Microsoft/Asobo/ATSimulations
Antonov An-2
User Guide
Version 2

THIS USER GUIDE IS INTENDED SOLELY FOR MICROSOFT FLIGHT SIMULATOR

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INTRODUCTION

Welcome to the Antonov An-2 User Guide! ATSimulations, in cooperation with Microsoft and Asobo, is happy to present the updated version of the Antonov An-2!

The An-2 is one of aviation's most distinctive aircraft, both visually and in its place in history. It was conceived and designed to meet a Soviet Ministry of Forestry request for a utility aircraft. The result was one of the most widely-used airplanes in aviation history. Due to its robust and highly-survivable design, adaptability, positive and responsive control at slow speeds, power, and load carrying ability, it was adopted for more than forty uses, from agriculture to military purposes. Over 18,000 An-2s were manufactured over the course of its 45-year production run. The aircraft has operated in dozens of countries for a broad spectrum of uses, from airline transport to military roles. Its ability to fly low and slow, while maintaining full pilot control, helped earn it the status of aviation legend.

This package comprises several An-2 iterations based on landing gear configuration: wheels, skis, and floats. These virtual renditions replicate all of the An-2's features in exquisite detail, including exteriors and interiors (with high-definition textures), photorealistic and fully-functional cockpits, true-to-life audio, and realistic flight dynamics. We worked closely with actual An-2 pilots in creating these renditions to provide the most realistic experience for flight simulator users. Enjoy your An-2 cockpit time!

We recommend that you invest time into learning about the An-2 and its unique flight dynamics by reading this user guide before jumping into its cockpit and lifting into the sky. Even if you are an experienced real-world pilot or an advanced Microsoft Flight Simulator user, you'll find certain concepts contained in this guide to be invaluable for your An-2 experience.

The following sections provide information about operating the Antonov An-2, historical facts about the airframe, flight configurations, a performance guide, and pre-flight and post-flight checklists.

Have fun!

SYSTEM REQUIREMENTS

- Microsoft Flight Simulator 2020
- Available hard drive space: 3 GB
- Other: mouse, joystick, sound card, speakers/headphones, TrackIR

FEATURES

3D Models

- Accurate exterior and interior models created with 3D scan technology
- 4k textures with specular, bump, and reflection maps
- FPS friendly

Panel & Gauges

- All gauges are developed using 3D parts
- Realistic night lighting

Systems

- Fully simulated electrical system
- Partly simulated pneumatic system
- Realistic engine starting sequence
- Simulated window freezing and window heating system

Flight dynamics

- Flight dynamics were developed in close cooperation with experienced An-2 pilots

Sounds

- Engine sounds recorded from an actual An-2
- All switches, knobs and levers operate with realistic audio

HISTORY OF THE ANTONOV AN-2

The An-2 is a single-engine, multi-role, utility biplane developed by aerospace engineer Oleg Antonov for agricultural and forestry purposes. It is notable for its short take-off and landing (STOL) capability, its versatility, ruggedness, and slow-speed performance. Over 18,000 were manufactured over a record 45-year production run, making it one of the most prolific of all aircraft in aviation history, and one of the most influential. It has been used for myriad purposes, from crop dusting to military applications. Users bestowed a number of nicknames to the An-2 over the decades, including its most common, “Kukuruznik,” a Russian word meaning “related with corn,” a fitting reference to its agricultural heritage. It also has been called “Annushka,” (“Annie”). The NATO reporting name for the An-2 is “Colt.”

THE AN-2: THE LEGEND’S BEGINNINGS

The An-2 traces its roots to the 1930s, when Soviet aerospace engineer Oleg Antonov envisioned a tough, single-engine utility biplane that could serve a wide range of civil needs. Years later, in 1946, the Soviet government gave Antonov his opportunity. The Ministry of Forestry sought a replacement for the Polikarpov Po-2, an open-cockpit, tandem two-seat biplane used as a general utility aircraft. The top-secret Soviet Research and Design Bureau Number 153 (OKB-153), which would later become Antonov State Enterprise, was established on May 31, 1946. Its first project was the biplane that Antonov had conceptualized years earlier.

One of Antonov’s greatest influences during the engineering stage of his aircraft was the wing design of the Fieseler Fi 156 Storch, a German military liaison airplane that was renowned for its excellent STOL performance. Antonov sought to replicate the Storch’s great slow-speed flying characteristics and its ability to operate out of austere, unimproved airfields. The engineer’s merging of the myriad functional goals of his prospect (including his original ideas), the guidelines set forth by the Ministry of Forestry, and the performance of the Fi 156, would prove a great, and historically enduring, success.

Antonov’s design was an all-metal biplane comprising an enclosed cockpit and a cabin that could accommodate 12 seats. The first prototype, designated SKh-1, was powered by a Shvetsov Ash-21 7-cylinder radial engine. The aircraft took its maiden flight on August 31, 1947. The test pilot reportedly remarked after landing that the aircraft performed flawlessly and that his only criticism was that the seat was not adjusted

properly for his height. The second iteration of the aircraft used a Shvetsov Ash-62 9-cylinder radial engine, bringing the payload capability up to 4,720 pounds from 2,870 pounds. Designated the An-2, Antonov's aircraft was ready for serial production, which was slated to take place in Kiev, Ukraine.

In late 1952 the Soviet government halted plans for production of the An-2 at the Kiev factory to focus on building fuselage components for the Ilyushin Il-28 bomber. Since the order was signed by Stalin, there would be no appeal. Six months later, however, Stalin died. An-2 production restarted in Kiev, and by 1960, 5,000 units had rolled off the assembly line. Production was continued later in Dolgoprudniy, Russian SFSR. The majority of An-2 production took place at Poland's WSK factory in the city of Mielec. More than 13,000 units were produced by the time full production ended in 1991. Limited production continued until 2001, with four aircraft produced for Vietnam. China has also produced the airframe under license, which it calls the Shijiazhuang Y-5. While some sources have claimed that East Germany produced the An-2, the country only refurbished some aircraft. In all, more than 18,000 An-2s were manufactured between the Soviet Union, Poland, and China.

THE AN-2'S OPERATIONAL HISTORY

The An-2 was quickly adopted throughout the Soviet Union and other Eastern Bloc countries as soon as it started rolling off the assembly line in Kiev. It was initially used for agricultural purposes, notably for crop dusting. The aircraft was also used in its early operational days for mineral prospecting.

The spectrum of use of the An-2 broadened each year after its introduction. It helped hunters by providing information on animal and bird habitat. It was used extensively for aerial photography to aid hydrologic and other physical science research work. It was used as a small airliner, transporting people, cargo, and mail. It was used to monitor oil pipelines and electricity networks, and it was used to transport materials for highway and other infrastructure projects.

Twenty-six countries have procured An-2s for their air forces and civil organizations. Due to the aircraft's versatility - notably its modifiability - excellent handling at slow speeds, power, and forgivingness, it has seen adaptation over the decades for more than 40 specific applications. Some special applications and modifications have included: Sampling air quality, water bombing forest fires, air ambulances, crop dusting, lightly armed combat variants for the insertion of paratroopers, and civilian parachuting. The most common variant is the An-2T, a 12-seat passenger version that today is very popular among civilian parachute clubs.

Oleg Antonov stated that the aircraft itself would be its best advocate. He said: "If they make at least 50 An-2s then a bright future will be ensured for it." He was correct in his prediction, as evidenced by the more than 18,000 produced.

Why did the An-2 become so popular? What is so special about the aircraft?

When asked, Oleg Antonov noted: "I think it is due to its flight parameters first of all: short take-off and landing distances, simplicity of piloting and operation. This machine is undemanding to the airfields." He further explained that the An-2's success and ubiquity was due to its versatility and adaptability; that its form, power, ruggedness, and flight profile throughout such a broad range of speeds and conditions make it uniquely qualified to modify into a wide range of specialized aircraft.

From an overarching design standpoint, the success of the Antonov derives from simplicity and reliability. This includes ensuring that all aerodynamic control surfaces are actuated with sufficiently powerful systems. The resilient and reliable operation of the aircraft is a function of the wing design. The An-2 incorporates automatic leading-edge slats and flaperons that provide aircraft stability during high angle-of-attack (AoA) maneuvers. The wing design is such that it is virtually impossible to stall the An-2 while under power with flaps extended. The An-2 is so inherently aerodynamically stable that even without any pilot control input, the aircraft, while powered, will recover to a horizontal flight profile, even when placed into a flat spin.

A note from the original pilot's handbook reads: "If the engine quits in instrument conditions or at night, the pilot should pull the control column full aft and keep the wings level. The leading-edge slats will snap out at about 64 km/h (40 mph), and when the airplane slows to a forward speed of about 40 km/h (25 mph), the airplane will sink at about a parachute descent rate until the aircraft hits the ground."

The An-2 indeed has no stall speed quoted in the operating handbook. Pilots of the An-2 say one can fly the aircraft in full control at an airspeed of just 30 miles per hour. The An-2's low stall speed makes it possible for the aircraft to "fly backwards," relative to the ground (granted it is flying into a headwind of more than about 31 or 32 miles per hour).

COMBAT SERVICE

Although it was designed originally to provide aerial support for agriculture and forestry, the An-2's incredible versatility soon caught the attention of military practitioners. The An-2 has seen military use for a number of mission sets, including logistical support (as a freighter), information operations (dropping leaflets), as an ISR (intelligence, surveillance, and reconnaissance) data collections platform, as a light bomber and surface attack aircraft (including maritime torpedo use), and recently as an unmanned combat air vehicle in the role of loitering munition.

The first verifiable military use of the An-2 occurred during the Hungarian Revolution of 1956, when the aircraft was used to drop informational leaflets and also for ISR gathering.

An-2s were used in the war in Indochina. DRV (Democratic Republic of Vietnam) Air Force An-2s ferried equipment, personnel, weapons, and ammunition to its allies in the civil war in Laos.

During the Vietnam War, the An-2 was modified to carry torpedoes and used as a naval interdiction platform. Its slow speed proved advantageous, as aircraft dispatched to intercept An-2s could not engage them due to their slow flight. The STOL capability of the An-2 proved particularly beneficial, as it could operate out of small, unimproved airfields hacked into the jungle.

In Cambodia in 1970, government forces used the An-2 to carry supplies to troops during operations against guerrillas. In 1979, An-2s were used in Cambodia by the Kmer Rouge for both logistical support and as forward air controllers.

During the Croatian War of Independence in 1991, An-2s initially used as crop dusters were converted to drop improvised bombs and as supply ships.

During the Second Nagorno-Karabakh War in 2020, the Azerbaijanis converted old An-2s into loitering munitions by fitting them with video cameras, remote controls, and high explosives, then flying them into enemy positions and detonating the explosives.

THE AN-2 TODAY

Since the collapse of the Soviet Union and the Eastern European communist states, most airlines in these areas have been withdrawing their An-2s from service, as some of these aircraft are now over 40 years old and the production dwindled. Private operators are still using the An-2, as their stability, capaciousness, and slow-flying ability make them very popular, notably for skydiving.

While their high noise levels, increasing maintenance costs, high fuel consumption, and unsophisticated nature (the pre-flight checks alone take between 30 and 40 minutes) make them obsolete for commercial service in Europe today, the large number of aircraft available has lowered their resale value (each can be purchased for as little as $30,000). They are ideal for the developing world, where their ability to carry large loads into short airstrips makes them advantageous to airlines on a budget. Many ex-Aeroflot An-2s work as regional airliners in Africa, Central and South America, Cuba, and Southeast Asia.

North Korea has a number of the aircraft using wooden propellers and canvas wings (the Y-5 version that was license-built in China). This construction gives them a reduced radar cross-section, and therefore a limited degree of "stealth." In a war they could possibly be used to parachute or deliver special operations troops behind enemy lines for sabotage operations.

The An-2's ability, looks, flying characteristics, and status as one of the world's largest single-engine biplanes, has increased the demand for the An-2 in the United States and Western Europe. The airframe is prized by collectors of classic aircraft, making them an increasingly common sight at airshows. However, nearly all western nations (the USA, Canada, the United Kingdom, France, etc.) prohibit the use of the An-2 commercially, despite its obvious potential as a bush plane and parachute aircraft. This is because the aircraft has not been certified by the relevant national aviation authorities, limiting its use.

The An-2 remains recognized as outstanding in its class and has many admirers throughout the world. As of 2007, more than 4,000 An-2s remain in operation. Many have been flying for more than 40 years and remain in excellent condition.

In 2012, the Ministry of Transport of the Russian Federation announced the initiation of the An-2 Deep Modernization Program, which includes the replacement of engines and other critical operational equipment.

AN-2 SPECIFICATIONS

The An-2 is a single-engine, short take-off and landing (STOL), utility biplane designed in the Soviet Union for agricultural and forestry use. The design comprises an all-metal, stressed-skin monocoque fuselage, an empennage consisting of metal framing and fabric covering, and metal-framed, fabric-covered wings (with the upper wing longer than the lower wing). The An-2 is renowned for its exceptional slow-speed and short-field performance. This is due primarily to the wings of the aircraft, notably the full-length, leading-edge slats and aileron-flap actuation system. The An-2 took its maiden flight on August 31, 1947 and over 18,000 have been produced.

Dimensions

Length	12, 7 m (40 ft 8 in)
Height	5, 35 m (13 ft 2 in)
Wing span	18, 2 m (59 ft 8 in)
Wing area	71, 52 m (769.8 sq ft)

Engine

Shvetsov ASh-62 9-cylinder radial engine (which was a development of the Wright R-1820 Cyclone) 1000 hp, displacement 30 liters.

Fuel

Total tank capacity: 317 US galls (1200 litters)

Air speeds

Max speed	258 km/h (160 mph)
Cruising speed	190 km/h (120 mph)
Stall speed	50 km/h (30 mph)

Performance

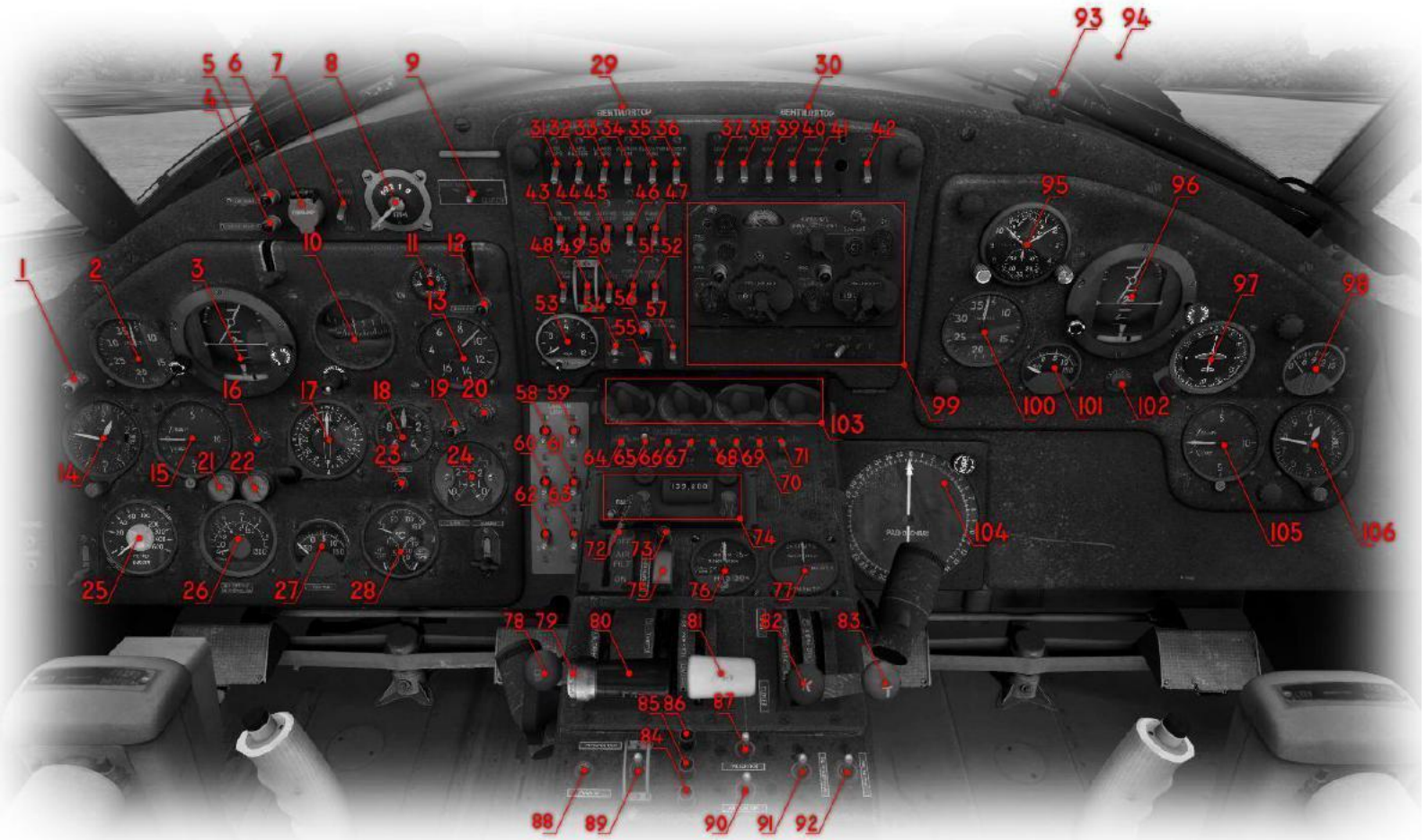
Range	845 km (525 miles)
Service ceiling	4500 m (14,750 ft)
Rate of climb	3, 5 m/sec (700 ft/min)
Take-off distance	170-490 m (560-1600 ft)
Landing distance	425 m (1400 ft)

Weight

Empty weight	3300 kg (7300 lbs)
Max take-off	5500 kg (12000 lbs

PANELS AND CONTROLS

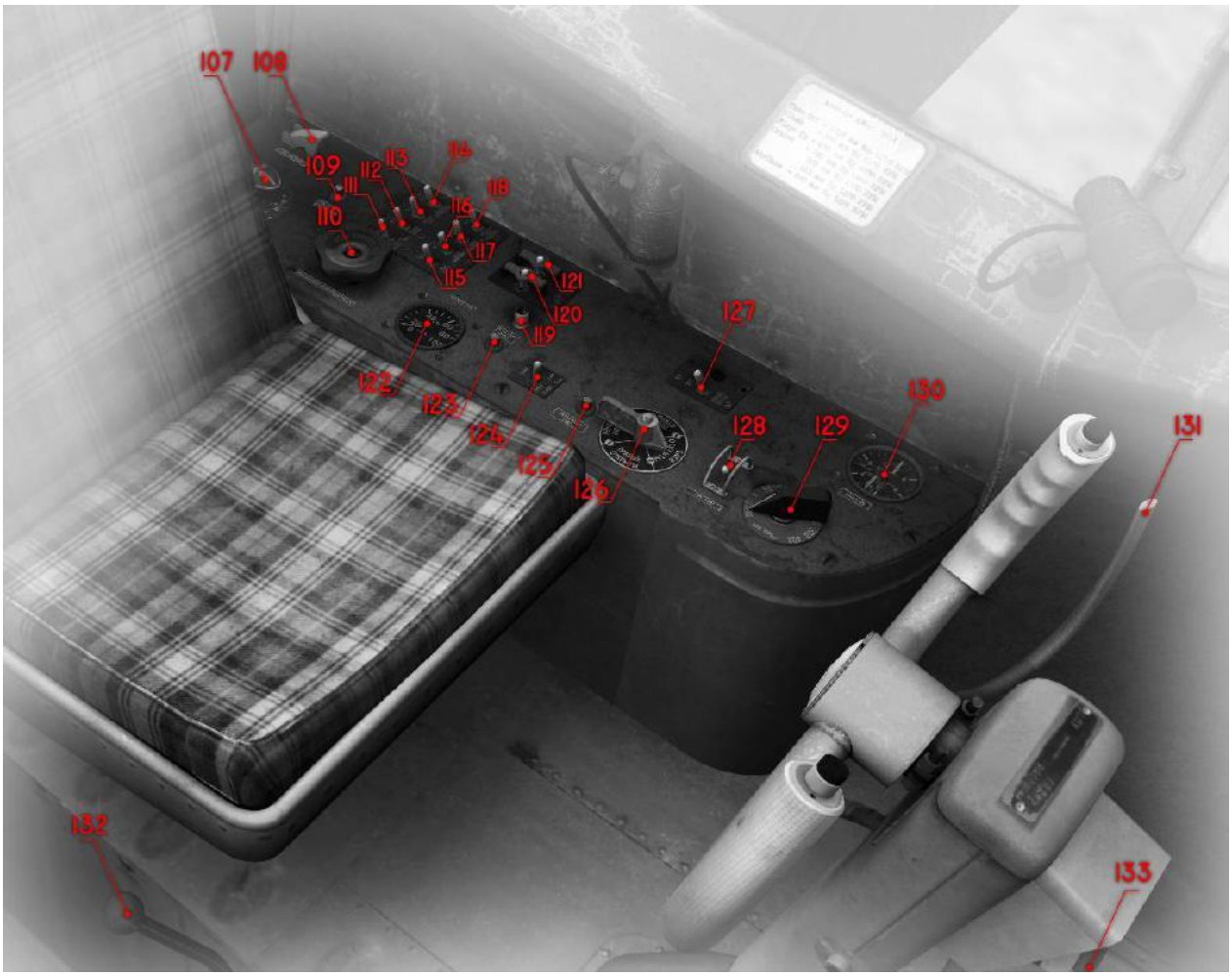
MAIN PANEL



1. Radio altimeter signal lamp
2. Airspeed indicator
3. Attitude indicator
4. Antifire system ready lamp
5. "Fire" signal lamp
6. Fire extinguisher button
7. Starter circuit breaker
8. Magnetos knob
9. Starter switch (Left click activates electric motor to rotate flywheel. Right click - clutch flywheel to engine)
10. Directional gyro
11. Ammeter
12. Generator lamp
13. Manifold pressure indicator
14. Altitude indicator
15. Vertical speed indicator
16. "Fast slave" button
17. UGR compass
18. RPM indicator
19. Chip detector signal lamp
20. Oil dilution signal lamp
21. Left tank low fuel signal lamp
22. Right tank low fuel signal lamp
23. Marker signal lamp
24. Cylinders heads temperature indicator
25. Radio altimeter indicator
26. Fuel meter indicator
27. Carburetor temperature indicator
28. Engine gauge (Fuel pressure, oil pressure and oil temperature indicators)
29. Cabin fresh air panel lever (Left)
30. Cabin fresh air panel lever (Right)
31. Up wing flaps circuit breaker
32. Flaps master circuit breaker
33. Low wing flaps circuit breaker
34. Aileron trimmer circuit breaker
35. Elevator trimmer circuit breaker

36. Rudder trimmer circuit breaker
37. Comm radio circuit breaker
38. GPS switch
39. Intercom circuit breaker
40. ADF circuit breaker
41. Marker circuit breaker
42. Radioaltimeter circuit breaker
43. Oil shutters circuit breaker
44. Cowl flaps circuit breaker
45. Antifire system circuit breaker
46. Cabin light circuit breaker
47. Panel light circuit breaker
48. Cockpit light circuit breaker
49. Pitot heat circuit breaker
50. UV lamps circuit breaker
51. Portable lamp circuit breaker (inoperable)
52. Floor light circuit breaker (inoperable)
53. Ampervoltmeter
54. Power inverter switch (Left click - main. Right click - aux)
55. Aux power inverter signal lamp
56. Tail wheel lock signal lamp
57. Tail wheel lock switch
58. Left land light switch
59. Right land light switch
60. Navigation lights switch
61. Taxi light switch
62. Strobe lights switch
63. (inop) (Beacon light for airplane where it exist)
64. Generator switch
65. Battery switch
66. Copilot's attitude indicator power switch
67. Pilot's attitude indicator power switch
68. Fuel meters power switch
69. Engine gauge power switch
70. Oil shutters and cowl flaps indicators power switch
71. Thermometers power switch
72. Air filter shutter lever
73. "Door open" signal lamp
74. COM radio
75. Emergency flaps up switch
76. Flaps position indicator
77. Oil shutters position indicator
78. "Altitude corrector" lever (Mixture)
79. Flaps low button
80. Throttle lever
81. Propeller lever
82. Carburetor heat lever
83. Fuel cut valve lever
84. "Aileron trimmer in zero" signal lamp (+-2 deg.)
85. "Elevator trimmer in zero" signal lamp (+-2 deg.)
86. "Rudder trimmer in zero" signal lamp (+-2 deg.)
87. Rudder trimmer switch (left click - left, right click - right)
88. Rise flaps button
89. Elevator trimmer switch (left click - low, right click - up)
90. Aileron trimmer switch (left click - left wing low, right click - right wing low)
91. Oil shutters switch
92. Cowl flaps switch
93. Lamp
94. Window heat knob
95. Clock
96. Attitude indicator
97. UGK-2 compass
98. Power inverter voltmeter
99. ADF control panel
100. Airspeed indicator
101. Outside temperature indicator
102. "Fast slave" button
103. UV lamps rheostats (inop)
104. ADF indicator
105. Vertical speed indicator
106. Altimeter indicator

LEFT CONSOLE



107. Engine primer lever
108. Oil dilution system switch
109. Low fuel sound signal switch
110. Pneumo valve knob
111. Fuel low sound switch
112. Right wiper switch
113. Left wiper switch
114. Wipers circuit breaker
115. Left fan switch
116. Center window heat circuit breaker
117. Left window heat circuit breaker
118. Window heat master switch
119. Pitot heat check lamp
120. Antifire system check switch
121. Antifire system check switch
122. Air pressure indicator
123. Pitot heat check button
124. Fuel meter switch (left click - only left tank, right click – only right tank)
125. Chip detector lamp check button
126. Fuel selector
127. Cockpit signal lamp switch
128. Fuel pump switch
129. Radio altimeter knob
130. Wheels brakes air pressure indicator
131. Wheels brakes lever
132. Manual fuel pump lever
133. Parking brake knob

ADF CONTROL PANEL

a1. Telefone\Telegraf switch (inop)

a2. Level of signal indicator

a3. ADF mode knob

a4. Antenna switch (inop)

a5. Volume (inop)

a6. “Near” channel KHz knob

a7. “Near” channel indication lamp

a8. “Near” channel frequency indicator

a9. “Near” channel hundreds KHz knob

a10. “Near” channel tens KHz knob

a11. “Far” channel KHz knob

a12. “Far” channel indication lamp

a813 “Far” channel frequency indicator

a14. “Far” channel hundreds KHz knob

a15. “Far” channel tens KHz knob

a16. “Near” - “Far” channels switch

ENGINE CONTROLS

Throttle Control

The throttle is the outboard lever which is mechanically connected to the carburetor by a flexible push-pull type cable. The full forward position of the throttle is OPEN and the full aft position is CLOSED.

Standard shortcuts:

Cut Throttle	[F1]
Decrease Throttle	[F2 or Num Pad 3]
Increase Throttle	[F3 or Num Pad 9]
Full Throttle	[F4]

Mixture Control (Altitude Corrector)

The mixture lever enables the pilot to regulate the fuel-air mixture to the engine to obtain efficient engine operation and maximum fuel economy at cruise. The RICH position is full **backward**, full **forward** is IDLE CUT-OFF, and manual leaning is accomplished by placing the lever between the RICH and IDLE CUT-OFF positions. Actually the An-2's pilots use altitude corrector very rare, on some airplanes it was even sealed in FULL RICH position.

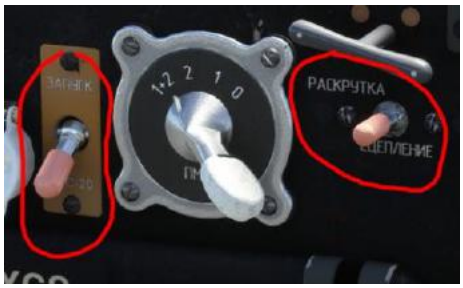
Standard shortcuts:

Set Mixture to Idle Cut-off	[CTRL+SHIFT+F1]
Lean Mixture	[CTRL+SHIFT+F2]
Enrich Mixture	[CTRL+SHIFT+F3]
Set Mixture to Rich	[CTRL+SHIFT+F4]

Magneto

The engine magneto switch controls the dual magneto system. There are four switch positions, designated counterclockwise as follows: BOTH, L, R and OFF. The engine is started and operated with the switch in the BOTH position. The L and R positions are for confirmation purposes only.

Starter



The starter circuit breaker (7) provides power to the starter control switch (9). Starter switch has three positions: **left** (left click) - provides power to electric motor which rotates the flywheel; **neutral** (right click from the left, automatically from the right) – power off; **right** (right click from neutral) - activates clutch which connects flywheel to the engine's crankshaft.

FUEL CONTROLS

Fuel Supply System

Fuel is supplied to the engine from two equally-sized fuel tanks located in the upper wing. From these tanks, fuel flows through a fuel selector valve, a manual fuel pump, a boost pump, a fuel strainer, and an engine-driven fuel pump to the carburetor.

Fuel Quantity Indicator

A direct reading, electrically actuated fuel quantity indicator is mounted in the main pilot's panel (26). Indicator shows whole, left tank or right tank fuel quantity. The mode is chosen by a three-position switch (124). Additionally, the aircraft has a low fuel signal lamp for each of the two tanks to indicate when fuel level is less than 50 liters (21 and 22).

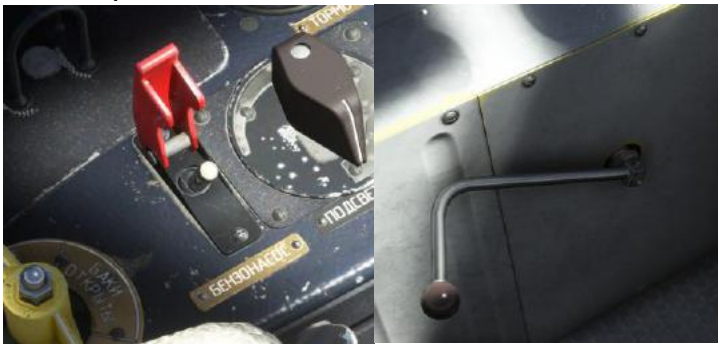
Note: To use fuel quantity indicator, the battery and circuit breaker (68) must be **ON**.

Fuel Selector Valve

A rotary type fuel-tank selector-valve handle is incorporated in the fuel system. The fuel-tank selector-valve handle, which controls the fuel selector valve through mechanical linkage, has four positions: **LEFT TANK, RIGHT TANK, BOTH TANKS** and **FUEL OFF**. The **RIGHT TANK, LEFT TANK** and **BOTH TANKS** positions allow fuel to flow from the appropriate tank(s) to the engine. The **FUEL OFF** position seals both tanks from the other components of the fuel system and inhibits fuel from flowing beyond the selector valve. The fuel selector rotates clockwise with left click and anticlockwise with right click.

Fuel Boost Pumps

An-2 has two fuel pumps, manual and electric. The manual pump is operated by a lever (132). The electric pump is controlled by an **ON/OFF** switch located on the right-hand side of the instrument panel.



FLIGHT CONTROLS

Wing Flaps

Wing-flap buttons (79 and 88) control the flaps. To lower the flaps, use button on the throttle lever side (79). To raise the flaps, use button on the lower left corner of the pedestal.

Note: to operate flaps motors, battery and circuit breakers 31-33 must be **ON.**

Standard Shortcuts:

Retract Flaps (fully)	[F5]
Retract Flaps (in increments)	[F6]
Extend Flaps (in increments)	[F7]
Extend Flaps (fully)	[F8]

Wing Flap Indicator

The position of the flaps can be determined by looking at the flaps position indicator (76). There are indication marks at 0, 15, 30, 45 and flaps can be selected at these settings or any setting in between.

Note: to use flaps position indicator battery and circuit breaker 70 must be **ON.**

Trim Tabs

An-2 has electrical controlled trim tabs for all three control axes. Each trim motor is connected to a three-position control tumbler (87, 89, 90). To indicate neutral tabs positions the airplane has control lamp for each axe (84, 85, 86).

Note: to operate trim motors battery and circuit breakers 34-36 must be **ON.**

Standard Shortcuts:

Elevator Trim Down	[Num Pad 7]
Elevator Trim Up	[Num Pad 1]
Aileron Trim Left Wing Low	[Num Pad 4]
Aileron Trim Left Wing Up	[Num Pad 6]
Rudder Trim Left	[Num Pad 0]
Rudder Trim Right	[Num Pad Enter]

WINDOW HEAT CONTROL

Flying in cold weather conditions can cause window freezing. To counter the visual obscuration this causes, use window heat (tumblers 116-118) and cabin ventilation knobs (on the floor between pilots). Window icing depends on the temperature difference between aircraft interior and exterior. To control temperature inside the cockpit you use the thermometer directly behind left-side pilot head. Check the outside temperature or set it up manually.

CHECKLISTS AND PERFORMANCE

Antonov An-2

PRE-START PROCEDURES AND CHECKS

Control lock	REMOVED & STOWED
Parking brake	SET
Log book, flight doc. & legal forms	On board
All switches	OFF
Magneto switch	OFF
Windows	CLEAN
Propeller	CLEAN
Engine cowling latches	ALL CLOSED & LOCKED
Oil cooler	CLEAN
Dust filter	Check position
Tires condition & pressure (40 PSI)	CHECK
Left & right wings	no defects, no gasoline leaks
Pitot cover	REMOVED
Navigation & landing lights glasses	CLEAN
Side fuselage	no cracks, no deformations

INTERIOR CHECK – NIGHT FLIGHTS

Battery	ON
Interior/external lights	all ON – check for serviceability

BEFORE STARTING

Oil collector can	REMOVED & STOWED
Doorstep	REMOVED & STOWED
Emergency manhole	CLOSED & SECURED
Magneto	OFF
Flight controls	Freedom of movement
Air system charging valve	OPEN
Air pressure	CHECK > 30
Parking brake	SET
Brake pressure system	CHECK > 6
Bus voltage	24V
Battery switch	ON
Fuel tank meter switch	ON
Engine unit gages switch	ON
Flap position & oil shutters indicators switch	ON
Oil cooler shutters power switch	ON
Anti-fire system power switch	ON

Left & Right fuel gages	ON
Oil coolers shutters & cowl flaps	ON
Trim tabs	Neutral
Fuel selector valve	BOTH
Fire Extinguisher	CHECK
"Chip Monitoring" button	Press to test

STARTING ENGINE WHEN HOT

Propeller control	FORWARD (Low Pitch)
Mixture control	BACKWARD (Full Rich)
Fuel master valve	OPEN = FORWARD
Carburetor heater	OFF
Oil cooler shutter	CLOSED
Cowl flaps	CLOSED
Fuel pressure (with manual pump)	0.25 – 0.35
Primer pump to cylinders	6 injections
MAKE SURE PROP. AREA IS	CLEAR
Magneto switch	OFF
"Starting sequence" switch	ON
Starter	ON - Until 8 ON AMPMETER – Then toggle the switch to interconnect engine shaft
Magneto switch	BOTH 1+2

AFTER START

Fuel pressure with manual pump	0.25 – 0.35
Throttle (when engine runs smoothly)	700 – 800 RPM
Check oil pressure	Normal > 3
"Starting sequence" switch	OFF
Generator	ON
A/C Converter	ON
Primer pump lever	LOCKED

BEFORE TAXI

Pax & cargo doors	CLOSED & LOCKED
All necessary switches	ON
Flaps upper & lower	Operative
Engine control lever positions	Correct
Indications of engine gages	Normal "All in the green"
Fuel quantity in each tank	CHECK
A/C Converter	Operative
Artificial horizon, course ind.	

& gyro compass" switches	ON
Gyro instruments	SLAVED
Navigation instruments	CHECKED & SET
Air pressure in pneumatic system	> 40
Wheel chocks	CHECK & REMOVED
Tail wheel	UNLOCKED

TAXI

Lights	As required
If snow or OAT (< 0°) pitot heat	ON
keep mixture T° > 8° with carburetor heater	ON
All necessary switches	ON
Brakes	CHECK
In turns, gyro indications	CORRECT

BEFORE TAKE-OFF

Voltage & Load meter	CHECK
Navigation instruments & Com's	Confirm SET
Carburetor heater	OFF
Mixture	FULL RICH
Fuel selector valve	BOTH
Altimeters	SET
Gyro compass	SLAVED & SET TO RUNWAY HEADING
Set trim tabs:	
Elevator	DOWN: If heavy for 10°; if not 3 - 5°
Rudder	RIGHT for 3°
Flaps	set for take-off (usually 15°)
Artificial horizon	CHECK normal indication
Engine gages	normal indications: "all in the green"
Cowl flaps & Oil cooler shutters	OPEN
Lights	AS REQUIRED
Take-off time	Recorded
Parking brake	Released

TAKE-OFF

1. Without flaps:	
Engine parameters	9 / 2100
Speed up to	140 Km/h 75 Kts
1. With flaps (wind <20 Kts): reduces take off distance by 35%	
If 15°: engine	9 / 2100
If 25°: engine	9 / 2100

If 30°: engine (max weight)	10.5 / 2200
Rotation speed	85 - 90 Km/h 48 Kts
Sped up to	120 Km/h 65 Kts
Flaps over 150 Ft	gradually drawn-in
Full drawing of flaps at	140 Km/h 75 Kts

CLIMB

Establish initially	9 / 2050 (9 / 2100 if urgent)
When altitude > 150 Ft	8.5 / 1850
Speed	140 – 150 Km/h
Oil T° < 70°	CHECK
CHT < 215°	CHECK
Lights	Considered

CRUISE

Oil T° 60° - 75°	CHECK
CHT: 120° - 215° (recommended: 150° - 215°)	CHECK
Oil Pressure 4 - 5	CHECK
Fuel Pressure 0.25 - 0.35	CHECK
Compressor pressure 45 – 50	CHECK
Voltages > 28.5 V & > 75 V	CHECK
Flaps	0°

DESCENT

Establish	5.2 / 1500 (= 180 Km/h 97 Kts)
Maximum speed for descent:	
Quiet air	220 Km/h 119 Kts
Turbulent air	190 Km/h 102 Kts
Maintain	CHT > 120° & Oil T° > 50°
Carburetor heater if OAT < -15°	ON
Fuel selector	BOTH
Parking break	CONFIRM OFF & PRESSURE IN BRAKES "0"
Air pressure > 40	CHECK
Flaps	AS REQURED

FINAL CHECK

Throttle	< 5
Propeller	FULL PITCH
Speed	< 140 Km/h 75 Kts
Flaps	CHOOSE SETTING (usually 15°)
Landing lights	ON

Tail wheel locking	CONSIDERED

FINAL CHECK

Tail wheel	UNLOCKED
Landing lights	OFF
Taxi light	CONSIDERED
Pitot heat	OFF
Flaps	0°
Cowl flaps & Oil cooler shutters	OPEN

COOLING DOWN & SHUT DOWN

Avionics switches	OFF
Throttle	700 - 800 RPM
Cowl flaps & Oil cooler shutters	OPEN
Let CHT cool down	< 120°
Electrical switches & radios	OFF
For a few seconds: throttle	1700 RPM, then 800 RPM
Fuel master valve	CLOSED
Throttle	OFF
Cowl flaps & Oil cooler shutters if T° < 100	CLOSED
Air system charging valve	CLOSED
Controls & ailerons	LOCKED
Oil & Air system purges	DONE

EMERGENCY PROCEDURES: ENGINE FIRE

Fuel master valve	CLOSED
Fuel selector	CLOSED
Magnetos & Converter	OFF
Cowl flaps	CLOSED
"FIRE" Button	PRESSED

CONTACTS

If you have any questions, comments, suggestions, or need any additional information concerning the Antonov An-2 add-on, please email: info@atsimulations.com

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