

“Kaya! There’s a welcome video link on the first page of the book. Watch it, then log in. Oh, and if you map the stick keys the way the video shows ahead of time, your first day will be a lot easier. Rudder pedals especially. Especially!” ▶②

‘Especially’ — twice. Last night I mapped the keys one by one following the video and pressed every button on the stick. Triggers, cannon, gear, flaps, view controls... If the Cessna stick had been a ‘steering wheel,’ this module was an ‘armory.’

I turned a page, and the first sentence jumped out at me.

‘Takeoff is optional. Landing is survival.’

“...Landing? I passed that with the Cessna, didn’t I?”

I talked big on purpose. Then I opened the channel I’d started a few days earlier, ‘MetaPilot Kaya.’ Five subscribers. One was my mom, one was Ray. The other three were my formation classmates from the graduation flight over Bora Bora.

“All right. Let’s become the top-scoring ace in front of all five of them.”

◆ 3. The Air Has Changed

I set my coffee down on the desk and clicked the welcome video. The airport I’d been so excited about in Bora Bora, that runway over the emerald sea, was nowhere to be seen.

Instead, a field airstrip spread out before me, all cold wind and blowing dust. The sky was ash-gray, as if it might snow any minute, and the rough drone of propellers rumbled in the distance.

Clomp. Clomp. Clomp.

The sound of combat boots echoed in my chest. Up ahead stood a silhouette, arms crossed, shoulders hunched. It was **Instructor SeaGAL**.

“First of all, welcome to this place.”

His voice was different from Season 1. Somehow softer... no — he looked cold, which made him seem a little more serious and grim. Instructor SeaGAL lowered his sunglasses slightly and met my eyes. “The airmanship you learned in the safe cradle of the Cessna still holds here, in the world of combat pilots. Keep the blue wonder of Season 1 in your heart. Season 2 begins now.”

◆ 4. Three Trials

He raised a hand, and the hangar doors behind him rumbled open — krrrng — revealing three aircraft in all their glory. SeaGAL began briefing the training course.

“First, the wild horse of the sky: the BF-109 fighter.”

A sleek body, a sharp nose. Just looking at it, I felt like I could cut my hand on it.

“You’ll climb on this one, learn to control your speed, and learn the **dogfight** — getting on the enemy’s tail.”

“Second, the flying tank: the IL-2 attack aircraft.”

A monster of a plane, clunky and huge, armored to the teeth. The rockets hanging under its wings gleamed.

“With this attacker you’ll learn ground attack. Cannons and rockets — how to flatten everything on the ground.”

“Third, the fortress of the sky: the He 111 bomber.”

Enormous wings, a cockpit glazed all the way across the front. My jaw dropped at the sheer size of it.

“Finally, you’ll lead this giant deep into enemy territory and carry out precision bombing. Without teamwork, no one comes back alive.”

◆ 5. Meet Your Helper: Ray

“Is it easy?”

I asked with a laid-back smile, as if I had all the time in the world. Instructor SeaGAL let out a snort and looked back at me.

“Finish this course and you’ll understand what makes prop fighters tick, and you’ll experience flying and gunnery at their limits. Whether it’s easy... find out for yourself.”

Just then, on one side of the screen, Tutor Ray appeared in a blue flight suit.

“Hi, Kaya! Season 2 focuses on the BF-109 course, and the IL-2 and He 111 give you a taste of each. Once you graduate, you can dig deeper into whichever plane suits you.”

Ray threw me a wink. Yep, the same Ray who’d called me a genius for simply starting the engine in the Cessna basics course. I’d been tense about the battlefield, so having such a thoughtful tutor along was a relief. At least until then, I believed Ray was a ‘carefully designed AI tutor.’ No profile picture, and a voice that was just too perfect.

“I’ll be the ‘**navigation system**’ for your challenge. Nice to work with you!”

◆ 6. The Address: Come Home Alive

The mood swung back to SeaGAL. He straightened his hunched shoulders and stood at attention.

“One last word. This may be a world inside a game, but it is a realistic simulation of a battlefield that was soaked in blood in history. Takeoff is optional, landing is survival; make a mistake and you crash, let your guard down and you get shot down. It will be a chance to feel, vividly, what the pilots of history felt.”

He slowly raised a salute.

“I hope every one of you, without a single straggler, conquers that beautiful and terrible sky of the Second World War and graduates safely. That is all. Dismissed!”

“Phew...”

I let out a long breath without meaning to. Suddenly my heart was pounding and my chest swelled. Fear? Excitement? Didn’t matter. From the blue sky back to an ash-gray one — and on my own two feet.

‘If I change the past, will the future change too...?’

With a wry smile, I squeezed the trigger of my pink wild horse once. For a moment, I even forgot my dream of ten million subscribers.

▶ Videos · Prologue			short clips
No.	Scene · when to watch	Code	QR
①	Fitting the fighter stick module and placing the rudder pedals When setting up the gear for the first time	2-001	
②	Mapping the stick and rudder keys in a fighter app When you press a button and nothing happens	2-002	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

Part One



Taming the Wild Horse

BF-109 fighter — from takeoff to formation flight, and the first operation

LESSON 1

Riding the Wild Horse

Take-off & Torque

◆ 1. The Air of 1942

When the simulation loading bar hit 100%, instead of the familiar desktop, dull gray clouds filled the monitor. Beyond the far horizon, black columns of smoke rose, and frozen tundra stretched on forever.

“Wow... even the atmosphere is different.”

I swallowed hard. This wasn't a tourist spot. This was the middle of the fiercest, cruelest battlefield in human history. Ray's voice came through a little lower than usual.

“Hello, Kaya. From now on, we're not travelers touring the sky. We've entered the world of the people who, in 1942, flew with their lives riding on a single propeller. It had romance, but it was also the most desperate of times.”

It felt like a solemn soundtrack had started playing. I looked into my channel camera and delivered my line with a straight face.

“Everyone, can you hear it? This engine sound — no... the sound of history?”

◆ 2. The Steel Prison (Cockpit)

“All right, everyone. Pilot Kaya is finally boarding a fighter!”

I gave a solemn thumbs-up and put on my headphones. The loading screen passed, and the cockpit of a Messerschmitt BF-109 G2 appeared before me.

“Ugh...”

I could hardly breathe. If the Cessna 152 cockpit felt like a cozy sedan, this felt like a prison made of steel. The view was narrow, and every surface was packed with clunky metal pipes and instruments wearing mysterious German labels — ‘**Achtung!**’ (Caution!) Worst of all, the nose sat so high that I couldn’t see the runway ahead at all.

“Ray! I can’t see a thing up front! Can you raise my seat?”

I heard Ray laughing through the headphones.

“Kaya, that’s because this plane is a taildragger. The tailwheel sits on the ground, so the nose points up. Not seeing anything on the ground is normal. You have to zigzag to see ahead.” ▶①

“Wait, how am I supposed to drive without seeing where I’m going?”

“Let’s start the engine first. It’ll sound different from the Cessna right away. And starting with this training, you absolutely have to use the rudder pedals.”

I hit the app’s auto-start. The magneto switch clicked on, and creak, creak, creak... the propeller turned slowly and heavily — and then the airframe shuddered and an explosive roar burst out.

KA-BOOOOM—!

“Aaah!”

The ear-splitting engine noise made me flinch. 1,475 horsepower. More than thirteen times the power of the Cessna (110 hp) was howling under my seat.

◆ 3. The Beginner Who Drove With the Handbrake On

“One thing before you go. Lock the tailwheel.”

“Huh? Lock the wheel? Then I can’t move.”

“It still rolls forward and back. The lock just keeps it from swinging side to side. If you don’t lock it, the tail spins around like a shopping-cart wheel and you’ll end up dancing on the runway.”

“Ah, so the opposite of a handbrake. In the Cessna I was the beginner who drove off with the handbrake still on, and here I have to lock it before I go.”

“Wasn’t that you in the Cessna, Kaya?”

“...You have a great memory.”

I pulled the lock lever and zigzagged out to the end of the runway. With the nose in the way, I leaned my head out left, right, left — like a kid peeking out from behind a curtain.

◆ 4. The Death Spin (The Torque)

“Okay, don’t chicken out, Kaya. You’re a woman with a certificate.”

I took a deep breath and grabbed the throttle. Run down the runway, pick up speed, then pull back — that should do it, right?

“Let’s go! Full power!”

Without hesitation, I shoved the throttle all the way forward. In that instant, the world turned upside down.

VRRRRMMM—!

The plane seemed to move forward — then suddenly the nose whipped to the left.

“Huh? Huh?! What’s it doing!”

In a panic, I yanked the stick to the right. But the plane ignored me, swung madly to the left, and plowed into the grass beside the runway, spinning round and round like a top. A wingtip scraped the ground and dust shot into the air.

[CRASHED]

Red letters on the screen. A disaster three seconds into the takeoff roll.

◆ 5. The Culprit Is ‘Torque’

“Ha ha ha! Kaya, did you just spin like a top? Lovely rotation, though. If I were a figure-skating judge, I’d have given you a nine.”

Ray burst out laughing. Face burning red, I protested.

“But it suddenly turned left! Isn’t it broken?”

“It’s not broken — it’s science. Kaya, you know how an electric fan on its highest setting makes the motor shake?”

“Yeah, I’ve seen that.”

“That force is torque. When the propeller spins hard clockwise, the reaction tries to turn the airplane’s body counterclockwise. The Cessna was weak enough that it didn’t matter, but this one has an enormous engine, so if you slam the throttle forward the whole plane just turns.”

Ray kept explaining, sketching on the screen as he went.

“To catch it, you need two things. First, push the throttle slowly. Second, use the right rudder pedal — actively.”

“Use the right rudder pedal actively?”

“Yes. Every time the plane tries to swing its nose left, kick right rudder to keep it straight. Takeoff is done with your feet.”

Tita’s note came back to me. ‘Fighters are flown with the feet.’ She hadn’t been joking.

◆ 6. A Tap Dance With Your Feet

Back on the runway. This time I changed my strategy. I locked the tailwheel and focused every nerve on the rudder pedals under my feet.

“Slowly... slowly...”

I pushed the throttle forward bit by bit. As the engine grew louder, the nose began to creep to the left.

‘Now!’

I tapped the right rudder lightly, again and again. The nose came back to center. When I added more power, the pull to the left grew stronger. I pressed my right foot deeper. The springs Tita had cranked tight pushed back against the sole of my foot. ▶②

“Good! Hold the runway centerline with your feet like that and build speed! Stick centered, just a little forward.”

The wild horse wobbled along like a drunk, but this time it didn’t wander onto the grass. When the airspeed passed 150 km/h, the tail came up and the view opened.

“I can see! I can see ahead!”

“Keep rolling! Past 170, pull the stick back just a little. Don’t relax until you’re off the ground!” ▶③

At last the plane felt light — whoomp. I pulled the stick back gently, the rattling of the runway disappeared, and I felt the smooth flow of air.

“I’m up... I’m flying!”

◆ 7. After the Rodeo

My hands, wet with cold sweat, trembled slightly. If the Cessna’s takeoff had been a drive, the BF-109’s takeoff was a ‘rodeo’ — climbing on a wild horse’s back and hanging on. Breathing hard, I shouted at the camera.

“See that? That’s how you take off in a One-Oh-Nine (BF-109)!”

“Perfect, Kaya. That’s it for today. I’ll do the landing. Starting next time, you’ll practice getting friendly with this one in the air, and you’ll learn landing after that.”

Ray took the controls and set us down gently. I shut down the computer and took a hot shower. My right ankle throbbed. If Tita was right, today had been a success.

They say BF-109 aces used to encourage the rookies by telling them that if you survive the takeoff, you can survive the fight.

✈️ **Lesson 1 at a Glance**

- 1 In a taildragger (tailwheel) aircraft, the nose sits high on the ground and you can't see ahead. Lock the tailwheel and zigzag to check what's in front.
- 2 When the propeller turns clockwise, the reaction tries to turn the aircraft to the left. This is torque.
- 3 Push the throttle slowly, and each time the nose swings left, correct with the right rudder pedal. Takeoff is done with your feet.
- 4 The tail comes up at about 150 km/h, and at about 170 km/h a gentle pull on the stick lifts you off (this book's training standard).

▶ **Videos · Lesson 1**

short clips

No.	Scene · when to watch	Code	QR
①	Tailwheel lock and zigzag taxiing When you panic because you can't see the run - way	2-003	
②	Throttle slowly, keep it straight with right rudder When the plane swings left on takeoff	2-004	
③	The tail comes up and you lift off When you don't know when to pull	2-005	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

LESSON 2

Test-Driving a 1942 Supercar

Performance Test

◆ 1. Opening: Unboxing in the Sky

Screen: 2,000 m above the clouds. A BF-109 flying the assigned training route

“Hi, everyone! It’s MetaPilot Kaya. Last time’s takeoff video... touching, right? (laughs)”

I looked at the camera with a bittersweet smile.

“The problem was what came after. I can take off, but as soon as I got up there I’d wobble around — and I flipped over three times in three days. So Ray took drastic measures. **‘Air Start’** — no takeoff, start flying right in the air! Apparently I learn this thing’s personality up in the sky first, and landing comes later?” ▶①

Sure enough, up in the air this thing was a different animal. On the ground it had been a rattling, staggering, stubborn machine, but the moment it caught the airflow, it turned into a sharp **‘blade.’** “Kaya, think of today’s training as filming a ‘car review.’ We’re testing what kind of personality this plane has, how hard you can push it, and how it corners.”

“Okay, roger that. A 1942 German supercar. Let the review begin!”

◆ 2. A Tour of the Tiny Cockpit

On the way to the first waypoint, I took my time and looked around the cockpit.

“All right, subscribers. Let’s start the test drive. A little cramped, isn’t it?”

I looked to the left side of the cockpit and pointed at two big wheel-shaped parts next to the throttle lever.

“These are the **‘trim wheel’** and the **‘flap wheel.’** Chunks of iron, but kind of like the Cessna’s trim wheel, right? Weirdly, the flap control is a wheel too. Back then, German fighter pilots apparently had to crank these by hand. I think I’d grow arm muscles cranking those in flight.”

“Right. A BF-109 pilot’s left hand is always busy. And on the right side of the panel are the coolant and oil temperature gauges. If the engine overheats, those needles go into the red, and then the engine blows. Check them often.” ▶②

“If the engine blows... that’s a crash, right?”

“Right. So this plane needs a lot of attention — you have to keep checking on it and keep soothing it. Oh, and the mixture lever the Cessna had? This one doesn’t have it. The engine sets the fuel by itself. German engineering.”

“Finally, something nice about German engineering.”

◆ 3. Cornering Test (Turns and Slats)

“Ahead, one o’clock — I see the first waypoint!”

A virtual yellow droplet marker hung in the sky.

“Great. This time, go into a ‘hard turn’ there. Stick right and pull at the same time!”

“Here goes!”

I threw the stick boldly to the right and pulled it toward my stomach. It didn’t turn gently like the Cessna. The plane flopped onto its side at ninety degrees in an instant and the nose snapped around.

KU-GU-GUNG—!

At that moment, something went ‘THUNK!’ and popped out of the wing.

“Gah! Did the wing just break?!”

“Ha ha, no way. Look at the leading edge of the wing. Something popped out, right? That’s the ‘slat.’ When you turn hard, it grabs the airflow and keeps you from stalling and falling. It’s an automatic device — the BF-109’s signature feature.” ▶③

I remembered how it felt when I’d pulled a hard turn in the motion simulator at the TITAN PC café. The feeling of being crushed into the seat, and the edges of the screen dimming in a blackout, came back too. And the plane swung its nose toward the next leg with unbelievable agility.

“Whoa... insane response time. It reacts the instant I turn the wheel!”

◆ 4. Zero-to-Sixty Test (Combat Speed and WEP)

“Okay, now a straightaway. Let’s test the engine. Push the throttle all the way. Let’s feel the very essence of German engineering.”

“Pedal to the metal!”

I pushed the throttle all the way forward. The ATA (boost pressure) needle on the panel shot past 1.3 and up to 1.42.

VRRRRMMM—!!

The engine note rose to a sharp whine. The airspeed needle climbed frighteningly fast toward 400, 500, 550 km/h. The clouds around me whipped past like bullets.

“Whoaaaa! This speed is unreal! The Cessna was a bicycle!”

“That’s War Emergency Power. The technical term is ‘**WEP (War Emergency Power)**.’ It eats into engine life to squeeze every last bit of power out of it for a short time. Use it too long and the engine blows, so keep it under a minute. Look at the coolant gauge now.” ▶④

“Uh... the needle is right at the edge of the red!”

“Ease the throttle back a little. Lots of dopamine is nice, but engines can’t feel dopamine.”

My heart was hammering. It felt less like flying a plane and more like riding a bomb about to go off. So this is the ‘**high**’ of a combat pilot.

◆ 5. Arrival, and a Preview

I tested the plane’s limits, climbing, diving, and turning again and again at tremendous speed. The queasiness from the hard turns slowly settled. Before I knew it, the runway of the destination airfield appeared far ahead. This was an air-ending exercise, so no landing.

“Wow... Ray. I think I’m getting along with this plane. It’s powerful and goes wherever I want, so my confidence is soaring!”

On screen, flushed, I chattered away. But Ray calmly poured cold water on it.

“Right? You’ve probably gotten used to how it handles. But Kaya, don’t forget.”

“Hm?”

“So far you’ve only gone for a drive. Next time you have to put this thing down on the ground. And after that, you’ll have to find enemy planes while moving fast, aim, and hit them.”

I gulped. Right. I’m not a racer now — I’m a fighter.

“Phew... got it. For today, I’ll just enjoy the speed.”

I winked at the camera. Actually, the sweat was stinging my eyes and I was squinting.

“All right, everyone. That’s it for the German supercar test drive. Performance? Incredible. Ride comfort? My butt hurts. In the next video, I’m told I’ll be **‘landing’** this thing, so stay tuned to see whether I can actually put it on the runway... or on the grass! Like, subscribe, and hit the bell — it’s a ‘challenge’!”

Lesson 2 at a Glance

- 1 If landing is still too hard, use an Air Start to get a feel for the controls in the sky first.
- 2 In the BF-109 you crank the trim wheel and flap wheel by hand. There is no mixture lever (the engine sets it automatically). Check the coolant and oil temperature gauges often, before the needles reach the red.
- 3 The slat that pops out of the wing's leading edge in a hard turn is an automatic device that grabs the airflow and prevents a stall.
- 4 WEP (War Emergency Power) squeezes out every bit of power for a short time at the cost of engine life. Use it for under a minute and watch the coolant gauge.

▶ Videos · Lesson 2			short clips
No.	Scene · when to watch	Code	QR
①	Starting a flight with an Air Start When you want to practice in the sky without taking off	2-006	
②	Reading the coolant and oil temperature gauges When you're worried the engine will blow	2-007	
③	Hard turns and slat deployment When the wing goes "thunk"	2-008	
④	WEP (War Emergency Power) and the one-minute rule When you don't know how long you can run full throttle	2-009	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

LESSON 3

The Landing of Death

Landing — The Kangaroo Pilot

◆ 1. The Point of No Return

“All right, time to land. Fly toward the runway.”

Ray gave the order. While I'd been happily carving up the sky, I hadn't realized: that tiny runway down there might become my grave.

“Phew... Ray. Honestly, I’m kind of scared. Takeoff was a disaster already — landing’s going to be even harder, isn’t it?”

“Hmm... honestly? Plenty of German aces in WWII died landing the BF-109. There’s even a story that more of them were lost in takeoff and landing accidents than were shot down by the enemy.”

“What?! Why are you only telling me this now!”

“So you won’t let your guard down, because landing is that hard. Okay, step by step. Tailwheel lock, slow below 250, gear down, crank the flap wheel to lower the flaps. Approach speed around 200!” ▶①

With shaking hands, I hit the landing gear switch and turned the flap wheel with my left hand. With a creeeeak, I felt the gear coming down. As the flaps lowered, the nose sank heavily.

“Subscribers... please pray that I live to stream again.”

◆ 2. I Can’t See the Runway!

Lining up with the runway was something I’d done a thousand times in the Cessna, so I was confident. But the closer the runway got, the bigger the problem.

“Huh? The nose is up, so I can’t see the runway?”

When I raised the nose to slow down, the huge engine cowling blocked the view. With the front blocked, the runway disappeared.

“Look to the side, the side! Judge your position by watching the edge of the runway through the left window! And flare like in the Cessna — like lifting the tip of a brush. Think of it as the tailwheel touching first.” ▶②

“What, I land looking sideways like a crab?!”

I cranked my head to the left and descended, watching the ground out of the corner of my eye. The altimeter needle dropped fast. 100 m, 50 m, 30 m...

‘Okay, it’s touching... it’s touching...’

◆ 3. The Bouncing Kangaroo

THUD!

I felt the jolt of the wheels hitting the ground. Did I do it?!

“Got it!”

But one second later, my hopes turned into a scream.

...BOING!

Instead of sticking to the ground, the plane bounced right back into the air.

“Whoa?! Why am I flying again!”

“You’re too fast! And don’t push the stick!”

Panicking, I instinctively shoved the stick forward. The nose slammed into the ground and bounced back up again. THUD! BO - ING! THUD! BOING!

My plane started hopping down the runway like a kangaroo on a pogo stick. The view in my cockpit danced right along with it.

“Aaah! What is happening? It won’t stop!”

“Throttle back — power cut! And leave the stick alone!”

After the fourth bounce, the plane finally rolled off the runway onto the grass, jammed its right wing into the ground, and barely came to a stop.

[CRASHED : Landing gear destroyed]

◆ 4. The Tragedy of the Narrow Legs (Narrow Landing Gear)

I threw off my headphones and slumped in my chair. Cold sweat.

“Ray... I don’t think landing this plane is possible. Isn’t this plane seriously cursed?”

Ray laughed as if he’d seen it coming, and explained.

“Kaya, do you know what a ‘manspreader’ is?”

“Huh? Where did that come from...”

“Planes like the Cessna or the British Spitfire have their wheels set wide apart, so even if one wheel touches first, they don’t tip over easily. A nice, stable ‘manspread.’”

Ray put a picture of the BF-109’s landing gear on the screen.

“But look at this BF-109. The wheels are attached close to the fuselage, so the legs are really close together, right? That’s why if it tilts even a little, it loses its balance and flips. Land like a kangaroo the way you just did, and the legs simply snap.”

“Ugh... those German engineers, seriously... why did they build it like this?”

“To save weight and cut drag. That makes it fast in the air — and the worst on the ground.”

◆ 5. Kangaroos Go Around Before the Third Hop

“And Kaya, remember Lesson 7 in the Cessna?”

“...It’s okay to give up. Go-around!”

“Exactly. The moment you think, ‘That’s the second bounce,’ that’s your go-around timing. Throttle slowly all the way, nose up a little, right rudder. Then come around one more time. The third bounce isn’t a kangaroo — it’s a repair bill.” ▶③

“Kangaroos go around before the third hop... got it memorized.”

“Good. But what happens if you slam the throttle?”

“...The spinning top.”

“Correct. No time to complain. Repair the plane and take off again. Nobody sleeps until you get it today.”

Fourth retry. On the second bounce, I called a go-around, and on my fifth attempt I managed to touch down softly on the runway.

◆ 6. It Ain't Over Till It's Over

‘Okay, this time for real. Wheels down, speed dropping...’

I let out a sigh of relief and relaxed. The plane rolled along the runway as the speed dropped to 50 km/h.

“Phew... I’m alive. Now the brakes...”

That was the moment. Suddenly the tail swung to the right and the plane started spinning like a top.

“Ah! Spinning again! I was almost there... what is it doing!”

SKREEEEEE—!

With a squeal of burning tires, the plane did a full 360 in the middle of the runway before it stopped. Luckily nothing broke, but I let out a long sigh.

“Kaya! You let your guard down! Haven’t you heard ‘It ain’t over till it’s over’?”

Ray’s voice rose a little. Then he quickly softened his tone.

“Ah, sorry. Your touchdown was really good. That’s why it hurt to watch. You have to keep using the rudder until you stop — no, until the engine is off and you climb out! As you slow down, you have to be even more sensitive about staying straight, just like on takeoff.

Let go of the rudder at the last moment and you get a ground loop, and the plane gets smashed!” ▶④

◆ 7. Ending: The Subscribers Cheer

Tap-dancing with my feet, after twelve attempts I finally managed to stop near the runway centerline — crooked, but standing. I was soaked in sweat. Just as Tita had said, my feet cramped.

“Ha... everyone. Did you see that?”

I stared into the camera with hollow eyes.

“Being a combat pilot... isn’t for just anyone. My repair bill alone today probably wiped out the German defense budget.”

▶ Kaya’s channel · comments

I Landed 12 Times (BF-109 Kangaroo Landing Montage)

3.1K views · 84 likes

- K

KangarooJack
Thumbnail title: ‘Kaya Kaya’d Again’ lol
- M

Messerschmitt
Landing the 109 is hard even for veterans. Calling the go-around on the second bounce was the right move.
- C

CrashMaster
Not gonna lie, I laughed a lot when it spun like a top at the end hehe
- P

PilotWannabe
Wow... I had no idea landing was that hard. Off to install the game.
- B

BoraBora_No1
You were No. 3 on the graduation flight, right? Subscribed. All three of us signed up for this season too. See you in the sky!

R**Repair_Bill_Bot**

[Automatic Estimate System] Today's damage: 4 sets of landing gear, 2 propellers, 1 wingtip. Estimate: approx. 50,000 Reichsmarks.

"Still... I made it back alive, so that's what counts. And my Bora Bora classmates subscribed. Next time, for real! I'm learning how to shoot. Shooting, when I can barely land? ...Yeah, tell me about it. Flight simulation is so hard."

I waved weakly.

"See you tomorrow. Bye..."

Lesson 3 at a Glance

- 1 Before the approach: tailwheel lock → below 250 km/h → gear down → lower the flaps with the flap wheel → approach speed about 200 km/h (this book's training standard).
- 2 When you raise the nose, the engine cowling blocks your view. Judge your position by watching the runway edge through the left window, and flare as if the tailwheel will touch first.
- 3 If you bounce (kangaroo), don't push the stick. On the second bounce, go around (throttle slowly all the way, nose up slightly, right rudder).
- 4 The BF-109's wheels are close together, so it loses balance easily if it tilts even slightly. Don't let go of the rudder until you stop — until the engine is off and you climb out. Otherwise you'll ground-loop.

▶ Videos · Lesson 3			short clips
No.	Scene · when to watch	Code	QR
①	Before landing: lock, speed, gear, flaps When the landing prep order is confusing	2-010	
②	Flaring while watching the runway through the left window When the nose hides the runway	2-011	
③	If you bounce, go around When a kangaroo landing has begun	2-012	
④	Rudder until you stop — preventing a ground loop When the plane tries to spin after touchdown	2-013	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

INTERMISSION

The Medal on a Napkin

The Medal on a Napkin

◆ 1. A Text After Logging Out

The night I botched the BF-109 landing twelve times. I tossed my headphones on the desk and collapsed onto the bed. I felt heavy inside. Was it motion sickness, or skills that wouldn't do what I wanted? I couldn't tell. My pen tablet in the corner of the desk caught my eye. On the night of the graduation ceremony I'd switched it on for the first time in ages and drawn one picture. Since then, dust had started settling on it again.

"I can't draw... I can't land... ugh... is this life a lost cause?"

Just then, my phone buzzed briefly.

[Ray]: "Kaya. It's raining... want to grab a drink?"

I couldn't believe my eyes.

'Ray? The AI tutor? Wait — not a system message, an actual text?'

The number was unknown. It sent a chill down my spine, and yet, strangely, I was glad.

"Ray?"

◆ 2. A Rain-Soaked Umbrella

We met at a tucked-away pub near the TITAN PC café, rain drumming on the windows. Folding my wet umbrella, I stepped inside. A

man was sitting by the window. Not in a flight suit, but in a dark coat. The sharp jawline and the gentle, long-lashed eyes were the face I saw on my monitor every day.

“You made it? Over here.”

He set down his glass and smiled. His real voice was much warmer than it sounded through the speakers.

“No way... you were a real person?”

“Surprised? You thought I was 100% AI? I didn’t post a profile picture because... I don’t photograph well. Ha ha.”

On screen he’d seemed perfect, but the real him looked a little sloppy somehow. On the table sat a sake bottle with two glasses or so left.

“Landing’s tough, huh? You don’t have to be perfect, Kaya.”

◆ 3. The Tutor Without Wings

After a few rounds, the awkwardness melted away. I worked up the courage to ask.

“But Tutor Ray... I mean, just Ray. If you fly that well, why are you only a simulator tutor? You could be a real pilot.”

Ray smiled bitterly and took a crumpled, folded piece of paper out of his wallet. The corners were worn white.

“I wish I had been. All through high school, the only thing I lived for was becoming a fighter pilot.”

At the top of the paper I could see the words ‘Flight Aptitude Experience Results.’ Below it, a single red stamp. **UNFIT.**

“Wow... really? But why...”

“Motion sickness.”

“...Sorry?”

“Motion sickness. I’m the guy who turns white ten minutes after sitting in the back row of a bus.”

Not knowing whether I should laugh, I covered my mouth. Ray laughed first.

“On the day of the experience flight, I came prepared with a secret weapon. Motion-sickness pills. And just in case, I stuck a patch behind my ear, too.”

“And?”

“I didn’t get sick.” He swirled his glass. “I fell asleep right after takeoff instead. The instructor called out, ‘Trainee, are you sleeping?’ My mouth was bone-dry and I was seeing two of every needle on the panel.”

I finally burst out laughing, and Ray laughed along.

“After we landed, the instructor told me a sleepy pilot is more dangerous than an airsick one. ...He was right.”

He emptied his glass and gazed at the streaks of rain outside.

“It felt like I’d turned back at the gate to the sky. So I came to this virtual world. At first I got sick here too. I put an electric fan in front of my face and stared at distant mountains — ten minutes, twenty minutes, stretching it little by little. Here, if you feel sick, you can just pause for a while. Teaching people like you, who heal through flying, is my only joy.”

An electric fan. The very trick I’d used to beat VR motion sickness. Come to think of it, the day after I wrestled with motion sickness, he’d said, “I use that trick too.”

Behind the ‘AI Ray’ who always rattled off data so coolly was ‘**Ray**,’ a callsign that had never once been called in the real sky.

◆ 4. A Drawing on a Napkin

“...Me too.”

“Hm?”

“I’m someone who turned back at the gate to the sky, too. When I was ten, I loved the sky I saw from an airplane window so much that I wanted to be a flight attendant. Somewhere along the way, buried in exams and job hunting, I forgot.”

Ray set down his glass and looked straight at me.

“Then we’re... fellow wannabes.”

Fellow wannabes. I liked the sound of that.

I took a white napkin from the table. Then I pulled out a black ballpoint pen that had been rolling around in my bag. The hand that had sighed over a dusty tablet now glided across that white runway.

A fighter bursting up through the clouds. In its narrow cockpit sat pilot Ray, mask off, beaming. I drew him with a thumbs-up — him on the day that never came. And at the window of an airliner flying alongside the fighter, I drew myself, small, in a flight attendant’s uniform, waving.

◆ 5. A Gift

“Ray. This is for you.”

I slid the napkin over to him. Ray’s eyes widened when he saw the drawing.

“This... is me?”

“A free donation from a gifted illustrator. In my eyes, this is who you really are.”

I rubbed the bridge of my nose, embarrassed.

“So what if it’s a fake sky? You’re **my Flight Leader**. I’m flying because of you.”

Ray looked at the napkin drawing for a long time. His smile grew longer.

“Thank you, Trainee Kaya. It’s worth more than any medal.”

“Then as a thank-you, nag me a little less at training tomorrow.”

“Hmm... that’s a tough one. Instead, when you finish Season 2, I’ll buy you something tasty somewhere cozier. Promise.”

We looked at each other and burst out laughing.

◆ 6. Ending: Connected Again (Connection)

The street at night, after the rain had stopped.

“Get home safe. I’ll be standing by for your login tomorrow.”

“Okay — you too, Ray!”

Watching him walk away beyond the window, I thought: he wasn’t just a tutor in a square monitor. He was a young man who loved the sky but had never yet worn wings — and my fellow wannabe, Ray.

Back home, I turned on the computer. ‘**Ray (Avatar)**’ on the login screen winked at me. It was the same graphic image as always, but now it looked different. I wiped the dust off my tablet. Then I stuck a note on the desk.

‘Don’t give up. If only for both of us.’

LESSON 4

Watering Thin Air

Lead Shooting — Bomber Intercept

◆ 1. Ray's Garden-Hose Theory

Screen: 2,000 m above the clouds. A BF-109 flying a set route

“All right, today's training is finally... **‘live-fire gunnery’!**”

I announced it like a war cry and gave the **‘cannon button’** on my stick a meaningful look. The red trigger button was whispering, “Press me.” But Ray let the air out of me right from the start.

“Kaya, have you ever watered a garden?”

“Huh? Watering? Out of nowhere?”

“Aerial gunnery isn't really like shooting a gun. It's more like **‘hit - ting someone running past with a garden hose’**. If someone's running to the right and you spray right at them, do you hit them?”

“No? You spray where they're **‘about to be’**.”

“See? Correct. In this business we call that **‘lead shooting’**. Targets in the air don't sit still. They move at 300 to 400 km/h. And your bullets take time to get there, too. So we shoot at the point where the bullets and the bandit meet.” ▶①

“Okay... that makes sense. **‘Shoot at the enemy's future.’**”

◆ 2. The Lure of the Big, Fat Target

“Today’s gunnery target is a bomber. Get in close on its tail, look through the gunsight, and fire.”

As I entered the training airspace, a huge aircraft appeared one kilometer ahead. The training target: an He 111 bomber.

“Whoa, it’s huge! I could hit that with my eyes closed.”

The bomber was lumbering along, straight and level — a virtual AI bandit set up for gunnery practice. Full of confidence, I pushed the throttle, turned in, and slowly closed on its tail. The bomber’s fat fuselage filled the orange crosshairs of my reflector gunsight.

“Gotcha. Bye-bye!”

With a smug grin, I mashed the cannon and machine-gun buttons on my stick at the same time.

Dudududu-doom—!

The airplane shook violently, spitting fire and smoke. The heavy recoil of the 20 mm cannon came right through to my fingertips. The feel was amazing. But the bomber just kept flying like nothing had happened — and then, now that it was under attack, it broke into a hard turn.

“What? Did I miss?”

My own airplane’s motion was shaking the sight while I fired, so I couldn’t even hit something that big. And I was a bit too far away.

◆ 3. Shoot the Empty Sky

“Kaya, keep a safe distance behind the bandit and fire from effective range. When the bomber’s wings fill the ring of your gunsight —

that's your range. Too far and your bullets lose their punch. Too close and you'll collide, or eat the debris and go down." ▶②

"Wait — the debris can hit me?"

"Yes. The pieces that fly off an exploding bomber are basically bullets. Plus the tail gunner back there is going to be shooting at you. Stay sharp."

Ray's voice sounded colder than usual. Nervous now, I went back in. The AI bomber spotted me and turned to evade, but it was so big and slow it still looked like it was cruising along without a care. Sparks from the tail gunner's rounds came flying my way, but they weren't a real threat yet.

I took another deep breath and put my crosshairs ahead of the direction it was turning — on a patch of empty sky.

"Guns! Guns! Guns!"

Ka-ka-ka-boom!

Out went the 20 mm **Minengeschoß (German high-explosive shells)**. Yellow tracers sliced through the air. And at that very moment, the bomber flew right into the curtain of fire I'd laid out, all on its own.

Shwoong! Ba-ba-boom—!

"Whoa!!"

A column of bright red flame shot out of the bomber's right engine. The wing snapped clean off, and the giant aircraft began to spiral down.

[TARGET DESTROYED]

◆ 4. The Thrill — and the Art of Editing

“Did you see that?! Ray, I hit it! Right in the engine!!”

I cheered out loud in my room. The sound of the cannon made the hit feel ten times better. It was like curling a ball into the top corner of the net. No — it was like I’d seen the future.

“Good shot. That’s the feeling we call a clean hit. The BF-109’s guns are all **nose-mounted**, so if your aim is good, everything goes straight down one line — bull’s-eye every time. And by the way, remember that you took out one of the He 111’s engines. Because later on, you’re going to be flying that bomber.”

“Huh? Me? On one engine?”

“That’s all the spoilers you get.”

I calmed myself down and gave the camera a big thumbs-up.

“Everyone, did you see that? They say a pilot who shoots well is called a ‘Top Gun.’ (shrug) Oh, and the miss on my first burst... um... you know that was a warning shot, right?”

Of course, it’s going up uncut — as a blooper video.

✈ Lesson 4 at a Glance

- ❶ Lead shooting: to hit a moving bandit, aim where it’s ‘going to be’ — the point where your bullets and the bandit meet.
- ❷ Too far and your bullets lose their power; too close and you collide or get hit by exploding debris. Effective range is when the bandit’s wings fill the ring of your gunsight.
- ❸ The BF-109’s guns are grouped in the nose, so if you aim well, your bullets converge on a single point.

▶ Videos · Lesson 4			short clips
No.	Scene · when to watch	Code	QR
①	Lead shooting — shooting at the enemy's future When you aim but keep missing	2-014	
②	Judging firing range with the gunsight ring When you don't know when to fire	2-015	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

LESSON 5

The Fast Chaser

Lead Pursuit — Fighter vs Fighter

◆ 1. Forget the Big Punching Bag

“Okay, this is Kaya, riding high after bagging a bomber! Bring on the next one!”

I shouted it like a champion. The glow of that victory still seemed to hang in the cockpit.

“The next target is a La-5. Small, fast, and very nasty. Kaya, you’ll need to concentrate a lot harder.”

The words were barely out of Ray’s mouth when a tiny dot burst out of the clouds ahead.

Shwaaang—!

With a roar, it flashed right over my head.

“What?! Why is it so fast?!”

I whipped my head around and yanked the stick, chasing the target.

◆ 2. Keeping Your Balance Inside a Blender

The bomber had lumbered along and soaked up the hits, but this one went absolutely wild. It was so fast that just closing the distance was a struggle.

“Hold still, please!”

I stirred the stick in every direction trying to stay on its tail. The sky stood straight up, then the ground leaped at me, and the cockpit spun like a top. It felt like being inside a high-end blender. Thanks to my training in where to put my eyes, I didn’t throw up, but tracking that target had my head spinning.

“Kaya! If you only try to trap it inside your gunsight, you’ll never catch it!”

◆ 3. Lose Your Speed, Lose Your Wings (Low-Speed Stall)

When it zoomed straight up, I pulled the stick and followed. My nose pointed at the sky, and the airspeed needle slid down: 300, 250, 200...

“Just a little more... its tail is right there...”

“Kaya, speed! Watch your speed!”

I pulled harder. Then the wings shuddered, and the world flipped sideways. Sky and ground traded places, and the airplane started to spin round and round. There was no stall warning like the one I’d

learned on the Cessna. The wild horse threw me off its back without any warning at all.

“Aaagh! I’m spinning! It won’t stop!”

“Let go of the stick, center it! Throttle back! Rudder opposite the spin! Once the nose drops, you’ll pick up speed. When you have speed, ease back to level!” ▶①

I practically let go of the stick to center it and stomped the pedal opposite the spin. The rotation slowed, and the nose pointed at the ground. As the airspeed came back, I pulled gently on the stick. The ground slowly sank away below me. Altitude 800 m. I’d lost a full thousand meters.

“Phew... the Cessna at least went ‘beeeep’ to warn me. This thing just throws you.”

“That’s its personality. Yank the stick at low speed and it stalls instantly, then spins instantly. It’s the most common way to crash in a fight. The moment you lose your speed chasing a bandit, you become the target.”

◆ 4. Don’t Follow — Cut the Corner (Lead Pursuit)

It started another hard turn in front of me, and I turned left with it, straining to get on its tail. But no matter how hard I tried, the gap wouldn’t close.

“Knock it off!”

I hit the pause key and froze the simulation, and with my airplane hanging motionless in midair, Ray went on.

“Kaya, if a bandit is flying in a circle, how do you catch it from behind?”

“Uh... fly faster?”

“That’s one way, sure, but the more efficient way is to cut across the inside of the circle (lead pursuit). Remember the predictive shooting you learned on the bomber? The flight path works the same way. Point your nose ahead to where it’s going to be. Just keep your speed up.” ▶②

Ray’s words snapped me awake. He was telling me not to run the outside of the track, but to dive into the inside lane.

◆ 5. The Split-Second Crossing

Simulation back on. I stopped staring at its tail and boldly swung my nose into the empty sky ahead of where it was turning. For a moment the bandit vanished from my gunsight, but I waited calmly. This time I kept an eye on my airspeed, too.

‘About here... it should pass right through here.’

A moment later, like magic, the bandit slid straight into my crosshairs. Its whole back was exposed — that split second when the target is at its biggest!

“Got you!”

I hit the trigger on instinct.

Dudu-doom—! Ka-ka-boom!

The instant fire spat from my nose, I could clearly see debris bursting off near the bandit’s cockpit.

“Hit! Good shot! Good shot!”

Mortally wounded, the bandit trailed black smoke and spiraled limply down.

◆ 6. Victory Sickness

“Hah... got it...”

The moment I saw the bandit spiral into the ground, the tight string of tension snapped. At the same time, a huge wave of exhaustion rolled over me. The fight had lasted barely three minutes, but it felt like I'd been sprinting all-out for three hours.

“Everyone... small, fast targets are a whole different level. Fighter pilots are... seriously monsters.”

I gave the camera a pale, hollow laugh.

“You saw that, right? Going round and round, then cutting inside and slicing it off before shooting. Apparently that’s an ace’s maneuver (lead pursuit). (shrug) Anyway... it’s gone. Ahh... and so is my sanity.”

► **Kaya’s channel · comments**

I Only Figured It Out After the Wild Horse Threw Me Once (BF-109 Dogfight Training)

4.8K views · 140 likes

- 3 3D_Motion_Sick**
I’m dizzy just watching, how do you even do that? (shaking)
- C Cobra**
Ooh, that lead pursuit just now was nice! You’ve got talent.
- S Spin_Doctor**
The scream at 02:40 when the spin starts lol. But the recovery was textbook. Stick centered, opposite rudder.
- V VomitComet**
Kaya, the target isn’t even shooting back, it’s just running away, and your face is already Shrek green lol. Take it easy.

✈ Lesson 5 at a Glance

- 1 Yank the stick at low speed and the BF-109 drops into a stall and spin with no warning. Recovery: stick centered, throttle back, rudder opposite the spin → once you have speed, ease back to level.
- 2 You can't close on a small, fast target by chasing it from behind. You have to cut across the inside of the circle it's turning (lead pursuit).
- 3 Point your nose at the empty sky ahead of where the bandit will pass and wait, and it will fly into your crosshairs. Always keep an eye on your airspeed.

▶ Videos · Lesson 5

short clips

No.	Scene · when to watch	Code	QR
①	Low-speed stall and spin recovery When the plane starts spinning without warning	2-016	
②	Lead pursuit — cutting across the inside of the circle When you can't catch a fast bandit	2-017	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

LESSON 6

The Ground Is Not a Bed

Ground Strafing & Target Fixation

◆ 1. A Target That Doesn't Move? Piece of Cake!

“Okay, today’s training is shooting ground targets. Destroy that truck down there.”

I hummed a little tune. I’d just taken down a fighter that thrashed around the sky like a mad dog — and now a truck parked quietly on the ground? Easy as pie.

“Everyone, this round is a bonus game. I’m going to blow it to pieces and blow off some stress from last time!”

I shoved the nose way down. Far off, I could see a truck the size of an ant.

“Kaya, don’t get careless. Never forget that the ground is the deadliest enemy of all. On the way down, one mistake and you’re dead.”

Ray said something scary, but it didn’t really register. My eyes were already locked on the truck.

◆ 2. Sucked into the Sight (Target Fixation)

The BF-109 began a steep dive. Gravity grabbed hold and my speed shot up like crazy. 500 km/h, 600 km/h... The truck grew bigger and

bigger in my gunsight. Just a little more... If I got just a little closer before shooting, I was sure I could blow it up.

‘Not yet. Wait till it looks bigger.’

I got close enough to see the details of the truck bed. It was like the target was pulling me in like a black hole. Every nerve I had was focused on that one truck in my gunsight. I forgot that the altimeter was unwinding like crazy, and that the ground was rushing up at a terrifying speed.

◆ 3. At Death’s Door (PULL UP!)

“Kaya!! Pull!! PULL UP!!”

Ray’s frantic scream nearly ripped my headphones apart.

“Huh?!”

When I came to my senses, the truck was right under my nose — no, right in my face. I panicked and hauled the stick back into my stomach with everything I had.

“Aaaaagh!!”

Ku-gu-gu-gu—!

Massive G-forces crushed my body. The view on the monitor went black for a moment (blackout). And in that instant, I heard the belly of the airplane brush the treetops.

Krrsh!

Barely — truly by a hair — I avoided hitting the ground. My heart nearly leaped out of my mouth.

◆ 4. The Hypnosis of Greed

By the time I’d climbed back up and leveled off, my hands were shaking.

“Phew... Kaya, you almost died just now. The technical term for that is **‘target fixation’**.”

Ray let out a sigh of relief too.

“If you focus too hard on the target, you lose your sense of distance and dive into the ground as if you were hypnotized. ‘Just a little more, just one more shot’ — and you plant yourself straight into the dirt. It’s the number one reason beginners die on ground attacks.”

“Wow... it really felt like I was in a trance. All I could see was the truck.”

“Let go of the greed. Even if you think you’re going to miss, when you reach your set safe altitude, you **break away** — no exceptions. You have to survive to get another chance.”

◆ 5. Hit and Run

Another try. This time I set myself some rules.

‘Shallow dive (under 30 degrees), speed under 450. For safety, **at 300 m I stop shooting and pull the nose up, no matter what.**’ ▶^①

Okay, starting the dive again. There’s the truck. The truck is in my gunsight. It still felt a little far, but I let go of the greed and squeezed the trigger.

Dudu-doom!

Cannon shells tore into the ground, kicking up dust. A few missed, but a couple of them slammed into the truck’s engine compartment.

Ka-boom!

The truck went up in flames. I fought the urge to watch the explosion, pulled back immediately, and shot up into the sky. Looking back, I saw black smoke rising. ▶^②

“Success! Did you see that? That’s the **‘hit and run’** technique!”

Sure, I hit less than I would have up close, but it was safe. And best of all, I lived to see the result.

► Kaya’s channel · comments

Tried to Get One Truck, Gave the Trees a Haircut Instead (Ground Gunnery Training)

5.5K views · 160 likes

G GrimReaper

Wow... on that first dive I really thought she was going in;; shaking.

T TreeHugger

She brought back a souvenir branch lol. Bet there are leaves stuck in the landing gear.

S Sniper

Get greedy and you die. Stocks or flying, same thing.

“Everyone, today’s lesson. **‘Taking profit is always right.’** I tried to squeeze out a little more and nearly got delisted... I mean, nearly got my plane scrapped. The ground... is not a bed.”

✈ Lesson 6 at a Glance

- 1 Target fixation: focus only on the target and you lose your sense of distance and dive into the ground as if hypnotized. It's the top reason beginners die on ground attacks.
- 2 Let go of 'just a little more, just one more shot,' and when you reach your set safe altitude, break away — no exceptions.
- 3 This book's rules: dive angle under 30 degrees, speed under 450 km/h, and at 300 m stop shooting and raise the nose. You hit less than you would up close, but you live to see the result.

▶ Videos · Lesson 6			short clips
No.	Scene · when to watch	Code	QR
①	Dive strafing and the 300 m break-away When you feel sucked toward the ground	2-018	
②	Hit and run When you want to check your results	2-019	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

LESSON 7

Dances with Wolves

Formation Flight

◆ 1. The Lone Wolf's Six O'Clock

“All right, the BF-109's final class is **'formation flight'**.”

Ray's voice filled the briefing room, heavier and more serious than usual.

“Have you ever seen a wolf roaming the wild alone? Hardly ever, right? Wolves are strongest in a pack. Fighter pilots are the same.”

I tilted my head. Wasn't flying alone freer and easier?

“By design, a fighter's rear — the **six o'clock** — **is its blind spot**. If you're flying alone and an enemy gets on your tail? That's the end.”

Ray drew four airplanes on the whiteboard.

“But if you have a buddy, it's a different story. Your buddy watches your back, and you watch theirs. The German air force called this the **'Schwarm (four-ship formation)'**. Formation flight isn't a show for looking cool. It's the most basic and powerful tactic for survival.”

It wasn't just a 'group ride.' It was a promise to fly holding each other's lifelines.

“Now, meet your partners. Alpha 1, 2, and 3. All AI pilots. Keep this in mind: these guys are emotionless machines. If you can't hold

formation and drift into them, they won't get out of your way. And since today is all about spatial sense and distance, I borrowed a VR headset from the Academy for the day. That sense of distance from your Cessna landings — let's use it again today."

"Long time no see, motion-sickness machine."

I pulled the electric fan out of my desk drawer and set it up in front of my face.

◆ 2. The Art of the Throttle (Throttle Control)

Once we were airborne, our Alpha flight lined up in a diagonal 'echelon' formation — the leader in front and the rest stepping back to the left like a staircase. My spot was at the very end: number four. I went over the heading, speed, and altitude from the briefing. All I had to do was keep number three in sight and follow the AI flight lead.

"Huh? It's getting away!"

Number three, ahead of me, drifted a little farther away, so I pushed the throttle. Instantly the gap closed and number three's tail came at me like it was about to grind up my propeller.

"Yikes! I'm gonna hit it!"

Startled, I chopped the throttle. This time my airplane fell back as if something were yanking it from behind. If I turned right to close up on number three I got too close, and if I swung the stick back the other way I got too far again. Even my altitude was bouncing up and down; it was like a rubber band stretching and snapping back, and I just couldn't hold the formation.

"Kaya! The throttle isn't an ON/OFF switch! Keep your left hand fidgeting and adjust it finely — very, very finely! And holding the

formation's heading comes first. Keep checking your speed and altitude while you adjust the spacing!" ▶^①

Glancing back and forth between number three and my instruments, I made tiny movements with the stick and rudder. My left hand on the throttle was about to cramp.

"That's just because it's your first time. You'll get used to it. Oh — and your spacing right now is very good. Minus the dancing back and forth."

◆ 3. Drawing a Giant V

"Lead's orders. Switch to '**V formation (Vic Formation)**'."

The radio call popped up as a message on the screen, and the airplanes ahead of me smoothly spread out and came back together. With the leader at the center, number two and number three tucked in on the left and right, and I moved over to take my place off number three's right wingtip. A giant victory '**V**' was drawn across the sky in **perfect order**. ▶^②

Trusting the VR headset's sense of distance, I tucked in tight next to number three. Just 10 m. Close enough to reach out and touch, four steel beasts of 1,400 horsepower each were breathing together as one.

◆ 4. The Moment of Chills

For a second, I forgot to breathe. When I turned my head to the left, there was number three beside me, and beyond it the leader and number two, flying side by side. Against the gray clouds, four propellers caught the sunlight and flashed all at once. What a sight.

The thundering engines resonated like a single chord. An overwhelming **‘sense of belonging’**, the kind I could never feel flying alone, and the **‘sheer intimidation’** of warplanes wrapped around my whole body.

“Whoa...”

The gasp slipped out before I knew it. I felt like a member of a giant wolf pack. A confidence that no one could touch us. So this was what fighter pilots call **‘the art of formation flying’**.

“Everyone... this isn’t a movie, right? I feel like I’m **dancing with wolves** right now.”

◆ 5. Ending: I Want to Fly with Real Friends

The four of us finished the flight as one. All the tension drained out of me; I took off the headset, sank deep into my chair, and tipped my head back. The fan cooled off the sweat.

“I gave it... everything I had.”

► Kaya’s channel · comments

Wingtips 10 m Apart — I Joined the Wolf Pack (Four-Ship Formation Flight)

7.2K views · 230 likes

W

WolfPack

Wow, I got chills when all four turned side by side... that’s the thumb - nail right there.

R

Ruler

Kaya’s spacing lol she’s dancing back and forth all by herself. Doesn’t she get motion sick?

A AI_Alpha

(System message) Number four, collision probability was 99%. (Lucky you, Human.)

B BoraBora_No1

Next week's evaluation flight — the three of us are signed up. Kaya, you be flight lead. At Bora Bora, number three was the calmest of all of us.

“Today's lesson. **United we stand, divided we fall.** And next time... I'd like to fly with real trainee friends instead of rigid AIs. Huh? They're already in the comments.”

I laughed and pushed back my sweaty hair. It may have been a virtual sky, but today I felt like a real pilot.

Basic BF-109 training was over. All that was left was the evaluation. And this time, I wouldn't be alone.

Lesson 7 at a Glance

- 1 A fighter's six o'clock is its blind spot. Get caught from behind while flying alone and it's over, so buddies watch each other's backs. The German air force called this the Schwarm (four-ship formation).
- 2 The throttle is not an ON/OFF switch. Keep making fine adjustments with your left hand to control your spacing from the aircraft ahead.
- 3 In both echelon (diagonal) and V formation (Vic), your sense of distance from the aircraft ahead is everything. If distance is hard to judge, borrow a VR headset for a while to get the feel.

▶ Videos · Lesson 7			short clips
No.	Scene · when to watch	Code	QR
①	Holding position with the throttle When you keep sliding back and forth behind the lead	2-020	
②	From echelon to V formation When you don't know where to go during a formation change	2-021	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

PART ONE EVALUATION

A Cold Heart

Operation High Wall

▣ Part One evaluation plan · Team intercept tactics

Aircraft	BF-109 G2 × 4
Flight	Kaya (No. 1, flight lead) · 3 Bora Bora classmates (Nos. 2, 3, 4) — the Season 1 graduation-flight formation, reunited
Objective	Shoot down all 4 enemy bombers (Pe-2) approaching to bomb the friendly airfield
Threat	4 enemy fighters (La-5) escorting the bombers
Time limit	8 minutes (before the bombers reach the airfield)
Disqualification	If the friendly base is bombed, the mission fails regardless of score
Required · Remove targets (60 pts)	Shoot down 4 enemy bombers (15 pts each)
Bonus · Remove threats (40 pts)	Shoot down enemy escort fighters (10 pts each)
Notes	Trainees divide roles in advance (interceptors / decoys) and organize their own formation to fly the mission. Judge: Instructor SeaGAL

◆ 1. Reunion

“Kaya — no, Flight Lead. This is the briefing room.”

Three people joined the voice channel. Numbers one, two, and four — the ones I’d flown my graduation flight with in the skies over Bora Bora. Back then we didn’t know each other’s faces or voices.

We still don't know each other's faces. But their voices were smiling.

"You're number three, right? The one who came down final the calmest at Bora Bora."

"Th-that was because Ray was watching my back the whole time..."

"Anyway, this time you're number one. The three of us watched all your landing videos. All twelve."

"...Why would you watch those?"

We laughed. Then we spread out the map. This time, Ray said nothing. We had to plan the evaluation ourselves.

"Four bombers and four escorts. There are four of us, too. If we hit them head-on, the escorts will tie all of us up."

"Then two decoys, two blades."

"I'll be a decoy. I'm the one who did the most go-arounds back in the Cessna. Running away is my specialty."

Number four said it, and number three raised a hand. It was decided in no time. Numbers three and four were the decoys. Number two and I were the interceptors. At the very end, Ray's voice cut in, short.

"Good plan. Just one thing. Decoys, don't try to be heroes. Interceptors, don't look back at the decoys. That's all."

◆ 2. The Bait and the Blade

"All aircraft airborne! Hold a 20-degree climb! We climb until the engines are about to blow!"

Four BF-109s screamed up into the sky. Altitude 3,000 m. Black dots appeared far off — a large enemy formation. Four bombers, and four fighters circling around them. Exactly our numbers.

“We stick to the plan. Three, four! You’re the ‘shield.’ Keep those enemy fighters off us!”

“Three, copy! We’ll hang on even if it kills us! Let’s go!”

Numbers three and four broke out of formation and charged the enemy escorts (La-5s). The bandits spotted us and reacted. All four of them swarmed in to catch three and four.

◆ 3. The Courage to Look Away

“Aaagh! All the bandits are on us!”

Number four’s scream came over the radio. Two against four. Obviously outmatched. Number two, my wingman flying beside me, flinched and started to swing his nose that way.

“Flight Lead! They’re going to die! Shouldn’t we help them?”

I shouted firmly.

“They’ll hold. No — we have to trust them! The decoys are risking their lives to buy us time. We can’t waste it!”

We forced ourselves to look away from the two being chased, pulled back on our sticks, and climbed higher, into colder sky. Our only target: the bombers.

◆ 4. The Eagle Descends (Boom)

Altitude 4,000 m. The bombers were below us, defenseless. The escorts were down low, busy chasing three and four. A perfect chance.

“Now! Let’s gooo!”

Number two and I rolled inverted (Split-S) and dove. Gravity took over and the airspeed needle went crazy. 600... 650 km/h. ▶①

“Target in sight!”

I lined up the lead bomber. A bomber without escorts was nothing but a giant punching bag. I poured 20 mm cannon fire into the root of its wing.

Ka-boom!

With its wing torn off, the bomber spiraled down. At the same time, number two smashed another bomber's engine.

◆ 5. Don't Get Greedy — Zoom Up (Zoom)

There was no time to enjoy the kill. We were going way too fast.

"Don't stop — keep climbing! Keep your energy!"

Instead of hanging around in the middle of the enemy, we used our dive speed to shoot straight back up. The bomber gunners opened up with defensive fire too late; we were already out of their range and back up at 4,000 m. ▶②

"This is the power of the BF-109. Catch us if you can!"

We built our energy back up and made a **second pass**. The remaining two bombers were torn apart the same way, without getting off a single shot in return.

◆ 6. Now We Go Save Our Friends

[MISSION UPDATE: All bombers destroyed. Base secure]

Only then did I look down. Numbers three and four were holding on for dear life. Number four had already been shot down and popped a parachute, and number three was running desperately with two bandits on his tail.

"Mission accomplished. Now we go support number three!"

"Copy that!"

Even after taking out the bombers, we still had energy to spare, so this time we dropped onto the heads of the enemy fighters. They never even saw us coming.

Dudu-doom—!

My cannon fire slammed into the back of the bandit chasing number three. In an instant, the tables turned. When two BF-109s with the altitude advantage joined in, the remaining bandits scattered in a panic.

◆ 7. Ending: The True Aces

After landing, I welcomed number four, walking back after the parachute ride, and number three, his airplane in tatters. On the voice channel, they both sounded wronged.

“Seriously, we thought you’d abandoned us! You could have at least radioed!”

I grinned.

“I figured if you held on for one more minute, we’d win. Thanks to you, the base is safe. Today’s MVPs are the ‘decoys.’”

Only then did their voices relax. I may have taken the kills, but they were the real heroes of the win.

[Evaluation result: Bombers 4/4 (60 pts) · Escorts 2/4 (20 pts) · Friendly losses 1 · Total 80 pts · Pass]

A one-line message from Instructor SeaGAL was attached.

“A flight lead is judged by decisions, not kills. Not looking back: pass. One minute of leaving the decoys alone: cut it down next time.”

► Kaya's channel · comments

**First Mission with My Bora Bora Classmates — All 4 Bombers Down
(Part One Evaluation Full Video)**

12K views · 410 likes

- M MeatShield**
Numbers three and four, I'm crying... they really pulled the 'use me as bait' move T_T
- E EagleEye**
Look how cold-blooded Kaya's call was. If she'd gone to help, it would've all fallen apart and the base would've blown up.
- E EnergyFighter**
Textbook Boom & Zoom. Hit, extend, climb back up — straight out of the manual.
- B BoraBora_No4**
Coming down in my parachute, I looked up and saw the flight lead's two planes diving. I was salty, but it looked awesome.

“Everyone. The hardest thing in combat isn't pulling the trigger. It's coolly doing ‘your job’ and trusting ‘your teammates.’ Today, we were one perfect team.”

✈️ **Part One Evaluation at a Glance**

- 1 Split into interceptors and decoys. While the decoys tie up the escorts, the interceptors climb higher and go after the bombers.
- 2 Boom & Zoom: use the energy of altitude to strike in a dive, then use that speed to shoot straight back up out of range. Keep your energy up.
- 3 The hardest thing in combat isn't shooting — it's coolly doing your job and trusting your teammates.

▶ Videos · Part One Evaluation			short clips
No.	Scene · when to watch	Code	QR
①	The Split-S dive When diving on bombers from high above	2-022	
②	Boom & Zoom — strike, then climb away When you linger in the fight and get someone on your tail	2-023	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

To the Next Hangar

Next Hangar

◆ 1. Shutting Down the Engine (Cool Down)

“Training complete. Shut down your engine.”

Instructor SeaGAL's radio call came in. I reached under the shaking instrument panel and switched off the magneto.

Pfft-pfft... thunk.

The BF-109's engine, which had been growling like a wild beast, coughed roughly and died. As the spinning propeller slowly came to a stop, silence settled over the noisy cockpit. All I could hear was the **'tink,' 'tink'** of metal as the coolant cooled.

When I took off my headphones, instead of the cold air of the battlefield I felt the familiar air of my own room. But my hands still remembered the vibration.

◆ 2. To the Next Hangar (Next Hangar)

“Great work, Kaya! Wow, did you see that last mission? I honestly thought you were an ace!”

Tutor Ray applauded over the Academy voice channel.

“Okay, the wild horse is broken in. Shall we go handle some real 'heavy equipment' now?”

Ray waved his hand and the background on the screen changed. The spot where the sleek BF-109 had stood went dark, and the lights came on in the next hangar. Crouched inside was a huge, clunky airplane that was anything but beautiful — it looked like a flying tractor.

“Your next training aircraft is the IL-2 Sturmovik. Do you know its nickname?”

“Um... the bear? The tank?”

“Correct. ‘The Flying Tank.’ They say the Germans called it ‘the Black Death.’ It’s a ground-attack aircraft that smashes everything on the ground with cannons and rockets.”

◆ 3. From the Sky to the Ground

I rested my chin on my hand and looked at that clunky aircraft. If the BF-109 was a delicate blade you had to handle with care, that thing looked like a sledgehammer that wouldn’t flinch no matter how hard it got hit.

“Delicate dogfighting, then brute-force ground attack... The Meta - Pilot curriculum really does the **sweet-and-spicy combo** right.”

“You can keep using your stick as it is. Only a few key bindings change. But your left hand is going to be very busy.”

“My left hand? My right foot wasn’t enough, now it’s my left hand too?”

I gave the grip of my pink wild horse a pat.

“All right. This time, let’s go smash the ground instead of the sky.”

My war had only just begun.

Phase 1 · BF-109 Training Complete

► Kaya's channel · comments

I Finally Did It... Taming the German Wild Horse BF-109, the Final Chapter (feat. 12 Landing Attempts)

24K views · 810 likes

M

MetaPilot_Kaya Pinned

Everyone! Part One on the One-Oh-Nine (BF-109) is finally done! Next up, as promised, I'm off to fly the 'Tank of the Sky,' the IL-2. Going from a delicate German machine to a rough-and-tumble Russian one — my arms hurt already. lol Please keep cheering me on! (Likes and subs are love)

520 likes · 45 replies

S

SkyWalker99

Wow, is this the same Kaya who spun like a top into the grass on her first takeoff? lol Watching her work the flare on that last landing actually got me emotional. She's become a real pilot.

215 likes

H

HistoryBuff_1945

The BF-109's narrow landing gear really did kill a lot of veterans, and the sim recreates it like that — amazing. Anyway, the IL-2 Sturmovik next... so you're putting down the 'sword' and picking up the 'hammer.' Can't wait!

132 likes

S

Sim_Racer_Z

The kangaroo landing montage at 3:45 LMAOOOO who edited this, it's insane lolol. I bet Kaya wrecked more of these than the Germans ever lost to the enemy

890 likes

R

RedStar_Comrade

Comrade, welcome to the world of the IL-2. That is not an airplane. It is a tank with wings. Now the flak will only tickle! Urrah (Hurrah)!

76 likes

F

Flying_Potato

Been watching since the Cessna days, and seriously, how fast is she growing? Now she's heading off to war... feels like marrying off my daughter... T_T Please come home alive!

45 likes

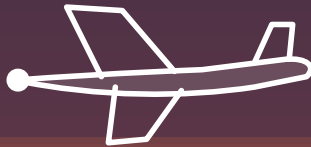
R

Repair_Bill_Bot

[Automatic Estimate System] Part One running total: estimated repair costs for propellers and landing gear destroyed by Kaya, approx. 50,000 Reichsmarks. From Part Two on, you will be billed in rubles.

1,204 likes

P a r t T w o



The Steel Bathtub

IL-2 Attack Aircraft — The Flying Tank

LESSON 8

The Rugged Beauty of Manual

Manual Engine — The Fan Theory



◆ 1. Wings on a Tractor

“All right, Kaya. Forget fine German engineering for a while. It’s time to meet ‘the Russian bear.’”

The loading finished with Tutor Ray’s voice. The airplane in front of me looked nothing like the BF-109 I’d been flying — not even the paint.

“Whoa... this thing looks seriously tough. Actually, let’s be honest — it looks kind of clunky.”

Unlike the sleek, streamlined German fighter, the **IL-2 Sturmovik** looked rough and hulking, as if someone had forced a pair of wings onto a farm tractor. The paint job was blotchy, like it had been slapped on in a hurry, and the surface felt like raw scrap iron.

“Don’t look down on it for being ugly. The Germans called this thing ‘the Black Death’ and shook in their boots. What good is pretty on a battlefield? The one that doesn’t die and breaks things well — that’s the best.”

◆ 2. The Steel Bathtub (The Bathtub)

I climbed into the cockpit. Unlike the cramped BF-109, there was plenty of room, but something felt off.

“Huh? Ray, what’s wrong with the glass? Everything outside looks wobbly.”

The canopy glass was as thick as a fishbowl and not very clear, so the scenery looked warped.

“That’s the heart of the IL-2. From the engine to the cockpit, it’s wrapped in solid steel and bulletproof glass. Its nickname is ‘the Armored Bathtub.’”

“A bathtub?”

“Yep. Think of yourself as sitting in a bathtub. Ordinary rifle and machine-gun rounds just bounce off. It’s basically a flying tank.”

I tapped the thick bulletproof glass with my fist.

“It’s reassuring and all... but it’s kind of stuffy. I can’t see much.”

“Put up with the stuffiness. That stuffiness is going to save your life. Okay, starting the engine! Even the sound is going to be heavy.”

◆ 3. “Automatic Transmission Is Not an Option”

The engine caught with a roar and the huge propeller began to turn. The airframe shuddered, and the vibration ran through my whole body. It was on a whole different level from the BF-109's engine.

“Good. The engine's running, so shall we try a takeoff?”

Out of habit, I reached for the throttle lever. Ray stopped me in a hurry.

“Wait! Kaya, what are you doing?”

“Huh? You have to push the throttle to take off.”

“That's for when you're driving the German wild-horse sedan (the BF-109). This tractor doesn't have any ‘automatic transmission.’ Push the throttle like that right now and the engine dies.”

I stared blankly at the instrument panel. All those levers and gauges seemed to be laughing at me.

“What? So I have to shift gears myself?”

“Of course. See that cluster of levers on the left? Throttle (power), mixture (fuel-air ratio), and RPM (prop pitch). You conduct all three yourself. The mixture you met in the Cessna is back. On the ground, keep it pushed all the way in.”

◆ 4. Twist the Fan Blades? (Prop Pitch)

“Welcome to the world of 100% manual.”

Ray first pointed to the ‘RPM lever’ next to the throttle and asked: “Kaya, you've got an electric fan at home, right? Picture its blades for a second.”

“A fan? You really love fans, don't you, Ray?”

“It saved my life. A normal fan has its blade angle fixed, right? But on an airplane propeller, the pilot can twist that blade angle how - ever they like.”

Ray made blade shapes with both hands.

“Say you twist the blades just a little and spin them. Hardly any air resistance, right? So the motor goes ‘wheee!’ and spins super fast. That’s RPM at 100%. You use it when you need all the engine’s power, like for takeoff or combat.”

“Oh, so what if you do the opposite?”

“Imagine twisting the blades a lot more so they shove the air. Huge air resistance, right? The motor strains and turns slowly. But every turn pushes a big, heavy gust of air, so you use it for flying far — in other words, cruising.”

“Aha! So this RPM lever decides ‘how much to twist the propeller blades?’”

◆ 5. The Formula That Saves Your Engine: ‘Prop Up, Throttle Down’

“Okay, here comes the really important survival formula. Get this wrong and the airplane goes to the repair shop before it even gets off the ground.”

Big red letters popped up on the screen.

IL-2 pilot must-memorize

Prop Up, Throttle Down

Power UP? Prop first! — RPM first, then throttle.

Power DOWN? Throttle first! — Throttle first, then RPM.

“Think about it. If you twist the blades way over and then switch the fan to ‘high,’ what happens to the motor?”

“Hmm... the blades are heavy so they barely turn, but the electricity keeps coming... so the motor burns out?”

“Ding-ding-ding! That’s exactly how the engine gets wrecked. It tried to force heavy blades around. For takeoff you always make the blades light first. When you add power, set the RPM (pitch) first, then push the throttle.” ▶^①

“Roger that! Prop up, throttle down — RPM lever all the way in first for takeoff!”

◆ 6. Open the Sauna Door (Radiator)

“And one more thing. I said the IL-2 is a ‘steel bathtub,’ right? It’s wrapped in thick steel plate, so it heats up like crazy. It’s basically a sauna.”

Ray pointed to a handle in the corner of the cockpit.

“That’s the radiator (cooler) shutter. When you’re using a lot of engine power, you have to throw the windows wide open. Otherwise the engine melts. Open it now, before takeoff.” ▶^②

I strained to crank the handle.

“Wow... twist the blades, open the windows... this thing really is high-maintenance.”

“But it’s tough. Even if flak clips you a bit in combat, close the shutter, glide, and you can still make it home alive.”

◆ 7. The Tractor Takes Off

“Okay, the sequence. Tailwheel lock, mixture all the way in, shutter open, RPM lever all the way in, then throttle slowly. This one has

torque too. But this time the propeller spins the other way... so, which foot?”

“...Left foot?”

“Correct! The Russian one is left foot. The right foot you memorized for the German one — use the opposite here.”

“Wait, even the feet switch sides? It’s like visiting a country where they drive on the other side of the road.”

“That’s why I tell you to feel it, not memorize it. The foot opposite to where the nose is turning. Simple, right?”

I pushed the RPM lever in and brought the throttle up slowly. As the nose crept to the right, I pressed with my left foot. The airframe rolled majestically forward. It was heavy. The airspeed crawled up, and the tail only lifted after we were halfway down the runway. Then, heavily, it let go of the ground. ▶③

“We’re up! Wow, this really feels like a flying tractor.”

“Check the coolant temperature. Still okay? So, getting a whiff of the engine oil yet? Let’s go up and start breaking things for real!”

✈️ **Lesson 8 at a Glance**

- 1 The IL-2 has no ‘automatic transmission.’ The pilot personally conducts the throttle (power), mixture (fuel-air ratio), and RPM (prop pitch). On the ground and for takeoff, the mixture goes all the way in.
- 2 The RPM lever sets the propeller blade angle. For takeoff and combat the blades are light (high RPM); for cruise they push the air heavily.
- 3 Prop Up, Throttle Down: power up — RPM first; power down — throttle first. Get the order wrong and you wreck the engine.
- 4 Open the radiator shutter before takeoff and check the temperature gauges. The IL-2’s torque goes the opposite way from the BF-109’s, so you hold it with left rudder.

▶ Videos · Lesson 8			short clips
No.	Scene · when to watch	Code	QR
①	Prop Up, Throttle Down — the RPM and throttle order When a manual engine is new to you	2-024	
②	Opening the radiator shutter When the temperature gauge shoots up	2-025	
③	IL-2 takeoff — left rudder When the Russian torque goes the other way	2-026	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

► Kaya's channel · comments

Hey! Can you NOT make it sound like the engine's exploding?! (IL-2 Sturmovik first flight)

15K views · 5 hours ago

M

MetaPilot_Kaya Pinned

Guys... rewatching this while editing and my face looks SO wronged lol. Like going from a German automatic straight into a one-ton stick-shift truck?? Today's lesson: "Power up? Prop first! Power down? Throttle first!" (Don't memorize it and you'll get lost in the sky.) P.S. Ray, is there an airplane with air conditioning next time? I'm about to get heat rash.

521 likes · 45 replies

R

Ray [Official Tutor]

Kaya, you ate three engines today. The bill's in your email. ^^ Still, props for finding the left rudder right away. Next lesson we take all that engine heat and go pop the lids off some enemy tanks.

1.2K likes

B

Bedroom_TopGun

03:12 "You've got an electric fan at home, right?" I actually laughed out loud when Ray did the fan-blade impression lmao. Why is the explanation so perfect? Somebody publish the Fan Theory paper.

890 likes

O

Old_Man_Carving_Planes

Wow... the IL-2 accuracy is insane. The BF-109 really was the aristocrat. Watching her crank the radiator by hand made MY arms hurt lol

456 likes

G

Golden_Wing [Study Notes]

04:20 Prop Up, Throttle Down (RPM up then push throttle / throttle back then RPM down) 06:15 Open the sauna (radiator Open for takeoff) 08:30 Fan Theory (light blades = takeoff / heavy blades = cruise) It'll be on the test. Memorize it, everyone.

1.5K likes

N

Newbie_Pilot

Guys I just did Prop Up, Throttle Down backwards and my propeller stopped right after takeoff... Ray was right... T_T

210 likes

LESSON 9

The Hammer and the Fireworks

23mm Cannons & Rockets

◆ 1. Let the Hammering Begin

After takeoff, Ray designated a column of German supply trucks lined up across a wide field as the target.

“Okay, forget the BF-109’s machine guns. This one carries 23mm cannons. You’re not poking with a needle, you’re swinging a hammer. Same rule as Lesson 6. Shallow dive, break away at 300m.”

I dipped the nose and put a truck in the gunsight. Expecting the BF-109’s light ‘rat-a-tat,’ I pulled the trigger.

“Here goes! Fire!”

But the instant I pulled the trigger, I was so startled I nearly let go of the stick.

BOOM! BOOM! BOOM! BOOM!

That wasn't gunfire. That was explosions. Every time the wings spat fire, the whole airframe shook with a dull thud.

"Aaah! You scared me! Why is the recoil so strong?!"

"It's strong enough to actually slow you down! Grip the stick tight! The recoil lifts the nose! Short bursts — two or three rounds at a time!" ▶①

◆ 2. The Deleted Truck

I looked down at the ground. With the BF-109, a truck would just stop and smoke. This time was different.

Ka-BOOM!

The truck the cannon shells hit blew apart without a trace. Debris flew everywhere and bright red flames shot up.

"See? Trucks just get erased like with an eraser. That's the firepower of an attack aircraft (Attacker)."

"Whoa... the impact is insane. That is SO satisfying."

"That's why people fly the IL-2. Now sweep them all up like you're using a broom! 300m! Break away!"

"Oh, right!"

I pulled back on the stick. The ground fell away below me. This time I didn't trim any trees.

◆ 3. Don't Aim (Rockets)

"Now that you've had a taste of the cannons, shall we bring out the real big brothers? Look under the wings."

I turned my head and saw club-shaped rockets hanging there in a row. Unguided rockets.

“Oh! Missiles?”

“A missile chases its target by itself. These you just light and throw. It’s 1942.”

“So I just aim them with the gunsight, right? Like the cannons.”

“The gunsight does have rocket marks, but the problem is the rockets don’t listen to the gunsight. Every one flies its own path. The Russian philosophy isn’t ‘precision strikes.’ It’s ‘fire a whole lot, roughly, and turn the entire area into a wasteland.’”

“What? Like a shotgun?”

“Correct! Put the marks near the target, point the nose down at where those tanks are bunched up, and fire them all at once thinking ‘somebody’s bound to get hit!’”

◆ 4. Fireworks (Fireworks)

I dropped the nose and closed on the armored column. I lined the gunsight marks up roughly on the enemy.

“Now! Fire everything!”

I hammered the rocket button.

Fwoosh-fwoosh — FWOOSH!

The rockets shot out from under the wings trailing white smoke, every which way. Some went high, some went low. The trajectories were a total mess. ▶②

“Ray! The rockets are wiggling like earthworms! How is that going to hit anything?”

But my worry was for nothing.

KA-KA-KA-BOOM!

The rockets slammed into the ground and set off a chain of explosions with huge clouds of dirt. A tank took a direct hit and flipped over, and the tanks around it were caught in the shock wave and ground to a halt.

“Whoaaa! Amazing! The accuracy stinks but the power is awesome!”

“Haha! Feels great, doesn’t it? You don’t have to hit exactly. You’re just planting fear. Shout it loud! Ura (Hurrah)!”

“Ura!”

“And... 300m.”

“Oh, again!”

Lesson 9 at a Glance

- 1 The IL-2’s 23mm cannon isn’t a gun that ‘pokes with a needle’ — it’s a weapon that ‘hits with a hammer.’ The strong recoil lifts the nose, so grip the stick firmly and fire short bursts of two or three rounds.
- 2 Unguided rockets are not missiles. The gunsight has marks for them, but every rocket flies its own path, so they’re a weapon you fire all at once toward the target area to turn the whole area into a wasteland.
- 3 Whatever the weapon, the Lesson 6 rule is the same. At 300m, break away.

▶ Videos · Lesson 9			short clips
No.	Scene · when to watch	Code	QR
①	Firing the 23mm cannon in short bursts When the recoil lifts the nose	2-027	
②	Rocket salvo When firing rockets by the gunsight marks	2-028	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

▶ Kaya's channel · comments

Aim? What's that? Can you eat it? (IL-2 23mm cannons and rockets)
16K views · 520 likes

D

Destruction_God
Wow... listen to how heavy that cannon "BOOM! BOOM!" is. If the BF-109 is a 'pinch,' this is a 'bone-breaking' sound. Kaya laughing and blasting away saying it's stress relief was a little scary... lol
420 likes

R

Rocket_Man_99
"Somebody's bound to get hit." Peak Russian tough-guy mindset
Imaooo. Seriously, even in the game you have to pray when you fire those rockets.
512 likes

T

Truck_Kun
German truck: "Please spare me..." Kaya: "Can't hear you ^^ (BOOM BOOM BOOM)" Just another peaceful day on the MetaPilot channel...
312 likes

R

Ray [Official Tutor]

I shouted “300m!” six times today. Five of those times, Kaya shouted it first. Growth.

640 likes

LESSON 10

The Thrill of Flying Low

Low-Level Flight & Map Reading

◆ 1. Skimming the Trees

“Okay, we’re out of ammo, so now we run. But there’s enemy flak everywhere, so fly high and you get shot down right away.”

“So what do I do? Hide in the ground?”

“Close. You have to hug the ground. As low as you can, like you’re brushing the treetops! That’s called ‘low-level penetration.’”

I pushed the stick forward and dropped. The altimeter needle plunged. 100m, 50m... 30m.

“Ray! Isn’t this way too low? I’m going to hit a tree! I feel like grass is about to tickle my feet!”

“You won’t hit! Go lower! The lower you fly, the harder it is for them to aim at us. Don’t be scared — get down there!” ▶①

I squeezed my eyes shut and took it down to 10m. It really felt like the landing gear was about to brush the tips of the branches.

◆ 2. The Tunnel of Speed

High up in the sky, the airplane had felt like it was moving slowly. But the moment I hugged the ground, the world changed.

WHOOOSH—!

The ground streamed backward at a crazy speed. Forests and fields flashed past like a treadmill.

Whip! Whip!

Telephone poles whizzed past right beside my wing, and I saw a herd of cows grazing in a field scatter in a panic at the engine noise.

“Whoa! It’s like a roller coaster! It’s so fast!”

“That’s what 400 km/h really feels like! Faster than a race car.”

◆ 3. Eyes Far Ahead

A tall chimney suddenly appeared right in front of me.

“Aaah! Chimney!”

I yanked the stick to the left. The airplane lurched and just barely missed the chimney.

“Keep your eyes far ahead! Look only right in front of you and miss an obstacle, and it’s over! Same as riding a motorcycle. Your eyes always look where you’ll be three seconds from now!”

“Got it! Wow, this is a real thrill!”

I raced on, dodging obstacles left and right. It felt less like flying and more like playing an obstacle-dodging racing game.

◆ 4. The Crumpled Paper Map

“But Ray, which way is the base? Flying this low, I can’t see anything.”

“Ah, you finally ask. Look at your knee.”

On the kneeboard strapped over my thigh was a crumpled paper map. In 1942 there were no radio beacons and no green needles.

“What did you learn in the Cessna? Reading the patterns on the ground.”

“Pilotage! Rivers and roads!”

“Right. See the river on the map? Fly with that river on your right, and at the bridge where the railway crosses the river, turn left — that’s the base. When you’re flying low, look for the big things you can see from far away first. Rivers, railways, chimneys.” ▶②

I glanced at the map and looked for the river. Beyond the right window, a silver ribbon glinted. The river. As I followed it, the railway came closer, and then I saw the bridge. I turned left, and the runway appeared in the distance.

“Found it! Paper maps aren’t half bad!”

“That’s real navigation. Radio beacons can break, but rivers don’t.”

“You’re doing great! Keep that up and race back to base at full speed!”

✈️ **Lesson 10 at a Glance**

- 1 To avoid enemy flak, fly a low-level penetration — as low as you can, as if brushing the treetops. The lower you are, the harder you are to aim at.
- 2 Hug the ground and the sense of speed multiplies. Look not right in front of you, but where you'll be three seconds from now.
- 3 Navigation in 1942 means a paper map and pilotage. Start with big landmarks you can see from far away — rivers, railways, chimneys — and connect them into a route.

▶ Videos · Lesson 10			short clips
No.	Scene · when to watch	Code	QR
①	Low-level penetration When flying low to dodge the flak	2-029	
②	Finding your way with a paper map — rivers, railways, bridges When you get lost flying low	2-030	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

▶ **Kaya's channel · comments**

※**Motion sickness warning**※ **What happens when you fly 10m off the ground at 400 km/h**

21K views · 700 likes

S

Speed_Demon_KR

Wow... didn't notice it up high, but down on the deck the sense of speed is insane. When the telephone pole went by (03:45) I actually ducked lol

560 likes

L

Low_Alt_Flyer

Textbook low flying. You're sneaking into the flak's blind spot, but plenty of people crash catching a power line doing that. Kaya's reflexes have gotten a lot better, huh?

320 likes

C

Cow_Lover

The cows running away lmaooo, what is this level of detail. My condolences to the cows who were peacefully grazing and got struck by lightning out of a clear sky...

189 likes

R

Ray [Official Tutor]

Confession. I got motion sick watching the edit of this video. I turned on the fan and watched it again.

980 likes

LESSON 11

The Zombie Airplane

Damage Tolerance & Landing

◆ **1. The Tin-Can Sound**

“Almost there! Just hang on a little longer!”

We were passing a forest near the base. Suddenly, enemy flak hidden in the trees opened fire.

Ting! Clang! Ratatat!

A racket broke out from the belly and the wings. It wasn't the tearing 'thwack!' I'd heard in the BF-109. It was a sharp metallic noise, like someone banging an iron bucket or a pot with a spoon. ▶①

"Aaah! I'm hit! What's that sound? It sounds like somebody kicking a tin can!"

I screamed and flinched on instinct. In a fighter, a hit like that would already have the engine smoking or a wing snapped off. With trembling eyes, I checked the instrument panel.

"Huh...? The instruments are fine?"

"You're okay! That's rounds bouncing off the armor plate! The vital parts are wrapped in steel, so most bullets can't even make a dent! Check coolant temp, hydraulics, controls!"

"Coolant normal, hydraulics normal, controls... working!"

◆ 2. The Immortal

I turned my head and looked at the wing. It was peppered with holes, and the tail was in tatters. But the airplane flew on, heavy and stubborn, as if nothing had happened.

"See? Engine's fine and the controls work, right? Now you know why the Germans called this thing 'the cement airplane.'"

"Whoa... it really is a zombie. There are holes in the wing and it just keeps flying."

"As long as it's not a vital spot like the engine or the cockpit, it'll drag itself home even shot to rags. That's the Sturmovik."

◆ 3. How to Park a Tractor

The runway came into view in the distance. This time, Ray wasn't going to land it for me.

"Landing sequence. Power down?"

"Throttle first! Throttle, then RPM."

"Good. Below 250: gear, flaps, tailwheel lock. Approach around 200. This one's heavy, so it won't bounce like the BF-109. But once it sinks, it won't float back up. Don't pull the throttle all the way; leave a little on." ▶②

"No bouncing sounds good to me."

"And after landing, your feet?"

"...Rudder. It ain't over till it's over."

I lined up my battered airplane with the runway. The heavy airframe sank. Thunk. All three wheels touched down at almost the same time. No bounce. I worked the rudder and held the runway centerline. And stopped.

"Phew... even its landing is a tractor. It just plops down on the ground."

When I opened the canopy, Ray gave me a thumbs-up.

"Good work, Comrade Kaya. Today you were a god of destruction, and immortal at the same time. And you landed it all by yourself."

I let out a sigh of relief and thought: delicate, sensitive fighters are great, but now and then it's not bad to drive a sturdy 'tank' that smashes everything and shrugs off a beating.

✈️ **Lesson 11 at a Glance**

- 1 Vital spots like the engine and cockpit are wrapped in steel armor, so most bullets bounce off. After taking hits, immediately check coolant temperature, hydraulics, and control response.
- 2 Even with holes in the wings, as long as the vital spots are intact, the airframe stubbornly makes it home. Hence the nickname 'the cement airplane' and 'the zombie airplane.'
- 3 Landing: power down, throttle first → below 250 km/h, gear, flaps, tailwheel lock → approach around 200 km/h → leave a little throttle and settle onto all three wheels → rudder until you stop.

▶ **Videos · Lesson 11**

short clips

No.	Scene · when to watch	Code	QR
①	Checking the instruments after taking hits When you hear tin-can noises	2-031	
②	IL-2 landing — settling onto three wheels When putting a heavy plane down	2-032	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

▶ **Kaya's channel · comments**

Made it home full of holes... (shaking) is this plane's toughness for real? (IL-2 survival log)

25K views · 820 likes

T

Tank_Driver_KM

Wow... that “Ting! Clang!” sound (01:23) is perfectly accurate. Not wood or aluminum tearing — that’s the sound of real steel plate getting hit. Just hearing it makes you feel safe.

512 likes

Z

Zombie_Plane

Saw the holes in the wing and went “uh, she’s going down” and it just kept flying lol. Definitely a zombie airplane. In a BF-109 I’d already be looking for the bail-out button.

340 likes

R

Repair_Bill_Bot

[Automatic Estimate System] Today’s repair bill: 0 rubles (excluding bodywork and paint). Engine fine, cockpit fine. Just slap a steel plate over the holes and hammer it flat — repair complete. Best value ever!

620 likes

H

History_Buff

I hear the Part Two Evaluation is next... is the exam in a tank?

215 likes

PART TWO EVALUATION

Cut the Supply Line

Operation Supply Cut

■ Part Two evaluation plan · Ground attack

Aircraft	IL-2 Sturmovik × 1 (solo)
Objective	Destroy at least 4 of the enemy supply truck column (6 trucks), destroy the fuel depot beside the bridge
Threats	2 flak positions in the woods on both sides of the supply road
Route	Low-level penetration → attack → low-level egress → return to base by paper map → landing
Required · Trucks (40 pts)	4 or more (10 pts each, max 40 pts)
Required · Depot (30 pts)	Destroy with rockets
Survival · Return (30 pts)	30 pts for landing on the runway and stopping. -10 pts for each violation of the 300m break-away rule
Judge	Tutor Ray

◆ 1. Alone, and Low

This time there was no formation. Just me and one tractor. Ray sat in the judge's seat and kept quiet.

"Briefing over. Kaya, power up?"

"Throttle first. ...No, wait — power up, prop first!"

"Go."

I locked the tailwheel, pushed the mixture in, opened the shutter, and pushed the RPM lever all the way in. Throttle. Left foot. The tractor flew. I leveled off at 50m and looked for the river on the map.

◆ 2. Hammering

Following the river, the supply road appeared. Six trucks were moving in a line. I lowered the nose in a shallow dive. Airspeed 400. The first truck in the gunsight.

BOOM! BOOM! BOOM!

Two stopped dead. 300m. Break away. I swung back in. BOOM! BOOM! A third, a fourth. The fifth was a miss. Flak flashes rose from the woods.

Ting! Clang!

"It's fine. Tin-can sound. Coolant normal."

This time I didn't scream. I turned the nose toward the bridge. There was the fuel depot. I put the rocket marks roughly on top of it and fired everything.

KA-KA-KA-BOOM!

The depot went up in a pillar of fire. 300m. Break away.

◆ 3. Coming Home

Low level. River on the right. Railway. Left at the bridge. Runway. Throttle first. Gear, flaps, lock. 200. Thunk. Rudder. Stop.

“Engine cut.”

Silence settled over the cockpit. Only after catching my breath for a long while did I look back at the judge’s seat.

[Evaluation result: Trucks 4/6 (40 pts) · Depot destroyed (30 pts) · Return (30 pts) · Break-away rule violations 0 · Total 100 pts · Pass]

“Kaya.”

Ray spoke for the first time. None of his usual playfulness.

“The person who was trimming trees in Lesson 6 kept to 300m four times on her own today. Missing two trucks is nothing. What you did... not just anyone can do that.”

“Ray... when your compliments get this serious, it’s scary.”

“Oh, sorry. Let me try again. You ate zero engines today. No bill.”

“I like that one better.”

► Kaya’s channel · comments

Got 100 points on the Part Two Evaluation (IL-2 solo ground attack, full video)

33K views · 1.1K likes

R

Repair_Bill_Bot

[Automatic Estimate System] Today’s bill: none. Checking whether this is a system error.

1,500 likes

B

BoraBora_No1

Goosebumps watching her pull up right on 300m every time. That's our Flight Leader from the Part One Evaluation, alright.

388 likes

R

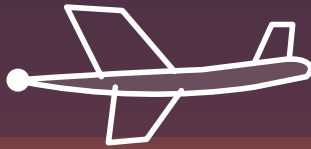
Ray [Official Tutor]

I gave my review in the video, so just one thing here. Her eyes were on the coolant gauge faster than mine.

870 likes

Phase 2 · IL-2 Training Complete

P a r t T h r e e



The Flying Greenhouse

He 111 Bomber — The Captain's Math Class

LESSON 12

Two Hearts

Twin Engines & Rudder Trim



◆ 1. This Is Not an Airplane

“All right, Kaya. Forget the fighter’s cramped chicken coop. Allow me to show you to the penthouse.”

With Tutor Ray’s introduction, the loading screen ended. Everything in front of me lit up.

“Whoa... what is this?”

My jaw dropped. The BF-109 had been so boxed-in up front it was suffocating, but in this airplane (the He 111) the whole cockpit was made of clear glass. From the ceiling to the floor — even under my feet — it was wide open.

“The He 111’s signature: the fully glazed cockpit. Amazing view, right?”

“Amazing isn’t the word... I think I’m developing a fear of heights. I can see the whole floor! If it cracks, don’t we just fall out?”

“Trust German bulletproof glass. This wide view wasn’t designed for spotting enemies — it was designed for seeing the target clearly and dropping bombs on it. It’s literally ‘the flying greenhouse.’”

“Oh, and this is the plane whose engine I shot out in Lesson 4, right?”

“Good memory. How that bomber pilot made it home afterward — you’ll find out firsthand in Lesson 15.”

◆ 2. You Don’t Fly Alone

I turned around to look behind me. There was a seat behind mine too, and above it a gunner’s position with a machine gun, and below, a gunner’s position where you lie down to shoot.

“Lots of seats, huh? Who sits in all of these?”

“Normally this plane carries five: pilot, bombardier, and gunners. But right now you have to be a one-woman band. Map a key for switching seats.”

“What? By myself? Fly, then run to the back and shoot, then come back and drop the bombs?”

“Bingo! That’s why a bomber pilot can’t just be a driver. You have to be the ‘Captain’ who runs the whole airplane.”

◆ 3. Not Enough Hands

I sat in the cockpit and studied the instrument panel. It was at least twice as complicated as the BF-109's. Every needle came in pairs.

"The bomber's biggest feature: it has two hearts. The left engine (No. 1) and the right engine (No. 2)."

Ray pointed to the cluster of levers on my left.

"So there are two throttle levers, two prop pitch levers, and two radiators."

I raised my left hand. I had to hold two levers at once with one hand.

"Wow... my fingers are going to cramp. What happens if these move separately?"

"Shove only the left one hard and the plane swerves right, doesn't it? On a twin, balancing the two engines (synchronizing them) is everything."

◆ 4. Epic Stereo Sound

"Let's start her up. Engine No. 1 (left) first!"

I flipped the switches in order and pressed the starter. On the left wing, a huge propeller went creak— creak— and then burst to life with a puff of black smoke. ▶①

Ku-gu-gu-gung—!

A deep, grand rumble filled my left ear until it went numb. The airframe shuddered to the left.

"Next, engine No. 2 (right)!"

This time the right. Ku-gu-gu-gung—!

Once both engines were running, the uneven shaking disappeared and a heavy, steady hum — woooong — filled the cockpit. It was a whole different league from a fighter's piercing roar, like two tour buses rolling along on either side of me.

"The sound is seriously epic. Like full-blast stereo?"

"Reassuring, isn't it? Two engines also means that if one quits, the other can get you home. Much better odds of survival."

◆ 5. Rudder Trim: How to Rest Your Feet

"One thing to learn before takeoff. Remember trim from Cessna Lesson 5?"

"The wheel that takes the strain off pulling the stick."

"Right. This one has trim for your feet too. Rudder trim. On a twin, if the two engines differ even a little, the nose slowly creeps to one side. Hold that off with your foot the whole time and your leg gives out first. So you turn the rudder trim toward the side your foot is pushing, and then the nose stays straight even when you take your foot off." ▶②

"Oh, a device for resting your feet. Wish I'd known about that in Lesson 1."

"The BF-109 doesn't have one. Which is why there's a theory that German fighter pilots had really thick feet..."

"Don't make things up."

"...Okay."

◆ 6. Lift That Heavy Rear

"Now, let's take off. She's packed with bombs, so she's really heavy. You'll need the runway from one end to the other."

I took a deep breath and gripped both throttle levers firmly together.

“Here we go! Full power!”

The engines swelled — woooOOOO — and the plane began to roll. It picked up speed slowly. As sluggish as a fully loaded truck climbing a hill.

“Patience! Don’t pull! Wait until you’re past 180 km/h!” ▶③

Just as the runway was almost gone, I eased the stick back.

Shhhhh...

There was none of a fighter’s snap as it leaps into the air, but it lifted off the ground heavy and graceful, like a huge cruise ship rising out of the water.

“Whoa... we’re up. She really is heavy. Feels like I’m driving the chairman’s limo.”

“Very good, Captain. Nose drifting a little to the left? One notch of rudder trim. Now take your feet off.”

I turned the trim wheel and lifted my feet. The nose kept going straight.

“Ooh... like riding a bike with no hands.”

“Let’s climb to cruising altitude and start the real ‘math lesson.’ Prepare to drop bombs.”

“Math...? Ugh, my head hurts already.”

✈️ **Lesson 12 at a Glance**

- 1 A twin has two engines. Throttles, prop pitch levers, and radiators all come in pairs, and balancing the two engines (synchronizing) is everything.
- 2 Start engine No. 1 (left) first, then engine No. 2 (right).
- 3 Rudder trim: turn it toward the side your foot is pushing so the nose stays straight with your feet off. It rests your feet when the two engines' power differs slightly.
- 4 A plane full of bombs is heavy. Use the whole runway, wait until you're past 180 km/h, then pull back slowly.

▶ **Videos · Lesson 12**

short clips

No.	Scene · when to watch	Code	QR
①	Twin-engine start order — No. 1, then No. 2 When starting two engines	2-033	
②	Resting your feet with rudder trim When the nose keeps turning to one side	2-034	
③	Heavy bomber takeoff — wait for 180 km/h When the runway is running out and you're still not flying	2-035	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

▶ **Kaya's channel · comments**

The floor is WIDE OPEN;; A German glass greenhouse that gives you a fear of heights (He 111 bomber first ride)

19K views · 640 likes

M

MetaPilot_Kaya Pinned

Guys... that glass floor is genuinely terrifying. On takeoff the runway streams by under your feet and my heart nearly stopped... and man - aging two engines is making me go cross-eyed. @@ Next episode is 'bomb aiming,' so I'm looking for someone who's good at math...

340 likes · 28 replies

H

HighAltitude_Vibes

Whoa... the He 111 cockpit view is insane. Fighters have that cramped-cockpit charm, but this is a real 'flying observation deck.' But when bullets start flying, there's nowhere to hide? lol

152 likes

S

Sim_Veteran_77

04:20 the left and right engines rumbling in stereo is ASMR-level. Listening with earbuds and my chest is pounding.

98 likes

K

Kaya_Fan_No1

Kaya lmaooo in the 109 she was screaming "too fast!" and now it's "too slow!" lmaooo

215 likes

B

Bomber_Harris

The joy of the bomber isn't flying, it's 'management.' Kaya, you're not a pilot anymore — you're an orchestra conductor. Of course, you also have to run off mid-conduct to fire the machine gun and drop the bombs... ^^

67 likes

M

Math_Hater

Next episode, math class preview... "speed × altitude / wind = bomb?" Can Kaya and her liberal-arts brain actually hit anything lol. Predicting she digs potatoes out of empty air.

104 likes

LESSON 13

The Math Class of Destruction

Level Bombing

◆ 1. Let Go of the Wheel

Altitude 3,000 meters. The plane settled into a steady track. Clouds drifted beneath my feet.

“Okay, five minutes to the target. Kaya, take your hands off the stick now.”

“What? Let go? Then who’s driving?”

“The autopilot. I’ve turned on the ‘automatic flight system (Autopilot).’ Now the plane will fly level on its own. You get up and crawl forward.” ▶①

I pressed the ‘switch seat’ key. The view changed in an instant. I wasn’t in the pilot’s seat anymore — I was lying flat on the glass floor at the very nose of the plane.

“Whoa... this is insane. It really feels like I’m floating in the air. I can see the whole world under my feet.”

“That’s the bombardier’s view. And you see that complicated-looking machine in front of you?”

In front of me sat a lump of metal that looked like a microscope crossed with a typewriter.

“That is the pinnacle of German engineering: the ‘Lotfe 7’ bomb - sight.”

◆ 2. This Is Not a Game

I peered into the machine. Through the lens the ground below was magnified, and it was covered in countless scales and dials.

“Don’t I just press the button when the target’s in the crosshair?”

“No. That’s an arcade game. Bombardier training is ‘math.’ If you drop a bomb right now, will it fall straight down?”

“Hmm... the plane is moving forward, so the bomb will travel forward as it falls, right? In a curve.”

“Exactly. So to ‘hit,’ we have to calculate. Airspeed, altitude, even wind strength — you have to put it all in to know where the bombs will land.”

I turned the dials and entered the numbers Ray called out.

“Altitude 3,000. Speed 350. Wind west at 10... there, input done. Now look through the lens.” ▶②

◆ 3. Syncing with the Machine (Synchronization)

When I looked through the lens, the target on the ground (a factory complex) was slowly moving.

“Now put the crosshair in the sight right on the target factory’s smokestack and press the ‘Sync’ button.”

When I pressed it, something amazing happened. The plane began making tiny movements on its own, holding the target dead center in the crosshair.

“Whoa! The machine bit onto the target! The aiming point is following it!”

“Now control of the plane has passed from the pilot to this ‘bomb - sight.’ The plane moves along the path the bombsight calculated.”

I swallowed hard. I wasn’t the one flying. I felt like a spare part, just waiting for the moment of destruction as this cold calculator told me to.

“Opening the bomb bay. Starting the countdown. Finger on the button.”

◆ 4. The Lightness of Two Tons

The crosshair in the sight crept slowly but surely toward the heart of the factory complex. There was none of the hot excitement of flying a fighter. Instead, a cold, clear tension hung in the air.

“Five seconds to release. 4, 3, 2, 1... Drop!”

I pressed the button. Clack, clack, clack!

Beneath my belly came the sound of heavy shackles releasing, one after another.

Whoosh—!

Suddenly the plane bounced upward.

“Huh?! What’s the plane doing? It’s jumping up!”

“Eight 250 kg bombs just left all at once. Two tons of weight gone, so the plane gets lighter and shoots up. Now, kill check. Fifteen seconds to impact.”

◆ 5. The Engineering of Destruction? No — Fear

I looked down through the glass floor. Tiny, faraway dots were falling in a line. A moment later, flashes lit up the factory complex on the ground.

...(silence)...

It was too far to hear anything. But I could see black clouds of smoke billowing up one after another like cotton balls, and the factory buildings shattering to pieces.

“Direct hit! Right on target. Kaya, your math’s pretty good!”

“Whoa... that’s huge.”

But I wasn’t entirely happy. All I did was press one button, and the world down there turned into hell. Fighting in a fighter had felt like a ‘duel’; bombing felt like one-sided ‘violence.’

“That’s bombing. Destruction made without emotion, purely from calculation and timing. How is it — feels a little strange, doesn’t it?”

“Yeah... it’s scary. It’s like I actually became some kind of god.”

“Don’t forget that feeling. That’s the ‘weight’ Instructor SeaGAL was talking about. Now, save the reflection for later and get back to the machine-gun position, fast! Enemy fighters have caught the scent and they’re swarming in!”

“What?! Oh, right! I’m all alone!”

Lesson 13 at a Glance

- 1 Bombing isn’t ‘put it in the crosshair and press the button’ — it’s ‘math.’ You have to enter airspeed, altitude, and wind into the bombsight to know where the bombs will land (this book’s training: altitude 3,000 m, speed 350 km/h).
- 2 Turn on the autopilot and change seats. Press the bombsight’s ‘Sync’ button and the plane flies the path the bombsight calculated, holding the target in the crosshair.
- 3 When eight bombs (two tons) leave at once, the plane bounces upward. Right after release, go back to the gunner’s position.

▶ Videos · Lesson 13			short clips
No.	Scene · when to watch	Code	QR
①	Engaging the autopilot and moving to the bombardier's seat When you don't know how to change seats	2-036	
②	Entering altitude, speed, and wind in the bombsight and syncing When the crosshair won't hold the target	2-037	
On a phone, tap the bold title . If the QR won't scan, enter the code at metapilots.kr/v .			

▶ Kaya's channel · comments

Came to play a game, left solving math problems... How to use a cutting-edge German bombsight
22K views · 750 likes

M

MetaPilot_Kaya Pinned
Guys... my hands were literally shaking then. (shaking) Terrified I'd botch the math and dig up potatoes in some random field. But the feeling of the bombs dropping and the plane going whoosh~ up... I'll never forget it. (But at the end, Ray, yelling at me to fly the plane right after complimenting me — for real?)
412 likes · 33 replies

M

Math_Hater_101
05:12 "Altitude 3,000 divided by speed... oh forget it!" we can all see Kaya's eyes shaking lmaooo. Thought I was watching an 'advanced calculus lecture,' not a flight sim.
230 likes

W

War_History_Fan
Whoa... pressing 'Sync' and the plane following the bombsight gave me chills. They had tech like that in the 1940s? German engineers definitely had aliens locked in the basement.
185 likes

P

Physics_Teacher

Drop two tons of bombs and the plane gets lighter... this kind of detail is why I'm trying bombers. "Two-ton crash diet: success" lol

324 likes

P

Peace_Keeper

One button turns the ground below into wasteland and up top you can't hear a thing. Something about that is eerie and scary. When Kaya said "it's scary" — me too.

112 likes

O

Overcooked_Pilot

That ending lmaooo the second the bombs drop: "Enemy fighters! Run to the gunner's seat!" Isn't this literally 'Home Alone'? Captain, navigator, bombardier, all by herself. Kaya: World's Toughest Job T_T

156 likes

LESSON 14

The Fear of Being Prey

Defensive Gunners

◆ 1. Six O'Clock, Bandits!

There was no time to savor the bombing. Suddenly Tutor Ray's urgent shout pierced my ears.

"Kaya! Six o'clock! Bandits on us! They're on our tail!"

"What?! Already? I haven't even made it to the front seat yet!"

“Keep the autopilot on and move to the rear gunner’s position! Hurry!”

I fumbled for the switch-seat key. In an instant my view jumped from the cockpit to the back of the plane. I went down a narrow, dark passage up to the dorsal gunner’s position on the plane’s back. ▶^①

“Here they come! If we can’t chase them off, we’re just ‘a woodpile in the sky!’”

◆ 2. The Open Roof (Dorsal Turret)

The moment I sat in the dorsal gunner’s position, a fierce roar of wind slammed my helmet. It wasn’t behind glass — it was just a wide-open turret.

“Aaah! Why is it so cold up here! I can’t hear anything over the wind!”

“See over there? Two dots! British Spitfires!”

Far behind us, between the clouds, two black dots were growing at a terrifying rate. I hadn’t realized it while flying the BF-109, but seen from this side, it really looked like the Grim Reaper charging at me.

Ta-ta-ta-tang!

Flashes sparkled on the enemy wings, and white tracer streaks went whsss— whsss— past the side of our plane.

“Aaaah! They’re shooting at me!”

“Of course they’re shooting! We just blew things up, so they’re furious. Shoot back! Pull the trigger!”

◆ 3. Spray the Hose

I swung the machine gun toward the enemy and pulled the trigger.

Du-du-du-du-du!

The gun spat fire, and spent casings flew past my face. But my bullets only trailed after the enemy's tail; none of them hit.

"Kaya! You'll never hit them that way! They're fast!"

"But I aimed! Why won't it hit!"

"The Lesson 4 garden hose! You have to shoot where the enemy is going — the space 'ahead' of it!"

"Oh, lead shooting! Got it!"

I swung the muzzle toward the empty air ahead of the enemy's path. The bullets arced out and sprayed across the sky. One fighter flew into the stream and hurriedly broke away.

◆ 4. He's Under Us! (Belly Gunner)

One enemy dodged my hail of bullets in a steep dive and vanished under our plane's belly.

"He's under us! That's the blind spot!"

"What do I do? I can't see him!"

"Move to the ventral gunner's position (Ventral Gondola)! Hurry! We have to protect the ship!"

I switched views again. This time I was lying flat on the floor of the plane. It was a cramped, capsule-like space with a glass floor. It felt like lying face-down on the edge of a cliff. ▶②

"Whoa... this place is seriously scary. The ground is right there under me!"

"Don't panic — find him! He's going to come up from below!"

Just then I saw the enemy fighter shooting straight up from below, going for our belly. I could even make out its propeller spinning.

◆ 5. Driven Off

“There he is! You bad(?) guy, go away!”

Screaming, I sprayed the machine gun straight at his nose. Shooting lying down, I felt the recoil through my whole body.

Tu-du-du-du-du-du!

My bullets hammered the enemy’s engine cowling. Black smoke burst out.

“Hit! I got his engine!”

Trailing smoke, the fighter lost power, wobbled, and dropped away below the clouds. Seeing things turn against it, the other one turned tail and fled.

“Haah... he’s gone. He ran away.”

“Well done, Gunner Kaya. You just saved our ship’s life.”

The tension drained out of me and I sprawled on my seat (no, the floor). Flying was hard enough, and now I had to go to the back and shoot too. Bomber pilot training really was the world’s toughest job.

“No time to rest. Back to the cockpit! We’ve got to get home!”

“Oh, right. I’m the pilot...”

✈ Lesson 14 at a Glance

- ① Bombers have weak defenses. When an enemy fighter gets on your six, keep the autopilot on and move to the rear dorsal gunner's position to fire back.
- ② Lead shooting is the basic rule in the gunner's seat too. Shoot at the space ahead of where the enemy is going.
- ③ If an enemy gets into the blind spot under the belly, move to the ventral gunner's position to respond. Once you've driven it off, go straight back to the cockpit.

▶ Videos · Lesson 14

short clips

No.	Scene · when to watch	Code	QR
①	Moving to the dorsal gunner's position and lead shooting When something is on your tail	2-038	
②	The ventral gunner — the blind spot under the belly When a bandit slips underneath	2-039	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

▶ Kaya's channel · comments

※Not for the faint of heart※ What to do when a fighter is on your tail (He 111 rear gunner experience)

26K views · 880 likes

M

MetaPilot_Kaya Pinned

Whoa... that had me sweating. Cockpit → dorsal gunner → belly gunner... bouncing back and forth nearly made me motion sick. Especially lying under the belly shooting — I really thought I was falling and my legs were shaking... Total respect to bomber crews.

512 likes · 45 replies

G

Gunner_Life

03:15 Kaya, at first you were literally spraying like a garden hose? lol nearly ran out of ammo.

289 likes

S

Spitfire_Ace

From a Spitfire's point of view, the He 111 is an all-you-can-eat buffet... but when someone fights back as stubbornly as Kaya, it's a real pain. Especially the belly gun — you dive in thinking it's a blind spot and get the tables turned on you.

176 likes

C

Claustrophobia

The belly gunner position... just looking at it gives me claustrophobia. Lying in a tiny capsule staring straight down... if I made eye contact with an enemy fighter from there I'd have a heart attack.

320 likes

M

Multi_Task_King

It's only this chaotic because she's playing solo lmaooo. If it were real, there'd be friends yelling "Hey! Behind us! BEHIND US!" and total mayhem. Recruiting a crew later would be so much fun!

412 likes

MetaPilot_Kaya Oh? Now accepting crew applications. No insurance provided, though ^^

L

Landing_Gear

So, enemies chased off, time to go home? But... I think you got hit by that fighter earlier?

155 likes

LESSON 15

Walking on One Leg

Single-Engine Flight

◆ 1. Ominous Smoke

“Phew... I can finally breathe.”

I crawled out of the gunner’s position and sat back down in the cockpit. Thanks to the autopilot the plane was holding level, but something didn’t feel right.

“Ray, there’s been a weird noise from the left for a while now...”

“Check your gauges! Engine No. 1 (left) oil pressure and temperature are abnormal!”

I turned to look at the left wing. Behind the propeller that had been spinning so strongly, black smoke was coughing out in puffs. The damage from the enemy rounds was finally catching up with us.

Pa-pung! Pfrrr...

With a dull bang, the left engine hacked roughly, lost power, and started to die.

“That engine I shot out in Lesson 4... so this is what it felt like.”

◆ 2. The Crazy Merry-Go-Round

“The engine’s quitting! Kaya, hold the stick tight! The plane is going to turn!”

“What? What do you mean, turn?”

Before he even finished, the plane lurched wildly to the left.

“Aaah! What’s happening! The plane is swerving on its own!”

“The right engine is alive and pushing, but the left engine is dead! You’re spinning like a boat rowed with one oar! Kick the opposite rudder, quick! Right foot!” ▶①

On instinct I stomped the right pedal as hard as I could.

“It’s no good! It’s too strong! My foot’s getting pushed back!”

“Harder! Push with everything you’ve got! Otherwise we flip over and crash!”

I sank my rear into the seat, put my weight on my right leg, and crushed the pedal. The spring Tita had cranked tight pushed back with all its might. My ankle hurt like it was about to snap, like pulling a taut rubber band. Finally the nose came back to center.

“Rudder trim! Lesson 12! Turn it toward the side your foot is pushing!”

I turned the trim wheel all the way to the right. The force on my foot dropped by about half. About half.

◆ 3. Put the Dead Engine to Sleep (Feathering)

“Now we have to deal with the dead engine. Right now the left propeller is windmilling like a pinwheel and creating drag. It’s like dragging a wheel with the brake on.”

“Then what do I do? I can’t exactly rip it off!”

“‘Feather’ it! You turn the propeller blades edge-on so the wind just slips past them.”

Following Ray’s instructions, I pulled engine No. 1’s pitch lever back to the feather position and shut the fuel valve. The wind - milling left propeller turned its blades edge-on — chak — and came to a complete stop. ▶②

Shhhhh...

Like magic, the drag dropped, and the load on my right leg eased a little more.

“Phew... better now, right? That’s what we call making the engine ‘light as a feather.’”

◆ 4. Riding a Unicycle

One engine had stopped, and only the other one hummed — wooong — straining to drag the plane along. Even with the trim cranked, I had to keep flying with my foot on the right rudder.

“Ray, this is really hard. My leg’s about to cramp. How long do I have to keep pushing?”

“Until you land and stop. Right now, Kaya, you’re riding a unicycle. Lose your balance and you go straight over.”

I could see the runway far ahead. Normally I’d have been glad to see it, but now it was something to dread.

“Listen carefully. On the approach, never turn ‘left’ (toward the dead engine). Bank toward the side with no power and the plane just flips over and spears into the ground. Always make a wide turn toward the live engine.”

◆ 5. The Limping Homecoming

The runway drew closer. When I cut the speed, the plane shook even harder. Breaking out in a cold sweat, I balanced the power of the live right engine against the strength of my right foot.

‘Please... please hold on...’

The runway surface was right under my nose. The left wing tried to sag limply, and I barely held it up with the stick. ▶③

Thud! Screech—

The plane slewed left and hit the ground hard. Alternating brakes and rudder until we stopped, I brought the staggering plane to a halt in the middle of the runway.

“Stopped! Engine cut!”

When I shut down the right engine too, a heavy silence fell over the cockpit. My right leg was shaking so much I couldn’t feel it.

“You did it, Captain Kaya. You made it home alive on a shot-up wing and one engine.”

“Phew... I did a whole leg day today. I don’t think I’ll be able to walk tomorrow.”

I looked down through the glass floor at the stopped left propeller. The scorched black engine cowling was proof of the fight I’d been through. That bomber pilot whose engine I shot out in Lesson 4 — did he get home like this too?

✈️ **Lesson 15 at a Glance**

- 1 When one engine stops, the live engine swings the plane around (asymmetric thrust). Stomp the rudder opposite the dead engine with everything you've got to straighten the nose, then turn the rudder trim that way to take the load off your foot.
- 2 Feathering: turn the stopped engine's propeller blades edge-on to cut drag. Pitch lever to the feather position, fuel valve shut.
- 3 On the approach, don't turn toward the dead engine. Make a wide turn toward the live engine. Don't let go of the rudder until you've landed and stopped.

▶ **Videos · Lesson 15**

short clips

No.	Scene · when to watch	Code	QR
①	Engine failure — opposite rudder and rudder trim When the plane yanks to one side	2-040	
②	Feathering — prop pitch lever and fuel valve When a dead propeller keeps windmilling	2-041	
③	Single-engine landing — wide turns toward the live engine When landing on one engine	2-042	

On a phone, tap the **bold title**. If the QR won't scan, enter the code at metapilots.kr/v.

▶ **Kaya's channel · comments**

My leg cramped... Emergency landing on one engine (He 111 Single Engine Landing)

34K views · 1.2K likes

M

MetaPilot_Kaya Pinned

I seriously thought I was doing leg presses at the gym... Tita, the rudder pedal springs are way too strong T_T When one engine quits the plane really won't listen. But I made it home alive, so I'm proud! (Not proud of the repair bill)

620 likes · 52 replies

R

Real_Pilot_Kim

Whoa... you really went through an asymmetric thrust situation. It's the training real pilots sweat the most over in simulators. "Don't turn toward the dead engine (Dead engine turn is deadly)" is a golden rule in aviation.

345 likes

G

Gym_Rat

04:12 we can all see Kaya's right leg shaking lmaooo

210 likes

F

Feather_Touch

Great explanation of feathering! Turning the prop blades edge-on like a folding fan to cut wind resistance... makes total sense. Without that she'd never have reached the runway.

134 likes

R

Repair_Bill_Bot

[Automatic Estimate System] Today's damage: left engine totaled / left wing structure damaged / landing gear tires worn. Total estimate: write-off. Might we suggest buying a new plane...

892 likes

T

TITAN_PCbang

The spring is fine. The foot is not. —T

2,100 likes

PART THREE EVALUATION

Two Captains

Operation Two Captains

■ Part Three evaluation plan · Two-crew bombing	
Aircraft	He 111 × 1
Crew	Kaya (pilot · captain) · Ray (bombardier and gunner)
Target	Bomb an enemy railway bridge (level bombing, altitude 3,000 m)
Threats	2 enemy interceptors, flak
Route	Takeoff → cruise → bombing → defensive fire → return → landing
Required · Hit (50 pts)	Railway bridge destroyed
Required · Survival (30 pts)	Runway landing
Teamwork (20 pts)	Radio calls and role changes must never break down. Judge: Instructor SeaGAL

◆ 1. Crew Application

“Kaya, did you see the comments? You said you were accepting crew applications.”

“What? That was a joke.”

“I’m applying. Bombardier and gunner. No insurance needed.”

I stared blankly at Ray on the screen. It meant he’d be in the same plane — not as a tutor, but as crew.

“But Ray... what about your motion sickness?”

“The gunner’s seat is the worst. So, this.”

Ray held up a small electric fan from off-screen. I held up my fan too. We laughed.

“Today I don’t give the orders. When the captain calls, I answer. One radio rule: we call each other by callsign.”

“My callsign... I don’t have one.”

“Then today you’re ‘Captain.’ And I’m...”

“Ray.”

I said it first. Ray was silent for a moment.

“...Yes. Ray.”

◆ 2. Two Hearts, Two People

“Engine one start. Engine two start. One notch of rudder trim. Captain, taking off.”

“Ray, move to the bombardier’s seat. Check the bombsight.”

“Bombsight good. Captain, wind west at 12. Want me to call out the numbers?”

“No. I’ll enter them. Ray, you watch out the window. Six o’clock.”

“...Copy.”

Altitude 3,000 m. The railway bridge came into view. I switched on the autopilot and crawled to the front. Ray made room for me and called the numbers. I turned the dials. Sync. The crosshair bit onto the bridge's center pier.

"Bomb bay open. Five seconds to release."

"Captain, six o'clock! Two bandits!"

"Drop!"

Clack, clack. The plane bounced up. I crawled back to the cockpit, and Ray scrambled up to the dorsal gunner's position.

◆ 3. Callsign

Du-du-du-du!

"Ray, lead! Ahead of him!"

"I know! I mean — copy!"

Ray's machine gun watered the empty air, and one fighter flew right into it. Black smoke. The other one swung under our belly.

"Ray, belly!"

"Moving! Captain, turn on my fan!"

"That's on your desk!"

Tu-du-du-du! The fighter turned tail and fled.

[TARGET DESTROYED: Railway bridge center pier]

"Hit. Ray, come back."

"...Captain. What you just said — would you call it one more time?"

"Call what?"

"Never mind. Returning to base."

◆ 4. Home, and Then

The landing was quiet. Both engines were alive. Rudder, stop, engines off. Silence settled over the cockpit. This time I wasn't alone.

[Evaluation result: Bridge destroyed (50 pts) · Landing (30 pts) · Teamwork (20 pts) · Total 100 pts · Pass]

A message from Instructor SeaGAL.

"A captain is not the one who gives orders, but the one who calls. When called, you answer; when answered, you trust. Today the two of you did that. Season 2 graduation approved."

Ray's voice came over the voice channel. It was a little hoarse.

"Kaya. It's not the real sky, but... today, someone called me by my callsign for the first time."

"You asked me to call you that."

"I did. But it was the first time I've ever been called."

I didn't say anything. Instead I thought of the spot on my desk where the napkin drawing used to be. Ray had taken it with him.

► Kaya's channel · comments

Ray got in my plane (Part Three Evaluation

two-crew bombing full video) · 58K views · 2.4K likes

M

Multi_Task_King

So THIS was the crew recruitment I suggested lol. "Turn on my fan!"

"That's on your desk!" I lost it right there.

1,300 likes

B

BoraBora_No1

Chills when she said “Ray, lead!” That’s the same voice that called us in Part One.

540 likes

S

Spitfire_Ace

Gunner Ray’s lead shooting is clean. If he weren’t a tutor he’d have made ace.

420 likes

P

Peace_Keeper

That last line, “it was the first time I’ve ever been called”... why does this channel keep making people cry.

980 likes

T

TITAN_PCbang

Quiet landing. Pedal springs earned their keep. —T

1,100 likes

Phase 3 · He 111 Training Complete

EPILOGUE

The Napkin Medal, into a Frame

EPILOGUE · License to Kill

◆ 1. The TITAN PC Café, the Springs

The day after graduation, I carried my rudder pedals to the TITAN PC café. Behind the counter, Tita had a screwdriver clamped in her mouth and was taking apart a computer tower.

“It’s the pedal springs. My leg cramped in Lesson 15.”

“Saw the comments. I wrote that the foot was the problem.”

“...That was you, Tita?”

Instead of answering, Tita took the pedals, flipped them over, and moved both springs to the next looser notch. Thirty seconds.

“Fighters are flown with your feet, so I set them stiff. Your feet get it now, so we loosen them a notch. You’ll need them tightened again for Book 3.”

“Book 3?”

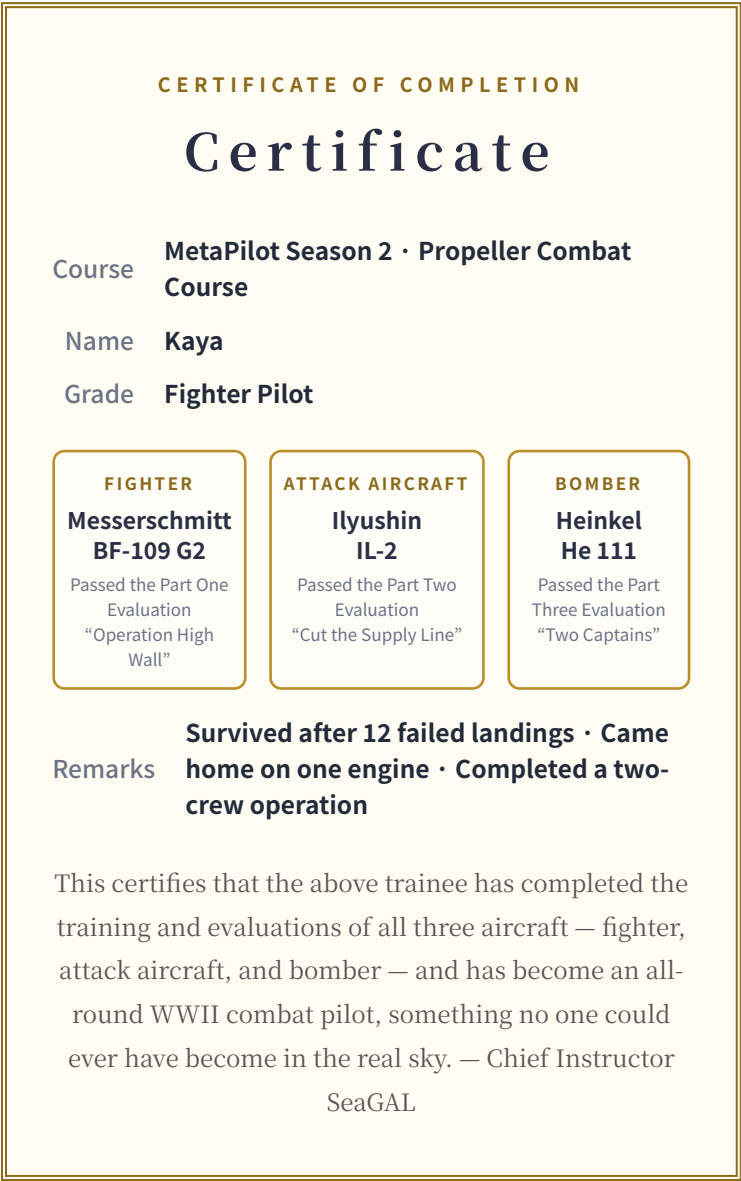
“Instructor SeaGAL asked me to fix up the F-16 cockpit. The one behind the steel door.”

Tita stuck her head back into the tower. And from inside the case, her voice floated up.

“The pedals — maybe build your own next time. I’ve got the drawings.”

◆ 2. The Medal: The Weight of the Iron Cross

When I got home, there was an email from the Academy. A shiny badge with a metallic sheen popped up on the screen.



It came with a message from Instructor SeaGAL.

“If the Cessna certificate was a ‘passport for travel,’ the certificate you just received is a ‘license to experience the history of war (License to Kill).’ You now have the right to save someone in the skies of the past, and to experience the pain someone else went through there. Don’t forget the weight you felt in Lesson 13.”

I printed the certificate, with its rugged Iron Cross emblem, and put it in a frame. When I hung it next to my Cessna certificate, two skies hung side by side on the gray wall. One blue, one ash-gray.

◆ 3. Something Tasty

“As promised.”

The place Ray took me wasn’t a pub but a small restaurant with wide windows. It wasn’t raining; outside, the first snow was falling. “Congratulations on graduating, Kaya. There’s so much to complement this season, I can’t decide where to start.”

“Then just one.”

“...Lesson 15. Your foot moved before I told you to turn the trim. I didn’t teach you that — you learned it.”

I took a frame out of my bag. It wasn’t the napkin. It was the picture redrawn on my tablet. A fighter soaring above the clouds, pilot Ray grinning with his mask off. Beside it, flying alongside, flight attendant Kaya at the window of an airliner. This time it was in color. Blue and sunset orange.

“Napkins tear. This won’t.”

Ray held the frame for a long time. Then he looked at the snow outside.

“You can’t change the past. The ‘unfit’ stamp is still there.”

“Yeah.”

“But the future... I think it changed today. Because someone called me.”

I remembered what I'd muttered to myself in the Prologue. If you change the past, does the future change too? Wrong. You can leave the past as it is, and the future still changes. If someone calls you.

“Ray. You'll teach me in Book 3 too, right?”

“Book 3, Instructor SeaGAL's teaching himself. Me... I'll watch over you by radio from up in the sky. There's a seat called the early-warning aircraft — it flies really high and sees everything.”

“What about your motion sickness?”

“I've got two fans ready.”

◆ 4. On to the Next Hangar

I got home and turned on my computer. The channel had 2,140 subscribers. One was my mom, one was Ray, three were my Bora Bora classmates, and one was ‘TITAN_PCbang.’ The other 2,134 were strangers. Strangers had laughed at my kangaroo landings and cried at my one-engine landing.

A new notification was up on the Academy screen.

[Season 3 · The Instructor enrollment notice — Aircraft: F-16C. Instructor: Chief Instructor SeaGAL. Bring: English, a thick manual, and a neck that can take 9 G.]

“English? A manual? 9 G?”

I stroked the grip of my pink wild horse. The propellers were done. Next: jets.

“Okay. Let's go. With the gruff instructor this time.”

Outside my window the snow was piling up. It was the last night of the year.

Season 2 · The Tutor — The End

► Kaya's channel · comments

I graduated Season 2 — the romance and pain of propellers (final tally feat. Repair_Bill_Bot)

61K views · 2.7K likes

M

MetaPilot_Kaya Pinned

Guys, Season 2 is over. Twelve kangaroo landings, two trucks missed, home on one engine. And one crew member. Next is Season 3 — the F-16, apparently. Off to study English. (Likes and subs are love)

880 likes · 120 replies

R

Repair_Bill_Bot

[Automatic Estimate System] Season 2 final tally: Part One 50,000 Reichsmarks · Part Two 0 rubles · Part Three one He 111 (written off). Total: incalculable. Instead of an invoice, congratulations on graduating. (A system first)

3,400 likes

W

WW2_Romance

Fighter (BF-109), attack aircraft (IL-2), bomber (He 111)... you've tasted all the romance and pain of the propeller era. Now the roar of jets is waiting in Season 3, right?

178 likes

F

Flying_Potato

Been watching since the Cessna days when you had 3 subscribers. Congrats on 2,000. It felt like marrying off my daughter, and now it feels like I've gained a son-in-law too...

560 likes

B

BoraBora_No4

Let's fly Book 3 together too, Flight Leader. This time I won't bail out.

410 likes

R

Ray [Official Tutor]

See you up in the sky. Two fans.

2,900 likes

APPENDIX A

The Aircraft at a Glance

A side-by-side look at the three aircraft trained in Season 2.

Aircraft	Key features	Watch out for
BF-109 G2 Fighter · “the wild horse of the sky”	1,475 hp engine, slats that pop out in hard turns, War Emergency Power (WEP), guns concentrated in the nose, no mixture lever (automatic)	A taildragger, so you can’t see ahead on the ground. Torque on takeoff (right foot), bounces and ground loops on landing because of the narrow gear, stalls and spins without warning at low speed
IL-2 Sturmovik Attack aircraft · “the Steel Bathtub,” “the flying tank”	Steel armor wrapped from the engine to the cockpit, 23mm cannons, unguided rockets, and the toughness to come home full of holes	Manual command of RPM, throttle, and mixture (Prop Up, Throttle Down), radiator shutter, torque the other way (left foot), obstacles at treetop height
He 111 Bomber · “the Flying Green house”	Twin engines, fully glazed nose cockpit, Lotfe 7 bombsight, dorsal and ventral gunner positions, rudder trim	Keeping the two engines in balance (synchronized), asymmetric thrust and feathering when one engine quits, one person doing the jobs of pilot, bombardier, and gunner

APPENDIX B

Key Numbers for the Three Aircraft

Only the numbers and sequences Ray teaches in the story. These are simulation-training references, set for this book's training course and separate from the operating limits of real aircraft. Check the videos for the detailed moves.

Item	This book's training standard
BF-109 takeoff	Tailwheel lock → throttle slowly + right rudder → tail comes up at about 150 km/h → gentle pull at about 170 km/h
BF-109 WEP	Under one minute only. Ease off before the coolant and oil gauges reach the red
BF-109 landing	Tailwheel lock → gear and flaps below 250 km/h → approach about 200 km/h → flare watching the left window → go around on the second bounce → rudder until you stop
Spin recovery (BF-109)	Stick centered, throttle back, rudder opposite the rotation → once speed builds, pull gently back to level

Item	This book's training standard
Ground attack rules	Dive angle under 30°, speed under 450 km/h, cease fire and break away at 300 m
Formation flight	Fine-tune spacing with the throttle. 10 m from wingtip to wingtip. Your wingman watches your six
Boom & Zoom	Split-S from 4,000 m → 600–650 km/h → fire once and keep climbing → back to 4,000 m
IL-2 engine	Power up: Prop Up (RPM first → throttle); power down: Throttle Down (throttle first → RPM). Mixture full on the ground and for takeoff. Open the radiator shutter before takeoff
IL-2 takeoff & landing	Torque: left foot. Landing: gear, flaps, and lock below 250 km/h, approach about 200 km/h, a little throttle left on, three-point touchdown
23mm cannon	Short bursts of two or three rounds. The recoil lifts the nose
Low-level penetration	Altitude 10–30 m. Look where you'll be in three seconds. Navigate by rivers, rail - ways, and chimneys
He 111 start & takeoff	No. 1 (left) → No. 2 (right). Wait for 180 km/h, then pull gently. If the nose swings, one notch of rudder trim

Item	This book's training standard
Level bombing	Altitude 3,000 m, speed 350 km/h, enter the wind → sync → release. $250 \text{ kg} \times 8 = 2 \text{ tons}$
One engine out	Full opposite rudder + rudder trim → feather (prop pitch lever to feather, fuel valve closed) → wide turns toward the live engine to land

APPENDIX C

Kaya's One-Line Lessons

The lessons Kaya learned the hard way, one per training session. Read them once before each flight.

Lesson learned	In one line	Source
Fighters are flown with the feet	Propeller torque tries to swing the plane left, so push the throttle slowly and correct with right rudder.	Lesson 1
Kangaroos go around before the third hop	Go around on the second bounce. The third one is a repair bill.	Lesson 3
It ain't over till it's over	Don't let go of the rudder until you've stopped — until the engine is off and you climb out.	Lesson 3
Shoot at the enemy's future	Aim where a moving enemy is going to be (lead). Don't chase — cut across the inside of the circle.	Lessons 4–5
Lose your speed, lose your wings	The moment you bleed off speed chasing a bandit, you become the target. Always keep an eye on the airspeed.	Lesson 5

Lesson learned	In one line	Source
The ground is not a bed	Drop the “just a little closer, just one more shot.” At the set altitude (300 m), stop firing and break away.	Lesson 6
United we stand, divided we fall	Your wingman watches the blind spot at your six. Fine-tune the spacing with the throttle.	Lesson 7
The courage not to look back	While the decoys buy time, the interceptors climb high and hit and run (Boom & Zoom). Trust your teammates.	Part One Evaluation
Prop Up, Throttle Down	Power up: RPM first, then throttle. Power down: throttle first, then RPM.	Lesson 8
Rivers don’t break down	No radio beacon? Find your way by rivers, railways, and chimneys (piloting).	Lesson 10
Never turn into the dead engine	When one engine quits, stand on the opposite rudder, feather, and make wide turns toward the live engine.	Lesson 15
A captain is the one who calls	When called, answer. When answered, trust.	Part Three Evaluation

APPENDIX D

Glossary · App Guide

In alphabetical order.

Air Start

A training mode that starts the flight directly in the air, without a takeoff.

Asymmetric thrust

The force that swings the plane toward the dead engine when only one engine is producing power.

ATA

A boost-pressure gauge reading in atmospheres. Push the throttle all the way and the needle shoots up.

Autopilot

An automatic flight system. Leave level flight to it and the pilot can change seats.

Blackout

Vision going dark under heavy G.

Boom & Zoom

A tactic of diving from altitude to strike (boom) and using that speed to climb away (zoom).

Break away

Stopping the attack at a set safe altitude and getting out.

Echelon

A diagonal formation stepped back from the leader like a staircase.

Engine balance (synchronizing)

Matching the power and condition of the left and right engines on a twin.

Feathering

Turning the blades of a stopped engine's propeller edge-on to the airflow to reduce drag.

Go-around

Abandoning a landing partway, climbing again, and coming around for another try. Book 1, Lesson 7.

Ground loop

An accident where, after touchdown and as speed drops, the pilot lets go of the rudder and the plane spins on the ground like a top.

Kneeboard

A small board strapped to your thigh, holding paper maps and notes.

Lead shooting / lead pursuit

Firing at the point a moving enemy is heading for — or the maneuver of cutting across the inside of the enemy's turning circle to get ahead.

Lotfe 7

The He 111's bombsight. Enter speed, altitude, and wind, and it calculates where the bombs will fall.

Low-level penetration

Flying as low as possible, almost brushing the treetops, to avoid enemy flak.

Magneto

The engine's ignition system. The magneto switch turns the engine on and off.

Mixture

A lever that sets the ratio of fuel to air going into the engine. The BF-109 doesn't have one; the IL-2 does.

Pilotage

Navigating by reading the patterns of the land, such as rivers, roads, and railways. Book 1, Lesson 8.

Power cut

Pulling the throttle all the way back to cut the power.

Prop pitch (RPM lever)

The lever that sets the propeller blade angle. Light blades mean high RPM; heavy blades mean low RPM.

Prop Up, Throttle Down

The IL-2 engine order. Power up: prop (RPM) first, then throttle. Power down: throttle first, then RPM.

Radiator shutter

A handle that opens and closes the airflow through the engine's radiator. Open it wide when using a lot of power.

Rudder trim

A device you turn toward the foot that's pressing, so the nose stays straight even when you lift your foot.

Schwarm

A four-ship formation of the German air force.

Slat

An automatic device that pops out of the wing's leading edge in hard turns, grabbing the airflow to prevent a stall.

Spin

A stalled aircraft falling while rotating round and round. Recover with the stick centered and opposite rudder.

Split-S

A maneuver that rolls the aircraft inverted and pulls into a steep dive.

Sync

A bombsight function that steers the aircraft itself so the crosshair stays on the target.

Taildragger

An aircraft with a tailwheel instead of a nosewheel. On the ground the nose sits high and you can't see straight ahead.

Tailwheel lock

A device that locks the tailwheel so it doesn't swing side to side during takeoff and landing.

Target fixation

Focusing on a target so hard that you lose your sense of distance and fly into the ground.

Torque

When the propeller spins one way, the reaction tries to turn the aircraft the other way.

Twin-engine aircraft

An airplane with two engines. If one quits, you can still get home on the other.

V formation (Vic)

A V-shaped formation with one aircraft on each side of the leader.

Waypoint

A point marked along the flight route.

WEP (War Emergency Power)

A power setting that squeezes out every last bit of power for a short time at the cost of engine life.

◆ App guide

An aircraft's numbers and flying principles are the same in any app, so the text uses no app names. All three aircraft in this book (BF-109 G2 · IL-2 · He 111) can be flown in a single app; the three criteria for choosing an app and example apps as of October 2026 are in **Appendix D of Book 1, The Guide**. For mapping the stick and rudder pedal keys, see the Prologue videos.

APPENDIX E

Video Index

Every scene video in one place. Each video is a short, looping clip showing a single control move. On a phone, tap the title; if a QR won't scan, enter the code at metapilots.kr/v. Scenes not yet made show as “coming soon,” and the addresses never change — check back later.

Where	Scene	Code	QR
Prologue ①	Fitting the fighter stick module and placing the rudder pedals When setting up the gear for the first time	2-001	
Prologue ②	Mapping the stick and rudder keys in a fighter app When you press a button and nothing happens	2-002	
Lesson 1 ①	Tailwheel lock and zigzag taxiing When you panic because you can't see the runway	2-003	

Where	Scene	Code	QR
Lesson 1 ②	Throttle slowly, keep it straight with right rudder When the plane swings left on takeoff	2-004	
Lesson 1 ③	The tail comes up and you lift off When you don't know when to pull	2-005	
Lesson 2 ①	Starting a flight with an Air Start When you want to practice in the sky without taking off	2-006	
Lesson 2 ②	Reading the coolant and oil temperature gauges When you're worried the engine will blow	2-007	
Lesson 2 ③	Hard turns and slat deployment When the wing goes "thunk"	2-008	
Lesson 2 ④	WEP (War Emergency Power) and the one-minute rule When you don't know how long you can run full throttle	2-009	

Where	Scene	Code	QR
Lesson 3 ①	Before landing: lock, speed, gear, flaps When the landing prep order is confusing	2-010	
Lesson 3 ②	Flaring while watching the runway through the left window When the nose hides the runway	2-011	
Lesson 3 ③	If you bounce, go around When a kangaroo landing has begun	2-012	
Lesson 3 ④	Rudder until you stop — preventing a ground loop When the plane tries to spin after touchdown	2-013	
Lesson 4 ①	Lead shooting — shooting at the enemy's future When you aim but keep missing	2-014	
Lesson 4 ②	Judging firing range with the gunsight ring When you don't know when to fire	2-015	

Where	Scene	Code	QR
Lesson 5 ①	Low-speed stall and spin recovery When the plane starts spinning without warning	2-016	
Lesson 5 ②	Lead pursuit — cut - ting across the inside of the circle When you can't catch a fast bandit	2-017	
Lesson 6 ①	Dive strafing and the 300 m break-away When you feel sucked toward the ground	2-018	
Lesson 6 ②	Hit and run When you want to check your results	2-019	
Lesson 7 ①	Holding position with the throttle When you keep sliding back and forth behind the lead	2-020	
Lesson 7 ②	From echelon to V formation When you don't know where to go during a formation change	2-021	
Part One Evaluation ①	The Split-S dive When diving on bombers from high above	2-022	

Where	Scene	Code	QR
Part One Evaluation ②	Boom & Zoom — strike, then climb away When you linger in the fight and get someone on your tail	2-023	
Lesson 8 ①	Prop Up, Throttle Down — the RPM and throttle order When a manual engine is new to you	2-024	
Lesson 8 ②	Opening the radiator shutter When the temperature gauge shoots up	2-025	
Lesson 8 ③	IL-2 takeoff — left rudder When the Russian torque goes the other way	2-026	
Lesson 9 ①	Firing the 23mm cannon in short bursts When the recoil lifts the nose	2-027	
Lesson 9 ②	Rocket salvo When firing rockets by the gunsight marks	2-028	
Lesson 10 ①	Low-level penetration When flying low to dodge the flak	2-029	

Where	Scene	Code	QR
Lesson 10 ②	Finding your way with a paper map — rivers, railways, bridges When you get lost fly - ing low	2-030	
Lesson 11 ①	Checking the instru - ments after taking hits When you hear tin-can noises	2-031	
Lesson 11 ②	IL-2 landing — settling onto three wheels When putting a heavy plane down	2-032	
Lesson 12 ①	Twin-engine start or - der — No. 1, then No. 2 When starting two en - gines	2-033	
Lesson 12 ②	Resting your feet with rudder trim When the nose keeps turning to one side	2-034	
Lesson 12 ③	Heavy bomber takeoff — wait for 180 km/h When the runway is running out and you're still not flying	2-035	

Where	Scene	Code	QR
Lesson 13 ①	Engaging the autopilot and moving to the bombardier's seat When you don't know how to change seats	2-036	
Lesson 13 ②	Entering altitude, speed, and wind in the bombsight and syncing When the crosshair won't hold the target	2-037	
Lesson 14 ①	Moving to the dorsal gunner's position and lead shooting When something is on your tail	2-038	
Lesson 14 ②	The ventral gunner — the blind spot under the belly When a bandit slips underneath	2-039	
Lesson 15 ①	Engine failure — opposite rudder and rudder trim When the plane yanks to one side	2-040	
Lesson 15 ②	Feathering — prop pitch lever and fuel valve When a dead propeller keeps windmilling	2-041	

Where	Scene	Code	QR
Lesson 15 ③	Single-engine landing — wide turns toward the live engine When landing on one engine	2-042	

NEXT SEASON · BOOK 3

MetaPilot 3: The Instructor The Roar of the Jet

Kaya has tasted both the romance
and the pain of the propeller age.

In the next sky, Chief Instructor **SeaGAL**
and the **F-16C** are waiting.

Bring: English, a thick manual,
and a neck that can take 9 G.



“Takeoff is optional. Landing is survival.”

From a blue sky to an ash-gray one.

Kaya, the illustrator who graduated from the Cessna,
walks into the sky of a battlefield on her own two feet.

Spinning like a top from torque, kangaroo landings, watering thin air,
a manual engine and a twin-engine bomber — and two captains.
Laugh your way through, and the principles of propeller fighters come
into view.

Read it like a story. Follow it like a manual.

BF-109 fighter

IL-2 attack aircraft

He 111 bomber