LOCKHEED

L-1049 SUPER-CONSTELLATION

RED WING

FLIGHT MANUAL
EN 2.5.0

Microsoft Flight Simulator

LICENSE AGREEMENT:

ONLY USE MODERN FLIGHT. THE L1049 IS NOT COMPATIBLE WITH THE LEGACY LIGHT MODEL.

HISTORY

1.HISTORY

1.1 CONNIE GENETICS

The Lockheed project was born out of an ambitious desire to create the first aircraft capable of comfortably carrying 20 passengers and 3,000 kg of cargo across the United States. All this without a stopover and economically interesting enough to widen the acceptance of air travel as an alternative to trains, boats and automobiles.
A truly revolutionary project for its time! Howard Hughes, an American billionaire and head of TWA, presented the initial performance requirements, and Lockheed designed an elegant, distinctive and now legendary aircraft to fit the requirements.

The military version was used during the BERLIN airlift between 1948 and 1949.

L049 is delivered to TWA in 1945 under the name of "Constellation". Over time it was modified and entirely revised to become L-1049 "Super Constellation" in 1951.

1.2 L-1049 HISTORY

The Super Constellation differs from the Constellation by the addition of a circular fuselage section adding 5.64m to the overall length.
The windshield was redesigned to give the crew better visibility and the rudders were enlarged for better lateral control.

–
General Eisenhower's first Air Force One aircraft was a C121E.

Wing tip tanks "TIP-TANK" could be installed.
The range increased by 1300 km, but the freight decreased by 3300 kg.

Most Super Constellations were retired by their original operators after the advent of the Boeing 707 and Douglas DC-8.

The last L1049 passenger flight in the United States was an EWR-DCA Oriental shuttle in February 1968.
The last commercial flight of the L-1049 Super Constellation was in 1993, when the Federal Aviation Administration banned all Dominican Republic airlines that flew Constellations into the United States (for safety reasons).

The last of the Constellation series built was the L-1649 Starliner. Driven by TWA's requirements for a very long-range aircraft to counter the Douglas DC-7C, the Starliner was created by assembling the L-1049G fuselage and a redesigned wing offering transoceanic capability and better performance.
The Starliners were quickly overtaken by the arrival of jet aircraft.

1.3 L-1049 Versions

L-1049: 24 Super Constellation prototype

L-1049 A: Manufacturer designation of some L-1049
- 142 units, Warning star: airborne radar surveillance version for the US Navy
- 1 unit specially designed for weather recognition.
- 73 RC121-D Improved, long-range, warning and airborne radar control version for the USAF

L-1049 B: Manufacturer designation of some L-1049
- 50 units, US Navy transport version for 72 pax with round portholes
- 10 units, USAF airborne radar surveillance version
- 1 unit Named "Colombine III", presidential transport plane with special internal equipment.

L-1049 C: 42 units Civil version of the L-1049B for one hundred and ten passengers max. with four R-3350-87TC18DA-1 Turbo compound engines of 3,250 hp each.

L-1049 D: 4 units Cargo version of the L-1049B with modified wings and fuselage and a large cargo door.

L-1049 E: 28 units Passenger version of L-1049D.

L-1049 F: 33 units Manufacturer designation of the military version C-121C.

L-1049 G: 102 units Advanced version of the L-1049C with four R-3350-972TC18DA-3 (R-3350-93W 3,500 SHP) engines with greater maximum continuous power, wing tip tank capacity… known as "SUPER G". This included Military C121D, G, H, R, S,& T variants. Some of these have been modelled Including EC121D USAF, EC121D-WV NAVY and the Vietnam EC121 R USAF BATCAT.

L-1049 H: 53 units Last version of the L1049G for cargo as the L-1049D

GENERAL INFORMATION

2. GENERAL INFORMATION

2.1. SPECIFICATIONS

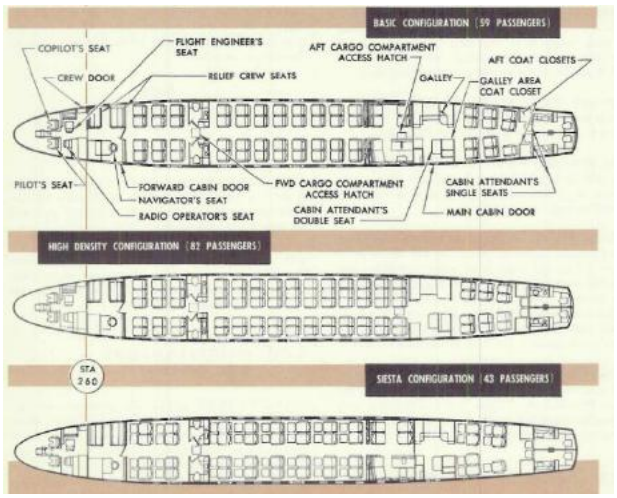
The aircraft could be configured in several ways:
Basic configuration: 59 passengers
High density configuration: 82 to 99 passengers
Siesta configuration: 42 passengers

The crew varied from 4 to 7 persons

Initially you only have a basic to high density passenger config with TWA and AIRFRANCE liveries.

Cargo and Littery layouts are available on M.A.T.S. livery.

Some military versions contained RADAR workstations aft of the flight deck for threat and troop movement surveillance.

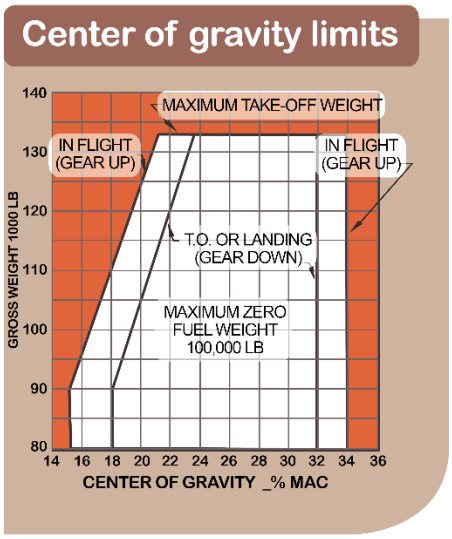


2.2. DIMENSIONS

The characteristic structure of the "Connie" with three rear tails was chosen to limit the height of the aircraft and to allow its use in a large number of hangars compared to its competitors.

Length over all:	116' 2''/35m	Wingspan:	125' 0''/37,6m
Clearance under fuselage	7' 0''/2,13m	Height over empennage:	24' 9''/7,3m

2.3. WEIGHT



Take-off weight limits:

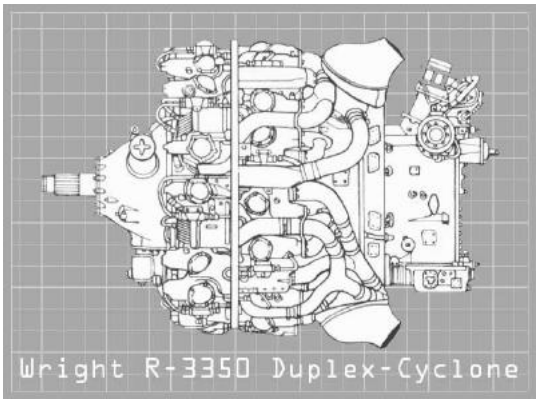
(L-1049C)	120,000 lbs. /54,44 Tons
(L-1049G)	137.500 lbs. /60,33 Tons

MAX landing weight limit: 110,000 lbs.

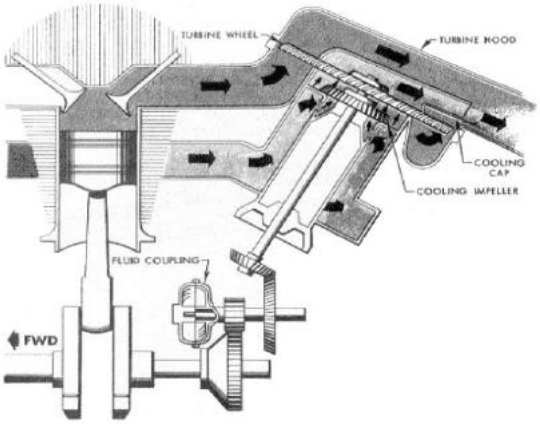
Check chapter 2.5 below for more information on CG. And payload

2.4. ENGINE AND PROPELLER

Lockheed incorporated Wright Duplex-Cyclone engines R-3350-972TC18DA-1 initially into the L-1049C, which first flew on February 17 of 1953.



Type: Twin-row 18-cylinder radial engine
Bore: 6 1⁄8 in (155.6 mm)
Stroke: 6 5⁄16 in (160.2 mm)
Displacement: 3,347.9 in^3 (54.862 L)
Length: 76.26 inches (1,937 mm)
Diameter: 55.78 inches (1,417 mm)
Dry weight: 2,670 pounds (1,210 kg)



Later development produced the much-improved R-3350-972TC18DA-3 both in reliability and performance. Specifically, the R-3350-93W turbo compound engines now incorporated a new supercharger system and Power Recovery Turbines (PRT).

Each engine's exhaust gas flowed through three PRT turbines, increasing power by 550 horsepower over previous models. Turbine speed is proportional to engine speed and requires no control.

Each engine incorporates a fuel-injection system, a two-speed supercharger, and a low-tension ignition system. Spark control is also provided.

One drawback of the PRT was the visible flame and extreme heat from the exhaust pipes. This was resolved by placing armor plating 2 inches (5.08 cm) thick, under each exhaust stack.

Propellers are Hamilton Standard 43E60/6903A with auto feather and synchronization.

Three blades turning clockwise

Feather angle:	80.5°
Low angle:	14°
Reverse angle:	-21.5
Size	15.1' / 4,57m
MAX. RPM	2900

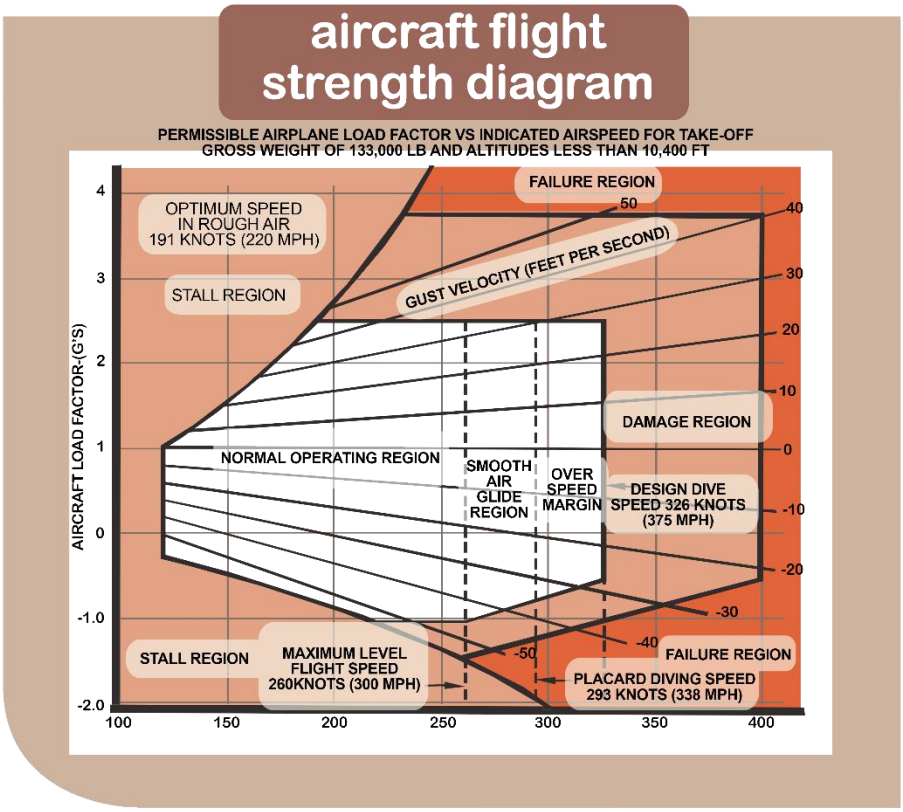
2.5. PAYLOAD AND C.G.

2.5.1. Balancing CG

The L-1049 is designated for take-off and landing operations at a Center of Gravity (CG) between 18% and 32% MAC

In flight, with the gear up, a 34% C.G. is authorized to allow the movement of passengers during flight without impact to pitch sensitivity for pilots.

You must first balance the CG of the aircraft on ground without fuel to 25% by allocating cargo and passengers. CG on longer flights will be higher due to fuel load. Over time CG will move forward as fuel load burns.



2.5.2 variations in centering

- 1000 gallons of fuel sets back the centering by 1.0%.
- 2000 gallons of fuel sets back the centering by 1.5%.
- 3000 gallons of fuel sets back the centering by 2.0%.
- 4000 gallons of fuel sets back the centering by 2.5%.
- 5000 gallons of fuel sets back the centering by 3.0%.
- 6000 gallons of fuel sets back the centering by 3.5%.
- 6600 gallons of fuel sets back the centering by 4.0%.

retracting gear advances CG forward by 1%.

Increasing Cowl and Oil Cooler flaps will increase drag by 1%

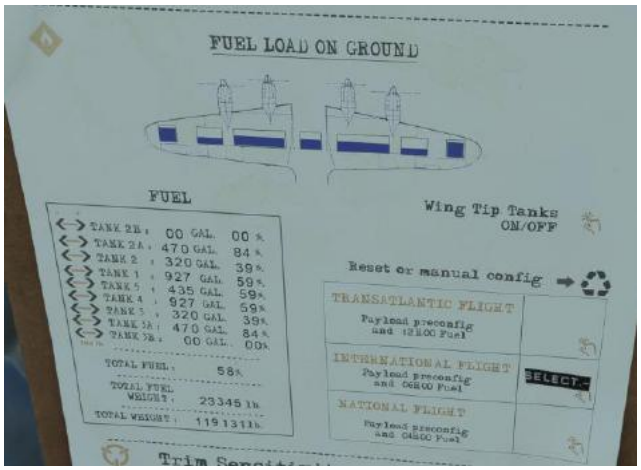
The addition or removal of 1000 Lbs. of PAX in the front compartment (in front of CG) is compensated by the addition or removal of the same amount in the rear compartment (behind CG)

2.6. PAYLOAD EXAMPLES

There are 3 pre-configured options for fuel and payload:

- Transatlantic flight 12 hours + 1 hour for emergency. / Heavy plane (100% fuel and CG balanced payload)
- International flight 06 hours + 1 hour for emergency. / Standard plane (50% fuel and CG balanced payload)
- National flight 04Hours and 30 minutes for emergency / Light plane (33% fuel and CG balanced payload)

For military,6 versions (4 Liveries) are available with the MATS version including a passenger, littery (bed for wounded), and cargo configurations. Only a passenger load configuration is available for the civilian versions. Other Military versions have Static Radar workstations representative of 1960's era Vietnam and cold war surveillance equipment behind the flight deck.



If you select another configuration, such as Transatlantic flight, international flight or national flight based on travel distance, you will have to configure passengers and luggage to maintain the CG near 25.0%, especially for heavy take-off.

Please do not use MSFS weight and balance UI

After a selection and/or a modification please validate your new payload by pressing INSTANT LOADING

Please refer to CLIPBOARD CHAPTER for more information

PERFORMANCE

3. PERFORMANCE

3.1 NORMAL PROCEDURES - SPEED

Take-off speed:	110 -115 kts / 203-212 km/h
Climb speed	180 kts / 333 km/h
Approach speed	
Initial / Flaps 60%	140 kts / 260 km/h
Final / Flaps 100%	115 kts / 213 km/h
Ceiling	25,500 ft (115/145 high octane AVGAS)
Minimum length runway	4500 ft / 1400m
Fuel flow	480 US GAL./1800 l/hour
Average autonomy	14 hours /3.500 NM / 6500km

3.2 OPERATIONS LIMITS (IAS)

V_{NO}/ normal operation:	260 kts / 482 km/h	
V_{NE} / max speed:	295 kts / 543 km/h	Never exceed limit
V_A / maneuvering speed:	140 kts / 333 km/h	60% flaps extreme movement
V_{FE} / flaps 60%:	184 kts / 341 km/h	IAS maximum for extension
V_{FE} / flaps 100%:	154 kts / 274 km/h	IAS maximum for extension
V_{LO}/V_{LE} for Gear down	165 kts / 306 km/h	Landing gear extension IAS maximum
Stall Speed / No flaps	103 kts / 190 km/h	Varies with gross weight see operation manual
Stall Speed / Flaps 100 %	80 kts / 148 km/h	Varies with gross weight see operation manual
V_{YSE} /one engine out	155 Kts / 274 km/h	IAS climb (METO) with one engine out
Damaged Flaps	210 kts / 388 km/h	Extending flaps at this speed or above will cause severe damage
Landing lights extend.	165 kts / 306 km/h	Landing extension and operation maximum IAS

This documentation is for FLIGHT SIMULATOR GAME USE ONLY

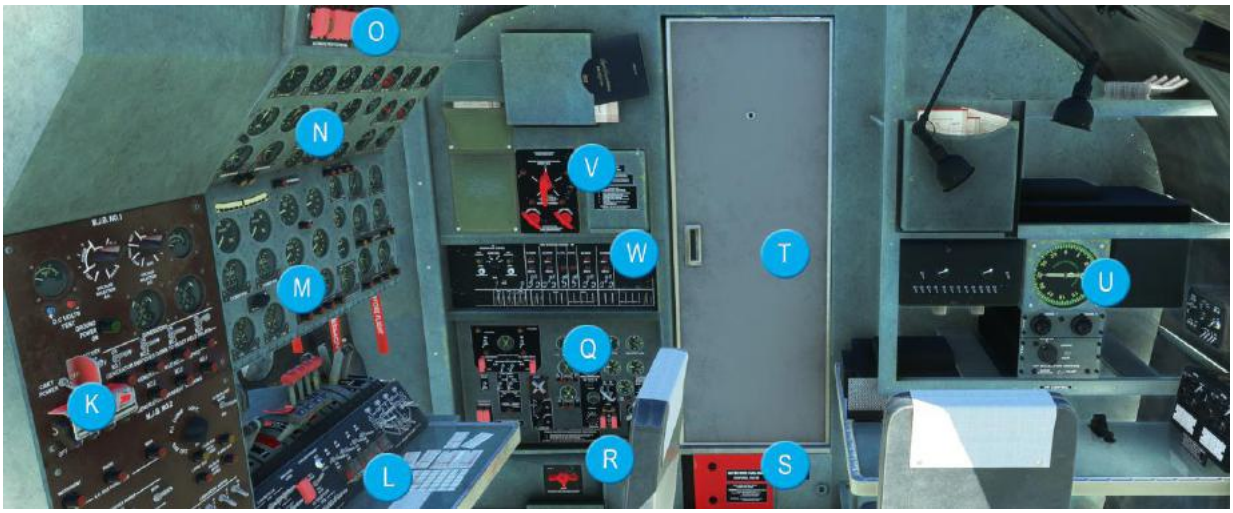
PANEL GUIDE

4. PANEL GUIDE

The following is a representation of the MATS C121D. There are some minor variations with the other liveries included, however the locations of equipment are pretty standard.

4.1 MAIN PANEL

A. LEFT BACK PILOT
B. CLIPBOARD
B2. ALTERNATE CLIPBOARD PLACE
C. LEFT SIDE PILOT
D. INSTRUMENT PANEL PILOT
E. CENTER PANEL
F. BACK PEDESTAL
G. FRONT PEDESTAL
H. INSTRUMENT PANEL COPILOT
I. OVERHEAD FRONT AND BACK
J. RIGHT SIDE COPILOT
K. MJB PANEL - FLIGHT ENGINEER
L. FLIGHT ENGINEER'S LOWER PANEL
M. FLIGHT ENGINEER'S UPPER PANEL
N. FLIGHT ENGINEER'S OVERHEAD PANEL
O. ROOF PANEL
P. OVERHEAD BACK

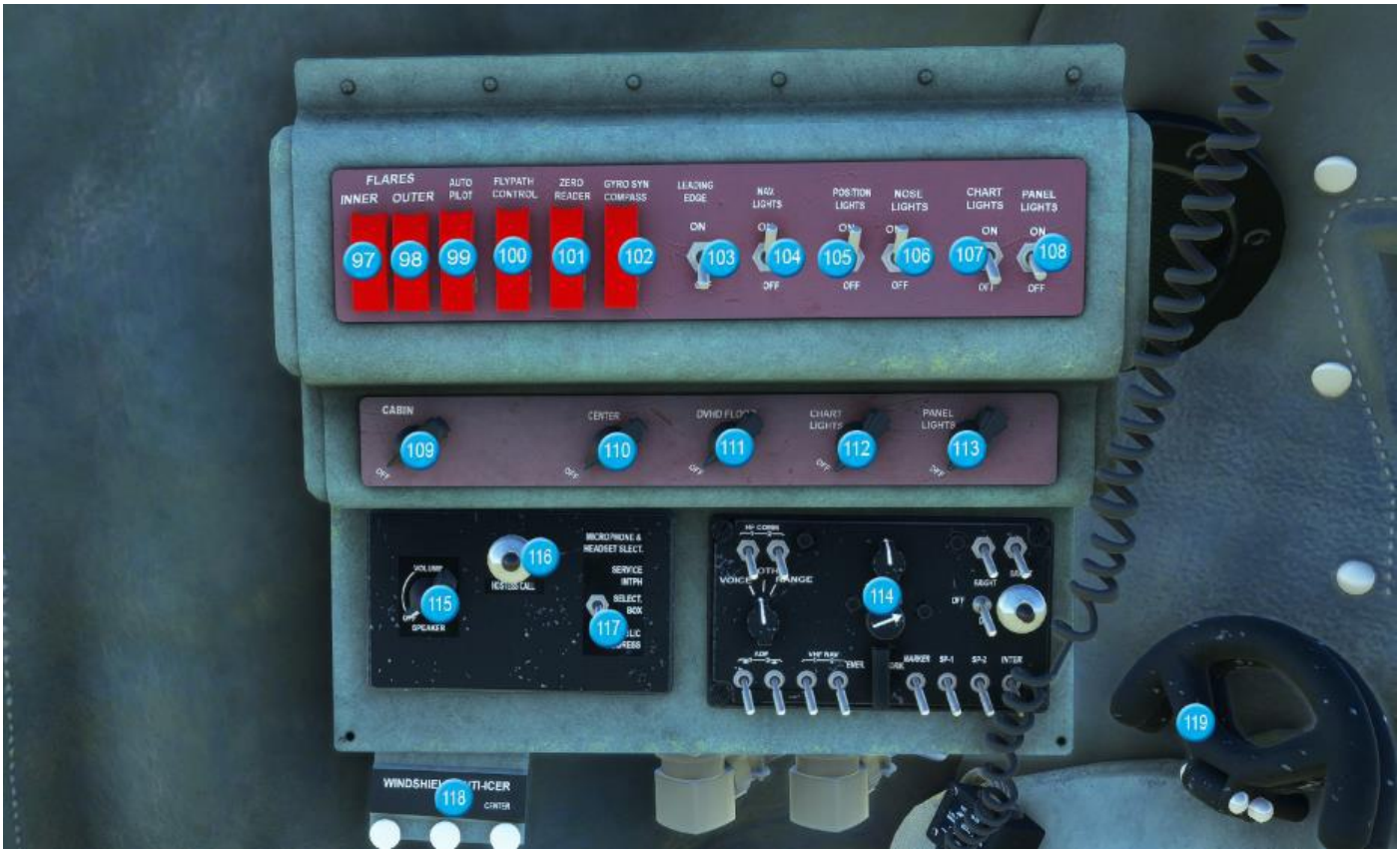


Q. CLIMATE – HEAT - PRESSURIZATION PANEL
R. CABIN HEATER EXTINGUISHER SELECTOR
S. TANK 2A/3A DUMP LEVER – LIFE RAFT RELEASE
T. COCKPIT/CABIN DOOR – HOSTESS CALL
U. RADIO OPERATOR SEAT AND AREA (INOP)
V. FIRE EXT. SELECTOR PANEL & SPARE FUSE PANEL

4.1.1. LEFT PANEL - PILOT

1. Autopilot warning light
2. Chronograph
3. Clock
4. Airspeed and true-airspeed indicators
5. Gyrosyn compass
6. Gyro horizon (vacuum)
7. Dual ADF indicator
8. Radio altimeter (AVQ-6)
9. Altimeter
10. Course Deviation Indicator (CDI)
11. Rate of climb indicator
12. RMI
13. AVQ-6 warning lights
14. Gyro compass controller
15. Turn and bank indicators
16. Pilot's static selector
17. De-ice pressure indicator
18. Vacuum gauge
19. Pilot's static source selector
20. Parking brake warning light
21. Pilot white glareshield light
22. Pilot red glareshield light
23. Localizer and glide path enabled indicators
24. Marker beacon indicator lights
25. Pilot chart flood light
45. DME
49. No go speed card

4.1.2. LEFT SIDE PILOT



97. FLARES INNER switches (if available)
98. FLARES OUTER switches (if available)
99. Autopilot breaker
100. Flight path breaker
101. Zero reader breaker
102. Gyro compass breaker
103. Leading edge light switch
104. NAV light switch
105. POSITION light switch
106. Nose light switch
107. Charts light master switch
108. Panel light master switch
109. Cabin light knob
110. Center panel light knob
111. Overhead flood light knob
112. Pilot's Chart light knob
113. Pilot's Panel light knob
114. Pilot's Radio selector box
115. Pilot's Speaker volume
116. Hostess call
117. Radio selector
118. Windshield blower anti-icer
119. Nose gear steering wheel

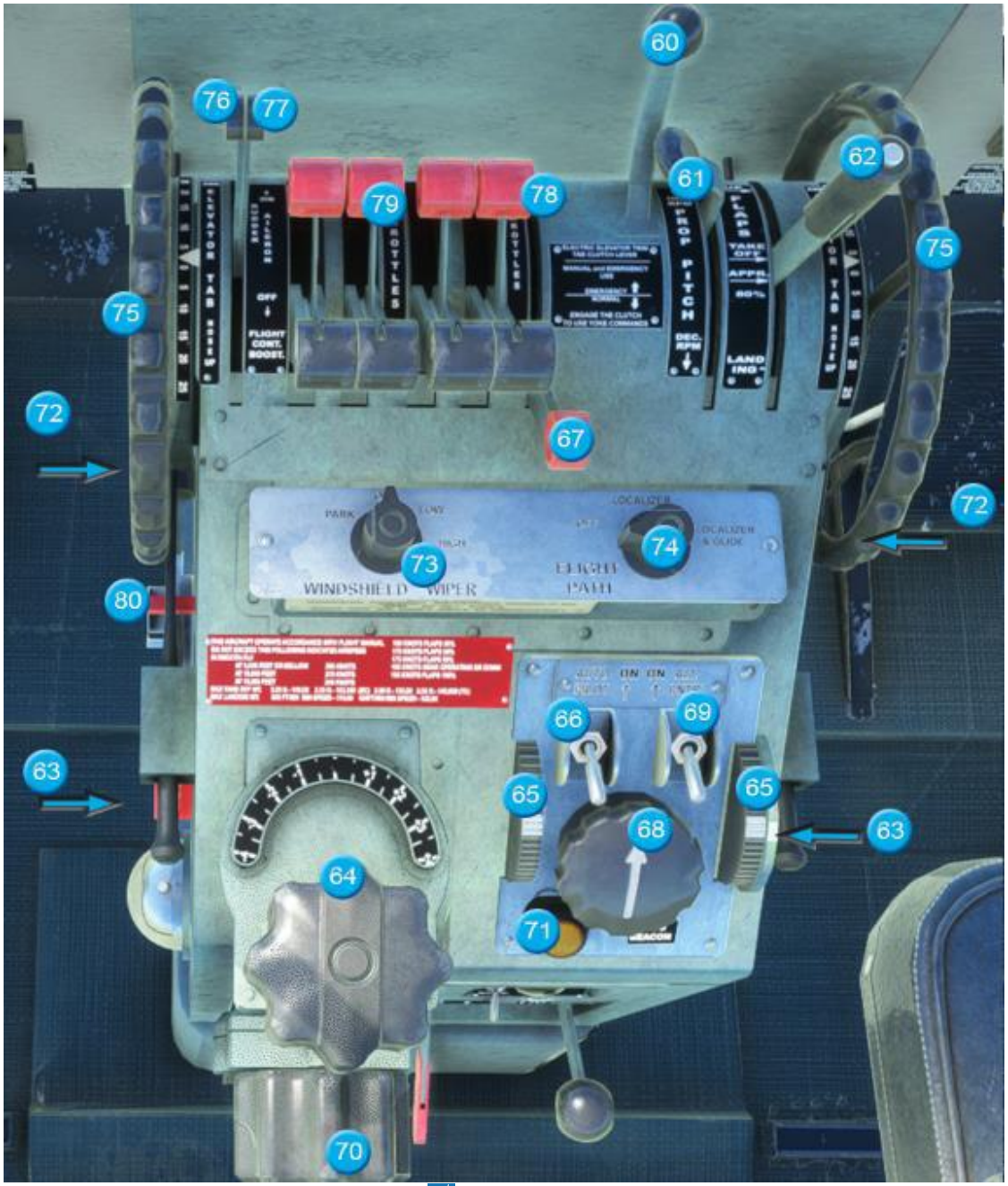
4.1.3. CENTER PANEL

25. Zero Reader indicator
26. Selector NAV1 or 2for ILS
27. Sector VOR1/VOR2
28. Selector ADF1/ADF2
29. Magnetic bearing selector
30. Fire warning light
31. Manifold pressure gage 1-2, 3-4
32. Tachometers 1-2, 3-4
33. Three axis trim indicator
34. Outside air temperature indicator
35. Wing flap position indicator
36. Landing gear position indicator
37. Propeller reverse pitch ind. Lights

4.1.4. COPILOT PANEL

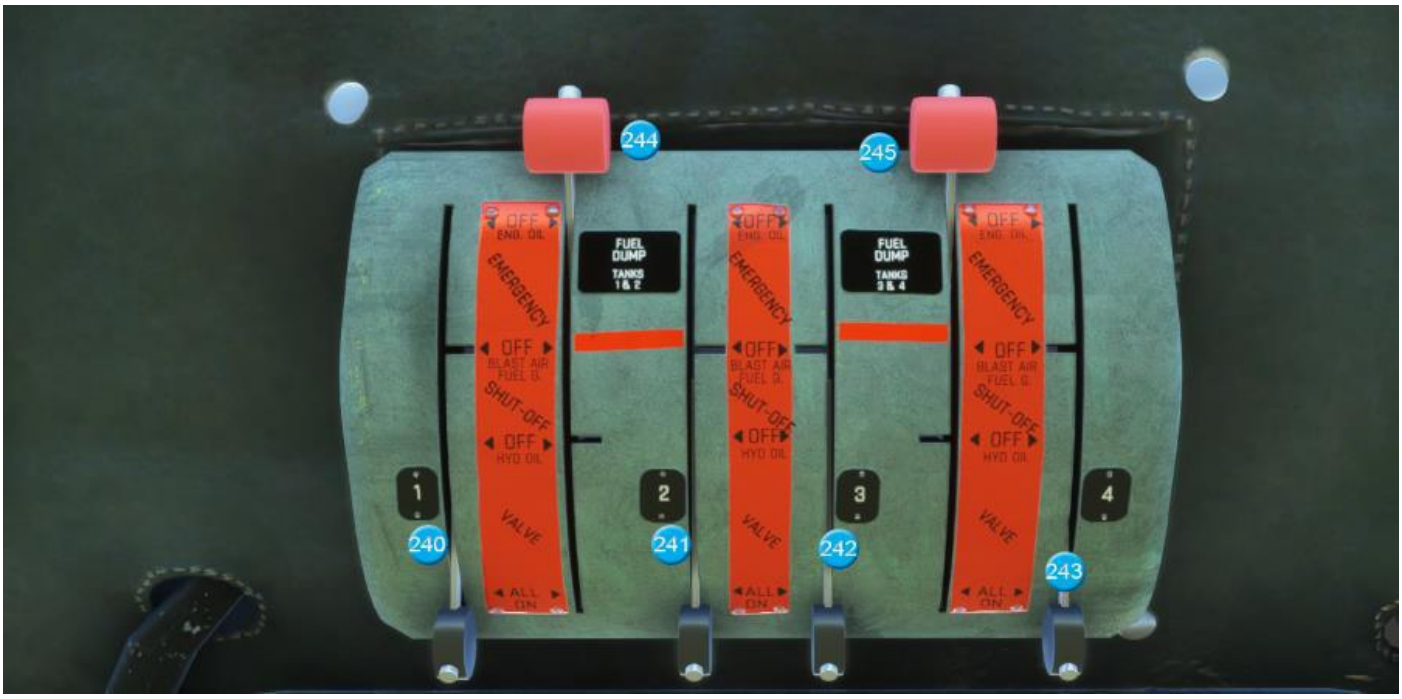
07. Dual ADF indicator
12. RMI
20. Parking brake warning light
24.Marker beacon indicator lights
41. Wing flap shut-off test
42. Airspeed indicator
43. Gyro horizon
44. Gyro compass indicator
45. DME
46. Altimeter
47. Course Deviation Indicator (CDI)
48. Rate of climb indicator
49. No go speed card
50. Turn and bank indicator (electric operated)
51. Copilot's static selector
52. Parking brake warning light
53. Copilot chart flood
54. Copilot red glareshield light
55. Copilot white glareshield light
56. Hyd. Pressure warning lights
57. Hyd1 & Hyd2 indicator
58. De-icer 1 & 2 indicator
59. Suction Indicator

4.1.5. BACK PEDESTAL



60. Electric elevator trim tab clutch lever
61. Master propeller pitch control lever
62. Wing flap control lever
63. Elevator booster control lever
64. Aileron trim tab knob
65. Auto pilot altimeter setting
66. Autopilot master switch
67. Reverse lock
68. Autopilot heading setting
69. Autopilot altimeter switch
70. Rudder trim tab knob
71. Autopilot gyro beacon light
72. Parking brake lever
73. Windshield wipers selector
74. Flight path selector switch
75. Elevator trim tab control wheels
76. Rudder booster control lever
77. Aileron booster control lever
78. Reverse pitch throttle levers
79. Throttle levers
80. Horn on/off lever

4.1.6. OVERHEAD BACK



240. Emergency shut-off valve ENG1

241. Emergency shut-off valve ENG2

242. Emergency shut-off valve ENG3

243. Emergency shut-off valve ENG4

244. Fuel dump lever (tank 1 & 2)

245. Fuel dump lever (tank 3 & 4)

4.1.7. OVERHEAD FRONT

81. Overhead pilot flood light
82. Ignition switches
83. Taxi light extend-retract switches
84. Taxi light switches
85. Ordinance light switches
86. Elevator aux. boost breaker
87. Elevator aux. boost switch
88. Rudder aux. boost switch
89. Rudder aux. boost breaker
90. ADF 1
91. VHF - COM 1
92. VOR - NAV 1
93. VHF - COM 2
94. VOR - NAV 2
95. ADF 2- INOP (This will become a TACAN)
96. Sun visor left & right
97. Transponder

4.1.8. MJB PANEL

120. Generators filed relay tripped lights
121. D.C voltmeter and selector
122. A.C. voltmeter and selector
123. Ground power on indicator light
124. D.C. ammeters
125. Generator field circuit breaker
126. Instrument inverter switch
127. Radio inverter switch
128. NESA inverter switch
129. F.I. Desk light
130. Dome light red/white switch
131. Fuselage relay closed indicator lights
132. Nacelle relay closed indicator lights
133. Propeller anti-icer switches
134. Engine starter selector switch warning light
135. Engine prime
136. Engine Starter
137. Engine starter selector switches
138. Cart light
139. cart/ground power switch
140. Battery master switch
141. Generator switches
142. Generator warning lights
143. Carburetor de-icer

4.1.9. FLIGHT ENGINEER'S LOWER PANEL

151. Master propeller control lever
152. Throttle levers
153. Engine low/high supercharger control levers
154. Mixture control levers
155. Fuel tank 1 & 2/2A selector levers
156. Fuel tank 3/3A & 4 selector levers
157. Ignition analyzer controller
158. Carburetor cold air control switches
159. Carburetor ram air control switches
160. Cowl flaps switches
161. Sparks control
162. Engine 1 or 2 master synchro. selector switch
163. Oil cooler flaps switches
164. Propeller synchronization button
165. Propeller RPM INC/DEC switches
166. Auto feather 1,2,3,4 switches and cover
167. Fuel pump low/off/high TANK 1 switch
168. Fuel pump low/off/high TANK 2A switch
169. Fuel pump low/off/high TANK 3A switch
170. Fuel pump low/off/high TANK 4 switch
171. Aux. fuel pump switches TANK 2 - 3 - 5
172. Fuel / oil consumption and autonomy
173. Dynamic table charts
174. NOTEBOOK
175. Fuse Panel (propeller and pumps)

4.1.10. FLIGHT ENGINEER'S UPPER PANEL

210. Propeller governor warning position
211. Supercharger temperature indicators
212. Fuel pressure warning lights
213. Cowl flap position indicators
214. BMEP gauges
215. Fuel pressure indicators
216. Cylinder head selector
217. Synchro scope
218. Oil low pressure warning lights
219. Cylinder head temp indicators
220. Manifold pressure indicators
221. Hydraulic quantity indicator
222. Oil pressure indicators
223. Fuel flow indicator
224. Master fire warning light
225. Tachometers
226. Hydraulic system pressure indicator
227. Oil inlet temp indicator
228. Inclinometer
229. Door OPEN warning light
230. Hydraulic pump low pressure warning lights

4.1.11. FLIGHT ENGINEER'S OVERHEAD

180. Oil quantity indicators
181. Oil out temperature indicator
182. Carburetor air temperature indicator
183. Outside Air Temperature
184. Oil quantity indicator
185. Altimeter's indicator
186. Airspeed indicator
187. Clock
188. Fuel total quantity indicator
189. cooler quantity indicator
190. Oil cooler flaps indicators
191. Fuel tank 2A quantity indicator
192. Fuel tank 1 quantity indicator
193. Fuel tank 2 quantity indicator
194. Fuel tank 5 quantity indicator
195. Fuel tank 3 quantity indicator
196. Fuel tank 4 quantity indicator
197. Fuel tank 3A quantity indicator
198. Vacuum warning light

4.1.12. FLIGHT ENGINEER'S OVERHEAD ROOF

250. Auto feathering covered switch and warning light

251. Feathering test Eng. 1 covered switch

252. Feathering test Eng. 2 covered switch

253. Feathering test Eng. 3 covered switch

254. Feathering test Eng. 4 covered switch

255. Warn. Light feathering test eng.1

256. Warn. Light feathering test eng.2

257. Warn. Light feathering test eng.3

258. Warn. Light feathering test eng.4

259. Spark control 1 2 3 4

260. Instrument panel F.E. DIM. Knob

261. Interphone (INOP.)

262. Oil dilution 1 2 3 4

263. STA.260 panel F.E. DIM. Knob

264. Instrument AUX. F.E. DIM. Knob

265. Galley call switch / and light

266. Navigator call / hostess call switch / and light

267. HYD 1/HYD2 cross over switch

268. Mechanic call and sound

269. APU START cover & switch

270. APU STOP cover & switch

271. Exhaust over-temp shutoff light

272. Fuel low pressure light

273. Oil high temperature light

274. APU exhaust temp display

275. APU RPM % 0 to 100 display

276. GEN selector (inop.)

277. APU GEN ON cover & switch

278. APU GEN OFF cover & switch

279. APU fire warning light

280. APU fire switch

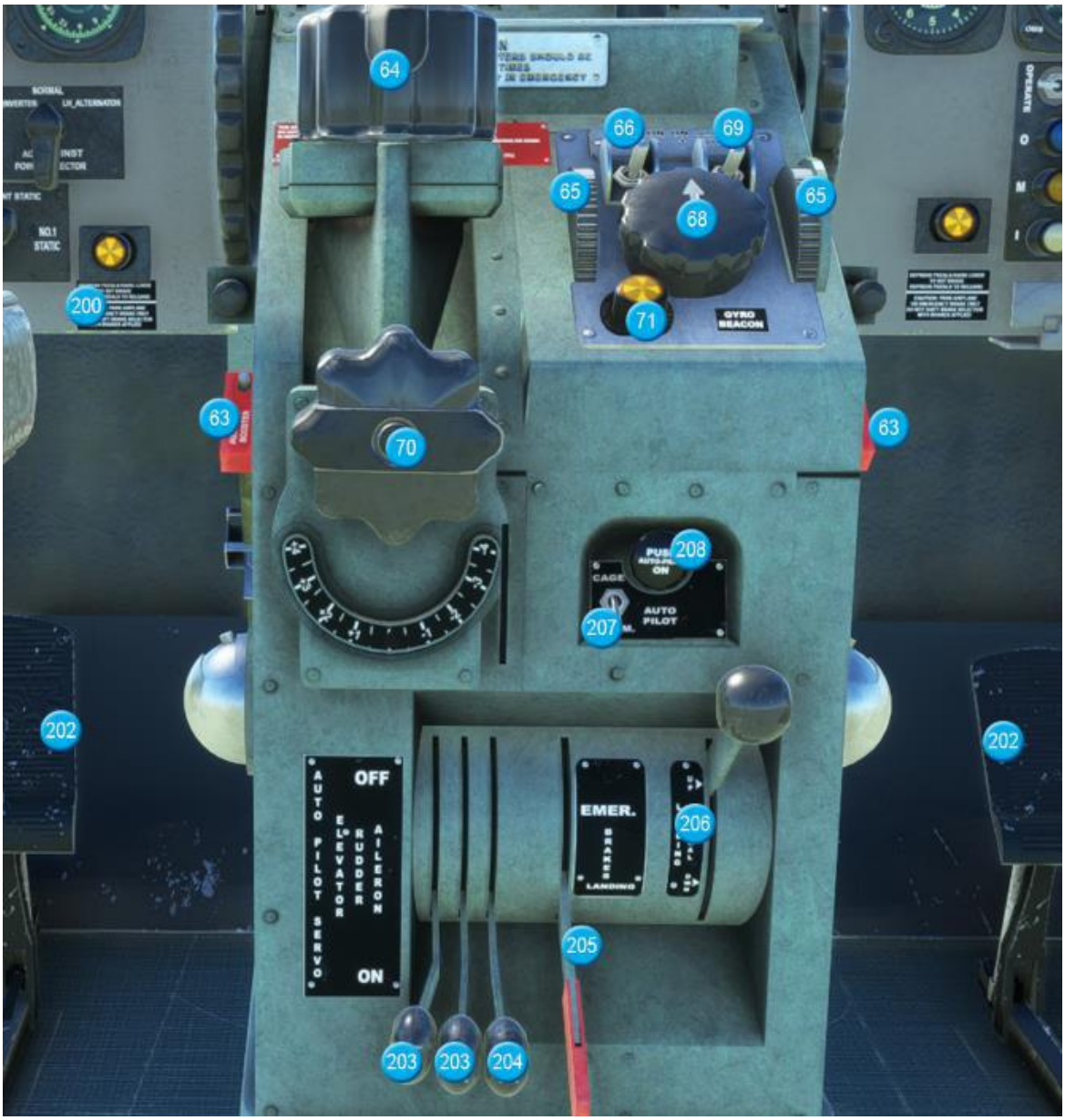
281. GEN field OFF light

282. APU GEN breaker

283. APU fire alarm breaker

284. APU GEN amp & volt display

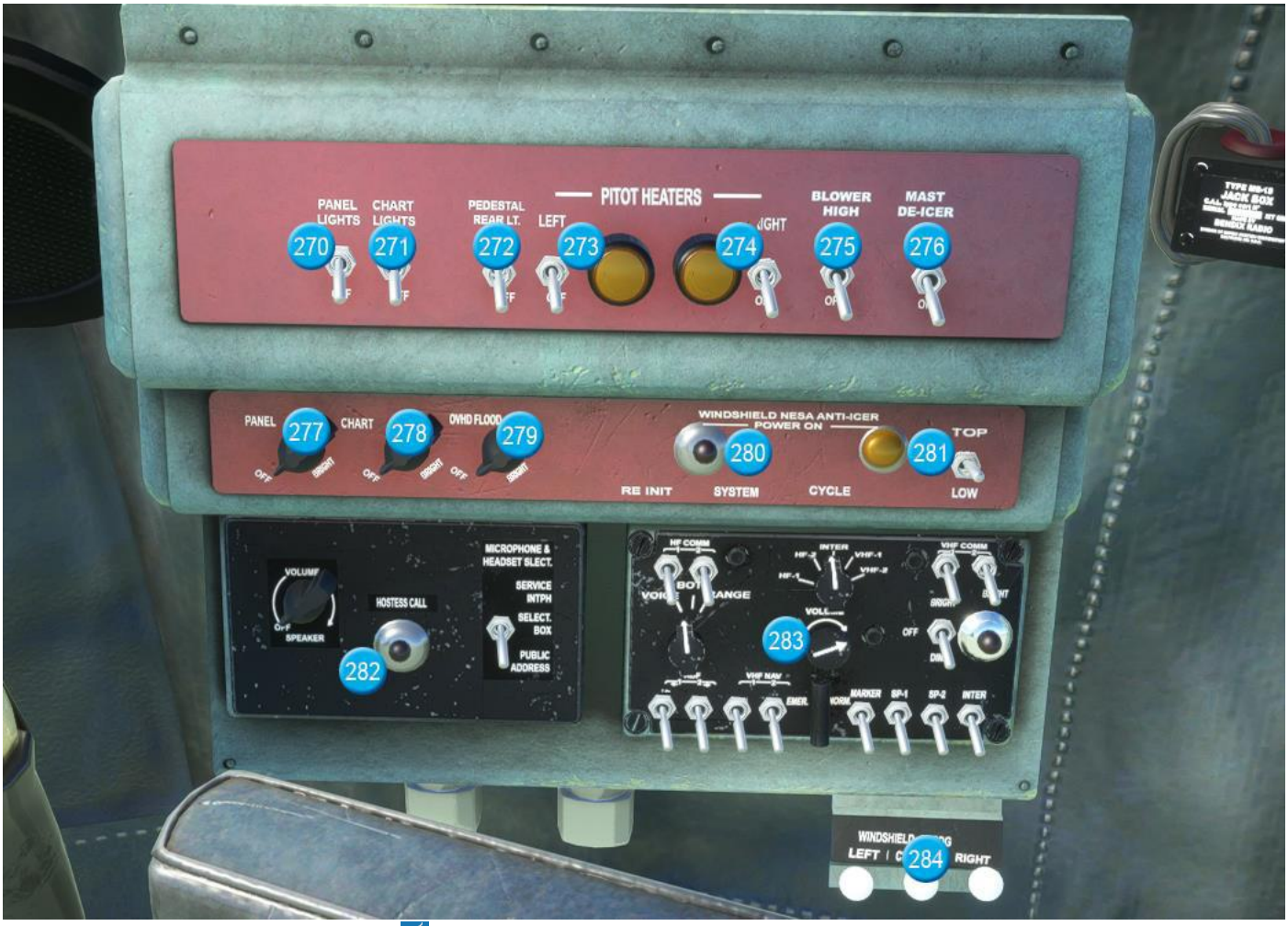
4.1.13. PEDESTAL FRONT



63. Elevator booster control lever
64. Aileron trim tab knob
65. Auto pilot altimeter setting
66. Autopilot master switch
68. Autopilot heading setting
69. Autopilot altimeter switch
70. Rudder trim tab knob
71. Autopilot gyro beacon light

200. Rudder pedal / brake pedal PILOT
201. Rudder pedal / brake pedal COPILOT
202. Ashtray
203. Elevator Autopilot servo disconnect lever
203. Rudder Autopilot servo disconnect lever
204. Aileron Autopilot servo disconnect lever
205. Emergency gear lever
206. Gear lever
207. Gyroscope Autopilot
208.Autopilot clutch

4.1.14 COPILOT SIDE PANEL



270. Panel light copilot master switch

271. Chart light master switch

272. Pedestal light switch

273. Left Pitot heating switch

274. Right Pitot heating switch

275. of/high windshield blower switch

276. Mast antenna de-icer switch

277. Panel copilot light knob

278. Chart copilot light knob

279. Overhead copilot light knob

280. reset press button windshield de-icer

281.Deicer selector low/high

282. Hostess call press button

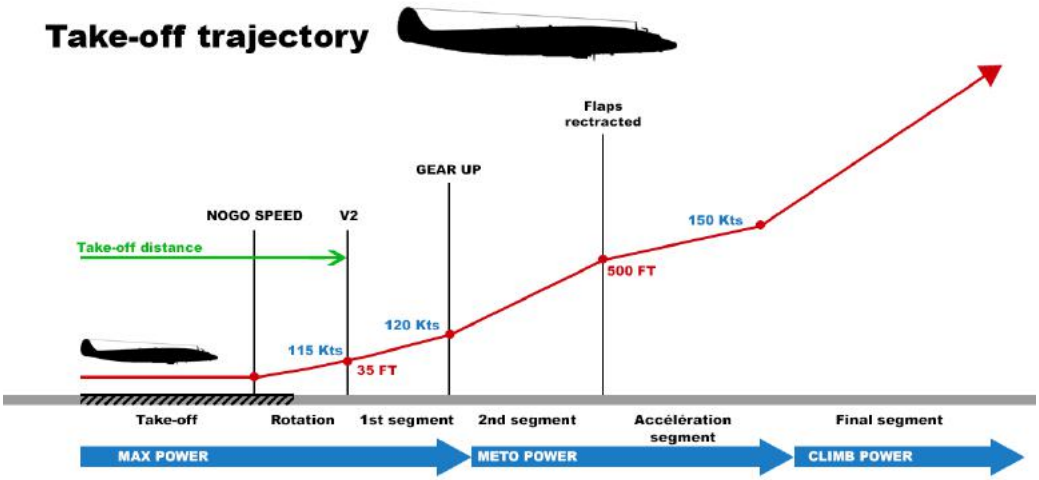
283. Copilot's Radio selector box

284. Windshield blower anti-icer

PROCEDURE

5. NORMAL PROCEDURES

5.1. TAKE-OFF



Pilot supervises the take-off and manages radios.
Copilot manages the aircraft.
Flight Engineer (F.E.) manages the throttle and all the engine's power.

Take off distance is calculated by pilot and announced before take-off.

No-Go speed is a speed at which, depending on the length and quality of the runway, take-off can be interrupted with one engine failure (V_1).

Pilot asks for "MAX POWER"

F.E. acknowledges "MAX POWER" then pushes throttles to max manifold pressure within 5 sec. In addition, he sets full AutoRich mixture, manifold pressure 54.5 to 59.5 (according to weight mass) in Hg, and propeller set to 2900 RPM
Copilot releases the brakes and start rolling for take-off. He announces when no-go speed (V_1) is achieved and when lift-off.

After lift-off at 120 kts with a positive rate of climb established, the Pilot request gear up (from Copilot) then asks for METO POWER
F.E. acknowledges "METO POWER" and he adjusts manifold to 47-50 in Hg and 2700 RPM (see tables: POWER SETTINGS LOW BLOWER P77)

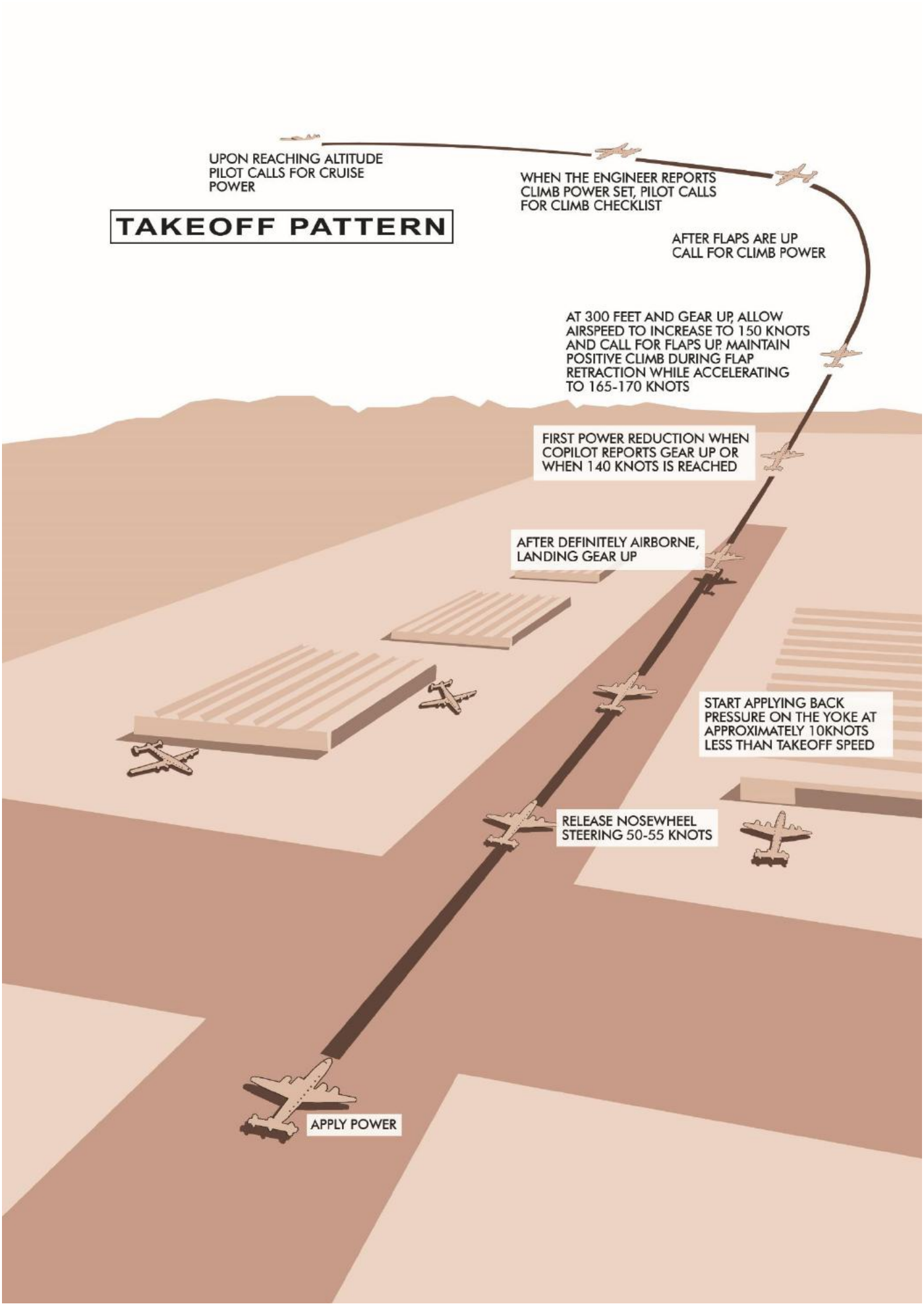
At 500ft, the Pilot request Flaps retraction and manages attitude to increase speed to 150 kts.
Copilot retracts flaps.

Pilot asks for "CLIMB POWER"

F.E. acknowledges "CLIMB POWER" and adjusts throttles to set BMEP – 2600 RPM – 40 in Hg (see tables: POWER SETTINGS LOW BLOWER P77)

Please read the checklist for more details

Please read the tables for more technical information


TAKEOFF PATTERN
UPON REACHING ALTITUDE PILOT CALLS FOR CRUISE POWER
WHEN THE ENGINEER REPORTS CLIMB POWER SET, PILOT CALLS FOR CLIMB CHECKLIST
AFTER FLAPS ARE UP CALL FOR CLIMB POWER
AT 300 FEET AND GEAR UP, ALLOW AIRSPEED TO INCREASE TO 150 KNOTS AND CALL FOR FLAPS UP. MAINTAIN POSITIVE CLIMB DURING FLAP RETRACTION WHILE ACCELERATING TO 165-170 KNOTS
FIRST POWER REDUCTION WHEN COPILOT REPORTS GEAR UP OR WHEN 140 KNOTS IS REACHED
AFTER DEFINITELY AIRBORNE, LANDING GEAR UP
START APPLYING BACK PRESSURE ON THE YOKE AT APPROXIMATELY 10KNOTS LESS THAN TAKEOFF SPEED
RELEASE NOSEWHEEL STEERING 50-55 KNOTS
APPLY POWER

5.2. Cruise

Cruise power is requested by the pilot.

F.E. manages BMEP, RPM, LOW or HIGH BLOWER and MIXTURE to obtain a fuel flow and a TAS according to the tables: POWER settings LOW BLOWER (P77)

 Please read the checklist for more details // Please read the tables for more technical information

5.3. Descent and Landing

This is a simplified descent and approach procedure overview. Please refer to the descent before landing checklist for more detailed information.

Initial descent from cruise is initiated under cruise power (xx RPM xx In Hg) to either an intermediate altitude assigned by ATC or the altitude prior to establishing final approach (for example ILS Glideslope). If a steeper descent is required, or at least 10nm before establishing final approach, power is reduced to descent power (xx RPM xx inHg) to reduce speed, extend flaps and gear on schedule as follows:

- At 180Kts, set flaps 60%
- Continue to reduce speed further to 140 Kts before establishing final approach
- Shortly before that, at 150 Kts max, put gear down and set flaps 80%
- Approximately 4nm before touchdown, reduce to landing speed of 115 Kts, and set flaps 100%
- Maintain positive thrust (*do not reduce throttle to idle*) until touchdown
- Apply reverse thrust only after nosewheel has touched down

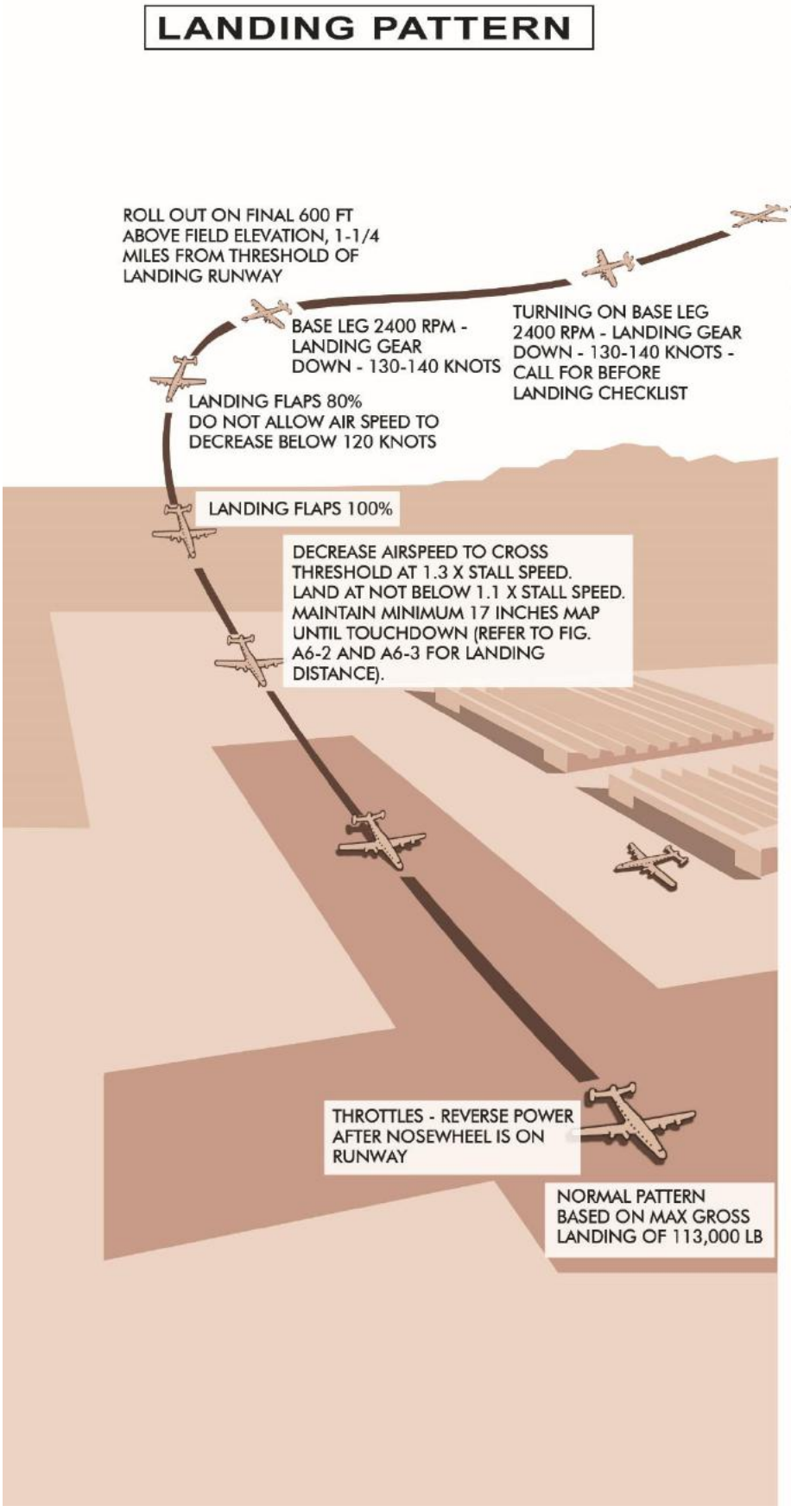
 Please read the checklist for more details // Please read the tables for more technical information

When landing on wet runways, apply the brakes lightly and intermittently for the initial phase of the landing run. After most of the weight is on the landing gear, more brake pedal pressure may be used, but applications must continue to be intermittent (There is no ABS in the 60's) to prevent skidding.

5.4. Go-around procedure

- Request MAX power (xx RPM xx inHg) (see tables: POWER settings for P77)
- Set take-off flaps
- Request gear up
- When a positive rate of climb and sufficient terrain clearance is achieved,
- Request Climb power (2900 RPM 54.5 to59.5 inHg) (see tables: POWER settings for P77)
- Set flaps 0 and set up for another approach as directed by ATC or your approach plate

LANDING PATTERN



IAS - KNOTS (NO.2 STATIC SYSTEM) BASED ON POWER FOR ZERO THRUST AT 1.1 X V STALL. ZERO BANK ANGLE - 1-G VERTICAL ACCELERATION.

FLAPS AND GEAR UP			
STALL SPEED X	1.3	1.1	1.0
145,000 LB	161	135	124
140,000 LB	157	133	121
137,500 LB	156	132	120
135,400 LB	154	131	119
133,000 LB	153	129	118
130,000 LB	151	128	117
122,000 LB	146	124	113
113,000 LB	141	120	109
100,000 LB	133	113	104
90,000 LB	127	108	98
60% FLAPS AND GEAR DOWN			
145,000 LB	140	119	109
140,000 LB	138	118	108
137,500 LB	136	117	107
135,400 LB	135	116	106
133,000 LB	135	115	105
130,000 LB	133	114	104
122,000 LB	128	110	101
113,000 LB	124	106	98
100,000 LB	117	100	92
90,000 LB	111	96	88
80% FLAPS AND GEAR DOWN			
145,000 LB	129	110	100
140,000 LB	127	108	99
137,500 LB	126	107	98
135,400 LB	125	106	97
133,000 LB	124	106	97
130,000 LB	123	104	96
122,000 LB	119	101	93
113,000 LB	115	97	89
100,000 LB	109	92	84
90,000 LB	104	87	80
100% FLAPS AND GEAR DOWN			
145,000 LB	126	106	96
140,000 LB	124	104	95
137,500 LB	123	103	94
135,400 LB	122	103	93
133,000 LB	121	102	93
130,000 LB	119	101	92
122,000 LB	116	97	89
113,000 LB	111	94	85
100,000 LB	104	89	81
90,000 LB	99	84	77

RECOMMENDED SPEED AT 50 FT

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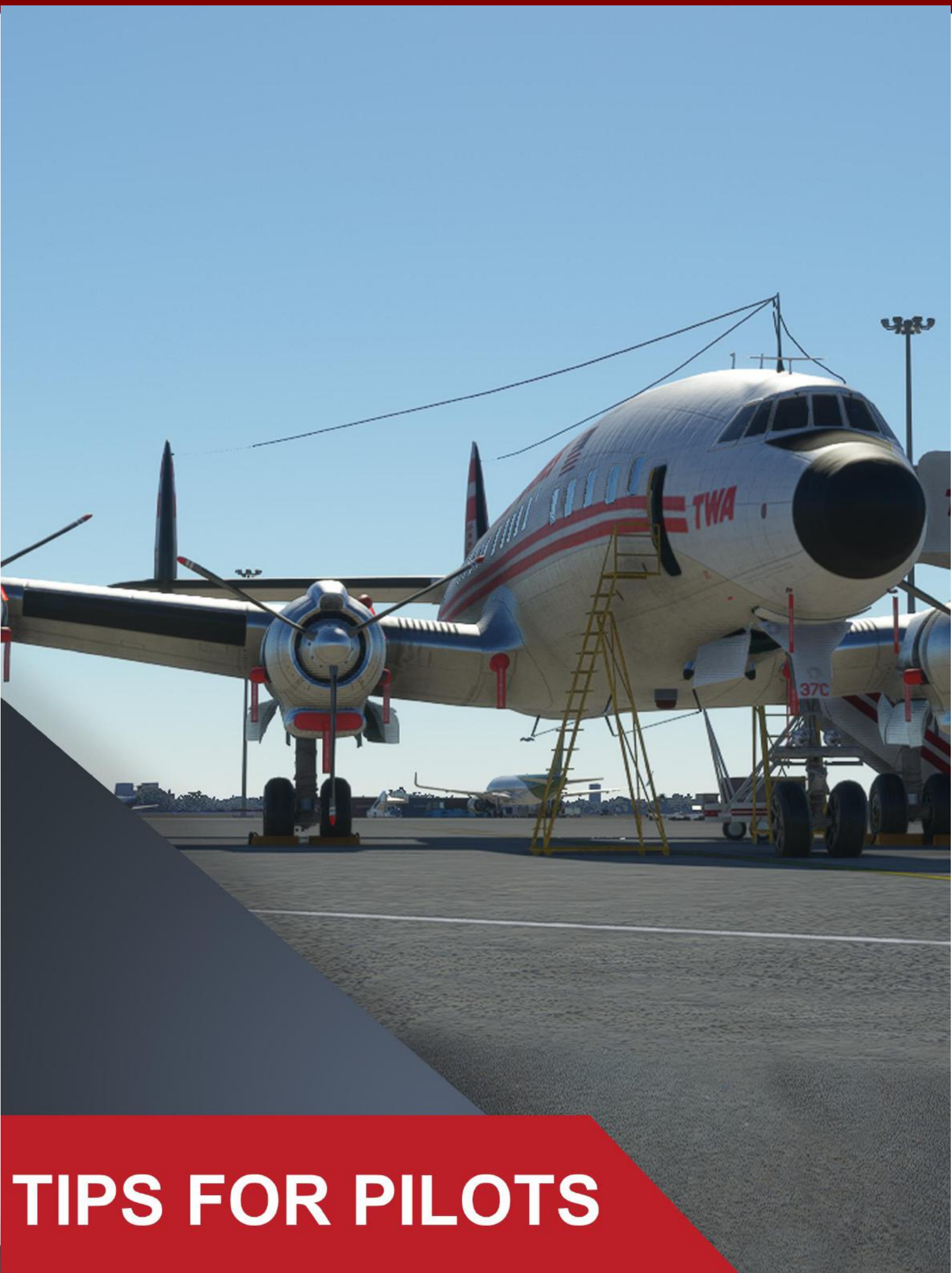


TIPS FOR PILOTS

6. TIPS FOR PILOTS

6.1 Engine vibrations

It is imperative to avoid a range between 1200 and 1300 RPM, for long periods of time, as to avoid a dangerous zone of vibration causing deterioration of the motors.

6.2 During Taxiing

The mechanical hydraulic pumps are deactivated if the motors are reduced below 1300 RPM.
So, during the taxi, it is problematic to reduce the motor RPM below 1300 RPM to decelerate the plane. The pilot must therefore continuously brake during taxiing for takeoff.

After the landing, it was common, for pilots taxiing towards the FBO parking, to cut the engines 1 and 4. In this power configuration, it is not necessary to brake for the taxiing due to slow speed of taxi.

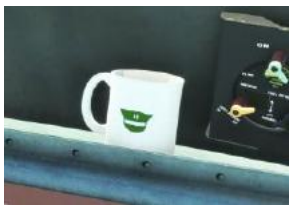
This procedure is also used when the taxiways are short.

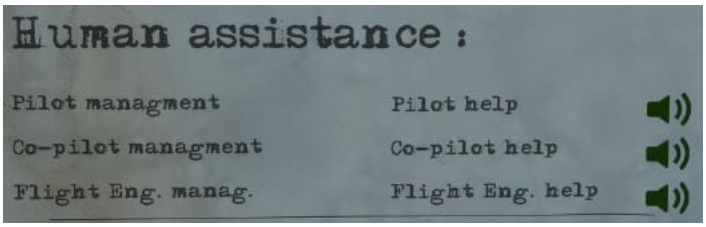
6.3 AI in game

Artificial intelligence is designed to relieve you of certain tasks, allowing you to focus on one or two roles and letting the computer do the rest.

Pilot, Copilot and Flight Engineer symbols above – left to right

AI management is summarized at the top of the clipboard and also indicated by the appearance of a coffee cup when the station is managed by AI





The first page of the clipboard allows you to select the AI roles giving you the control to remove or activate the pilot, co-pilot and flight engineer assistance or voices.

In addition, the orders page also gives access to the AI selection for the three roles.

More information is available in chapter 5.55

6.3.1 AI PILOT

You can let the pilot manage certain functions or phases of flight to take advantage of your role as co-pilot or flight engineer (F.E.)

Take-off phase:

As soon as you are lined up on the runway and ready to take off, engage the "autopilot takeoff"

The pilot takes the controls, orders the engine power.

You just have to release the parking brakes and the plane will take off to climb to the indicated altitude.

The pilot orders the gear up, the flaps and the post takeoff checklist which you will have to manage.

He also manages the climb attitude to maintain a minimum speed of 170Kts.

If the AI co-pilot is activated it will execute the AI pilot's orders, otherwise you will have to execute the AI pilot's requests

You can change the altitude by using the arrows

Single arrows +/- 500 ft Double arrows +/- 1000 ft

Select the altitude and press "Manage altitude" to bring up a green confirmation arrow.

The AI pilot will take the flight control and manage the power to reach the desired altitude. At the selected altitude he will request cruise power configuration

It is possible to modify the altitude during the autopilot TAKEOFF or if you decide to change altitudes and select the Pilot or Copilot to manage to climb

Altitude

When the red padlock icon appears, the course management is locked by another process.

Heading

Select a heading on the compass rose and press manage heading to display a green confirmation arrow.

The pilot takes control and activates the autopilot to the desired heading.

When the red padlock icon appears, the course management is locked by another process.

The speed management is used and updated during the auto pilot takeoff, cruise and landing phases.

It is not yet usable when selecting a speed

Landing phase:

The AI pilot can manage the entire descent and landing phase if a Localizer and/or ILS frequency is selected and the NAV radio is receiving.

The AI pilot takes control and activates the auto pilot. He requests power, descent and approach checklists, gear and flaps 60-80 and 100%.

He follows the loc & glide slope and steers the aircraft until the wheels touch.
He manages the speed to 180 kts at the beginning of the process then 140 kts during the final and 110 kts at touchdown.

6.3.2 AI COPILOT

The AI copilot allows you to choose to manage the takeoff or the landing.

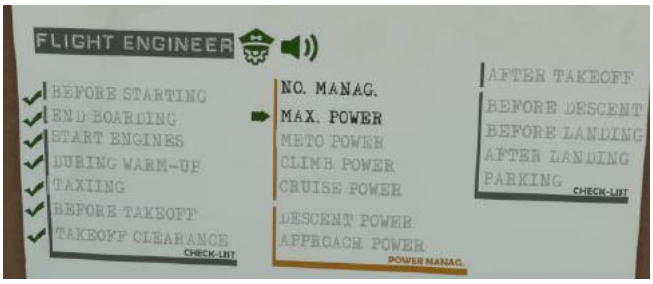
During these phases, the copilot executes the pilot's orders to manage the autopilot, gear, flaps, throttle, RPM settings or perform the checklists required for the phase of flight you are in.

You must select the AI copilot then choose manage takeoff or landing to display a confirmation arrow.

6.3.3 AI FLIGHT ENGINEER

The FE of the L1049 has a very important role.
Some commands are only available from his position, such as the engine mixture.

During takeoff, he is the only one to manipulate power, throttle, mixture and propeller pitch after pilot requests max power.



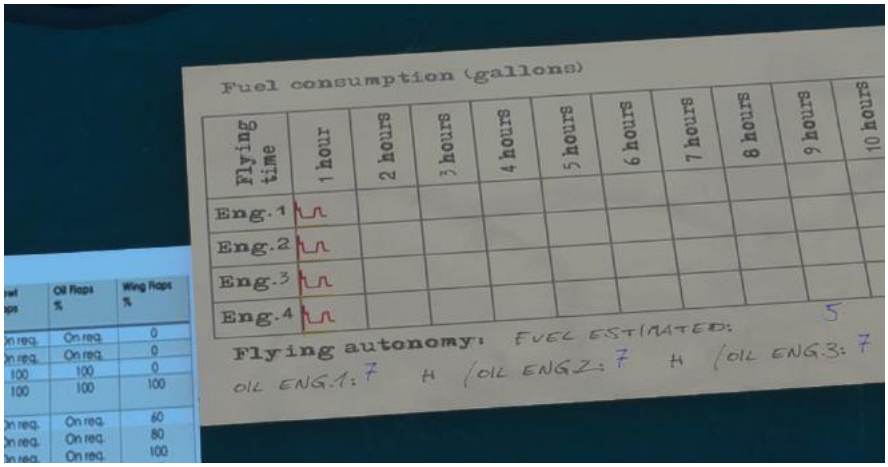
If you activate the AIFE, he will manage power configurations for you during takeoff, cruise and/or landings.

Each power configuration is defined by RPM, BMEP, InHg of manifold, mixture (Fuel Flow) and propeller feathering.

These values vary according to the weight and the altitude of the aircraft.

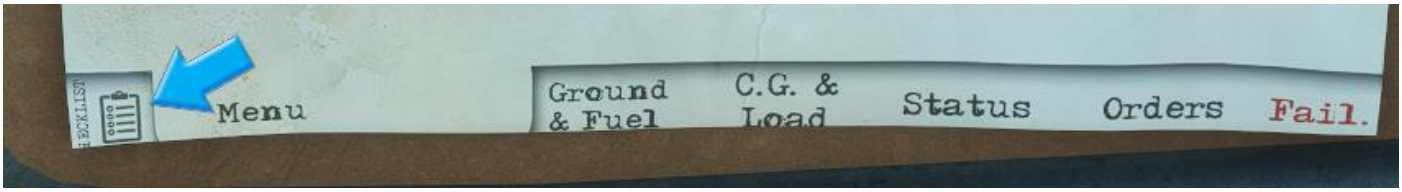
The dynamic data is available on the tables (above) on the desk of the F.E.. They are highlighted by phase of flight and current weight to make it easy for you to see how the engines need to be managed.

In simple and normal mode, this data is dynamically displayed for easier readability.



A "data chart" display fuel flow over the time.

6.3.4. CHECKLIST ON CLIPBOARD



A pictogram placed at the bottom left of the clipboard allow access to the various paper checklists.

6.3 Center of gravity and G. in game

6.4 Variables persistency

Some variables are saved each time the game is closed or the plane is disabled by returning to the menu.

We use these variables to give persistence to the aircraft, to save technical data for maintenance purposes and in the future to create a career mode for your pilots and aircraft fleets.

Engine (each) :

- Time of use
- Damage over time
- Failures fire, oil , fuel …Etc.
- Oil, extinguishers, deice and HYD fluids quantities

Clipboard :

- Essentials (ex.: yoke hidden, seat positions….Etc.)
- Fly mode
- GPS activation
- Clipboard position

Notebook :

position / status ‘open/closed)
page in use
Charts displayed dynamically or not

Failures :all

Carrer mode: W.I.P.

6.5 Career mode

This mode is under creation. It is not available in this version.
Nevertheless, you can use the option "delete all datas" to reset all persistent variables. This is particularly helpful after a major failure or crash. Using this will remove all conditions and return to a normal state. *Please use this option after a crash or major failure terminating a flight*

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SUPPORT & CREDITS

7. INSTALL AND SUPPORT

This product should be automatically installed to the right flight simulator scenery folder.

- "community" folder for SimMarket Buyer
- "Official/OneStore" for Marketplace and Steam Buyer

PLEASE SET YOUR MSFS FIGHT MODEL TO "MODERN" in general option.
(Every update could reset this option to legacy…causing throttle and brake problems)

In case of trouble please contact us:

Discord **https://discord.com/invite/5uCtPUwX2E**
Email **contact@redwing-copter.com**
Facebook **https://www.facebook.com/REDWINGSIM**

For updated information, Improvement efforts, fixes and optional installation advice, please check our website **https://redwing-copter.com/**

If you want 1K 2K 4K version, sceneries without certain landmarks...etc.
...You can ask us and we can provide assistance.

8. CREDITS

Authors: Bertrand D., Etienne C., Vincent L. and all subcontractors

We thank all helpers and beta-testers, dkgolfnut-Dennis and his father , LØU, Mirou, TwoCats (Martyn Cook) and especially "FlyingFrolic", jean-noël, eteokles, elblounge, Fogboundturtle, sebizart , easyraider, ditaildraggin68 and TheSmoke14.

A special thanks to all our customers for helping us create better products by requesting period specific features and giving helpful feedback on the support channels on Discord.

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MORE DETAILED INFORMATION

9. MORE DETAILED INFORMATION

The following pages will provide specific information about the following items:

ADF
APU
Ailerons, rudders, elevators and trims
Airspeed TAS, GS, and IAS
Altimeter and altitude
Air conditioning system
Autopilot and gyroscope
Auxiliary hydraulic and electric boosters
BMEP
Brake system
Clipboard
Clock
De-icing and NESA
Direction Indicator, Gyrosyn compass and Gyro flux gate statics
Electric system
Feathering & synchronization system
Fire detection system
Fire extinguishing system
Flaps
Fuel system
Gyro horizon
Hydraulic system
Ignition analyzer controller
Landing gear
Life raft
Lights - external
Lights - interior
Magneto / ignition
Marker beacon receiver
Oil engine system
Auxiliary oil tank and control
Outside air temperature
Oxygen system
Pitot static system
Radio altimeter / AVQ-6-9
Rate of climb
Reverse
Starter
Supercharger
Trim
Turn bank indicator and inclinometer
VOR
Windshield wipers
Zero -reader / ILS

ADF

ADF for Automatic Direction Finder designates the receiver on board the aircraft.

NDB for Non-Directional Beacon or Locator means the ground transmitting station.

The NDB
beacon is the oldest means of radio navigation since it was invented in 1920 by Fisher.
This non-directional radio transmitter, which broadcasts its signal in all directions and with the same power, is based on the principle of radio direction finding.

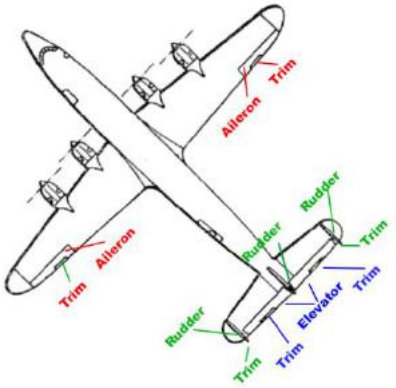
There are three types of transmitters:
- NDB often of great range of 100 to 200 Nm, it stakes the airways. Its code is generally composed of three letters;
- Locator of reduced range between 15 and 30 Nm near an aerodrome it is used as an approach and landing aid. Its callsign is usually composed of two letters. Not to be confused with the ILS localizer;
- Broadcasting system very long-range broadcasting transmitter

The ADFs are automatic. They provide permanently the bearing of the station on which they are tuned. The pilot or the co-pilot still can orientate the loop antenna by means of a crank in order to search for the best audible extinction (LOOP).
The needle instrument on board indicates the direction of antenna, but the wind rose is not a RMI radio magnetic indicator.
To read the heading directly to the antenna, the pilot must manually position the heading of the plane to the needle of the ADF instrument.
QDM: Heading to an ADF on a RMI or after Heading correction

QDR: Heading from an ADF on a RMI or after Heading correction

AILERONS RUDDERS ELEVATORS & TRIMS

Aileron, rudder, elevator and trims.



All the surface controls are assisted by hydraulic, but they can be disengaged to return to manual operation at the physical strength of the pilots and crew.

During the flight, trim adjustments on each axis must be made to maintain the aircraft in a stabilized flight configuration without holding pressure on the yoke.

See hydraulic section for axis command boosters and HYD 1/HYD 2 limitations in case of failure

See also Trim section for more information's

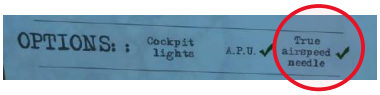
Airspeed TAS, GS, and IAS

IAS (Indicated Air Speed): (White needle) Speed read on the airspeed indicator. It is commonly used for piloting. However, this has known errors due to air density reducing as you ascend, so it will not show speed accurately through the air mass.

GS (Ground Speed): Ground speed, will be equal to the IAS speed with the variation due to the wind and the wind angle to the aircraft.

TAS (True Air Speed): (yellow needle) Speed of the aircraft relative to the air mass through which it is flying. This should be used for flight planning (Fuel, Distance, Time) and validation you are matching Charted TAS speeds located on FE workstation

The anemometer provides the speed of movement of the aircraft in relation to the air mass. This speed is called true air speed (TAS)

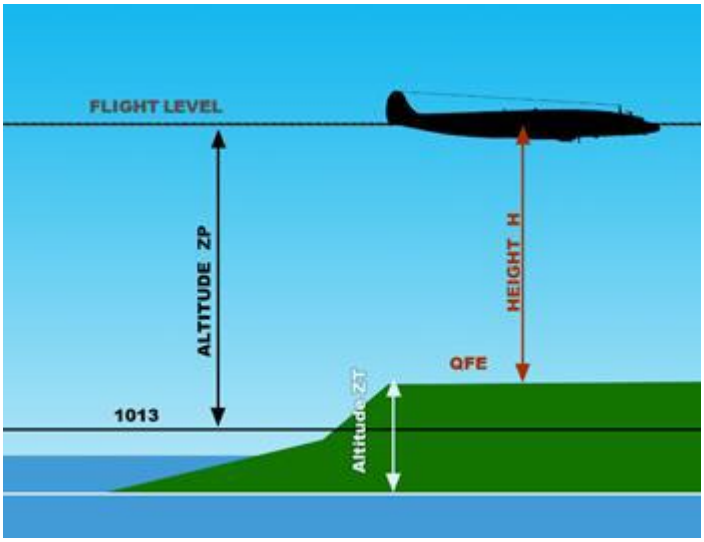
TAS needle option is available in the first page of clipboard menu OPTIONS 

Altimeter and altitude

The altimeter provides a pressure altitude. This measurement is based on the decrease in atmospheric pressure as altitude increases.

The altimeter is actually a barometer graduated in altitudes.

A knob is dedicated to modulate the reference pressure in InHg or Hpa



QNH: This setting is displayed in the adjustment window and is relative altitude to sea level pressure
On the ground, an altimeter set to QNH indicates the topographic altitude ZT of the airfield.
In flight, an altimeter set to QNH indicates a current altitude based on QNH value. Note that the QNH setting is only valid for a given sector/area of about 100 to 150Km around the station that provided the most current QNH.

The altitudes indicated on the maps are in function of the QNH.

QFE: This setting is used for the take-off and landing phases; displaying the pressure prevailing at the current location/airfield in the window.
On the ground before take-off, by setting the pointer to zero with the adjustment knob, you can read the QFE in the window.
In flight, an altimeter set to QFE indicates a height (altitude/pressure) relative to the airfield concerned.
The QFE can either be communicated by radio to the pilot or calculated from the local QNH and the altitude of the airfield. In case the QFE is transmitted by an air traffic service, the reference level is the official altitude of the aerodrome.

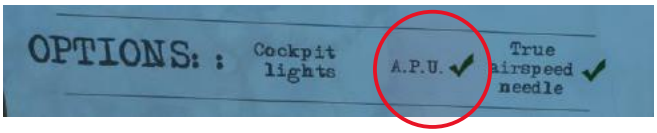
1013: This setting consists in displaying in the adjustment window the pressure that would prevail at sea level if the real atmosphere corresponded to the standard atmosphere.
This pressure is expressed in hectopascal. (i.e., 1013.25 hPa)
This setting is used for air traffic because it is independent of any measured or calculated pressure. It allows a correct spacing in the vertical plane of all aircraft flying in the airspace.

Air conditioning system

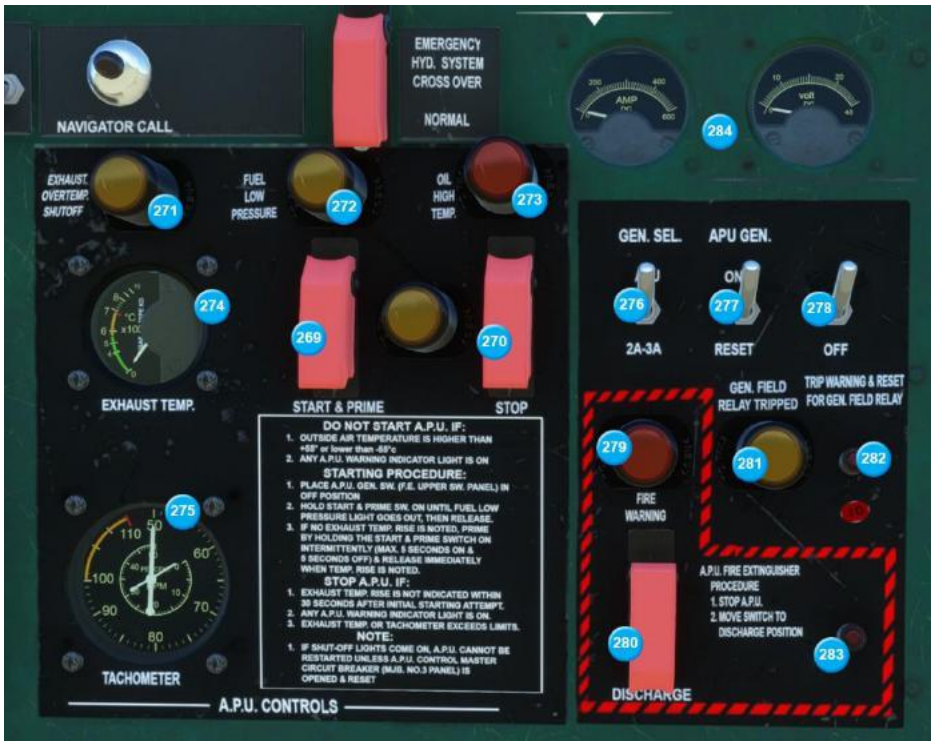
Work in progress

A.P.U.

The auxiliary power unit is a secondary engine system only available on military versions and optional for civilian versions A.P.U. is used to provide energy to start one engine without ground power unit.



APU is installed on Military versions, however you can, add this system as an option in main page of the clipboard while you are on the ground.



START & PRIME, STOP and ALL GEN buttons are mouse push-down type buttons. You need, for example, to push down (left click and hold) the "ON" button of the APU GEN (277) even if is already in the ON status/position. In addition, the APU GEN OFF Switch (278) in an up state and you need to push-down and hold to activate the OFF position shutting off the output in Volts.

To start APU, the Battery switch (139 on PANEL M.J.B. NO2) must be on. Next, open START & PRIME cover (269) and hold switch up until low fuel flow pressure light (272) turns "OFF". Then wait for Tachometer (275) to increase RPM to 100%. Please verify output in AMP and VOLTS on indicators (284) above GEN ON Switch.

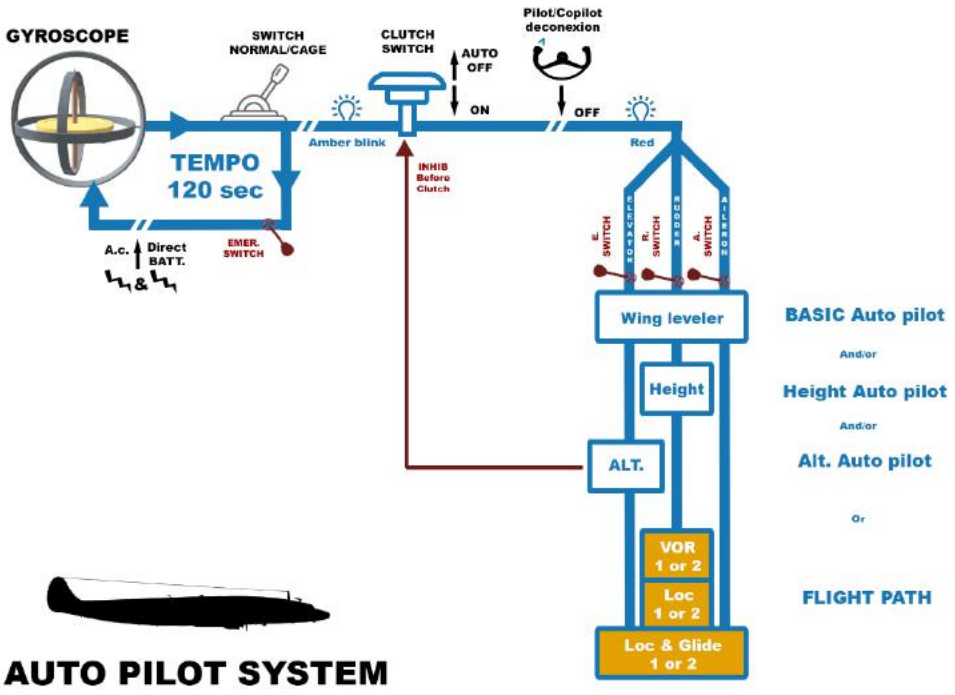
If no output in VOLTS turn off APU GEN output by tripping field relay switch (278). If no AMPS (284 indicator) are showing then activate generator reset by push-down APU GEN ON switch (277) to reset. It will spring back up to the ON position. Please verify output in AMP and VOLTS on indicators (284) above GEN ON Switch.

APU can only run for 5 minutes without damaging the unit. In case of EXHAUST OVERTEMP SHUTOFF light or OIL HIGH TEMP light, immediately stop the APU to avoid damage/fire.

In case of APU fire light and or audible warning, stop the APU and wait for RPM under 20% to discharge the fire extinguisher.
You can switch off the APU fire alarm via a breaker just to the right of the discharge switch.

Autopilot and gyroscope

Device indicating a constant direction thanks to an axis around which it turns.
An electric motor system drives the gyroscope at 20,000 rpm



Press the spring-loaded switch to "cage" to lock the gyroscope.
Wait 120 second to obtain the operational speed and the auto de-cage of the gyroscope.
An amber light should blink 45 times a minute when properly engaged.

Push the clutch switch to engage the auto-pilot system with the gyroscope.
If the clutch switch returns to stand-by position, verify:

- Gyroscope power is ON
- Gyroscope breaker on left side pilot's position is IN
- Autopilot Alt switch is not engaged

A red light should warn if the clutch is not engaged or auto pilot switch on the pilot's panel is not on.

By default, the basic PB-10 auto pilot is engaged via the left switch Autopilot (AP) ON. Roll and pitch control of the aircraft will be maintained at level.
Turn the "AP. Heading" knob (large knob in middle with arrow) will orient the ailerons & rudder to follow the heading selected on the big arrowed knob.
Pressing the "A.P ALT CNTRL" switch will orient the elevators to follow the vertical speed selected on the two black wheels on left and right of the A.P.

Selecting the flight director knob just in front of AP Switch will allow for three settings:
1. OFF position (turned to left side) keeps basic level flight both ailerons (roll) and elevator (pitch control).
2. VOR (middle setting) enables autopilot to track VOR's for cross country navigation using NAV1 radio.
3. LOC & Glide slope (turned to right side) for ILS and Localizer approaches using NAV1 radio.
The auto pilot will try to catch the VOR, LOC or LOC and glide when settings 2 or 3 are selected.

Three levers E.R.A for elevator, rudder and aileron in front of the pedestal, on lower left, are able to disconnect each individual axis from the autopilot in case of emergency. This is currently WIP.

The aircraft must be leveled and correctly trimmed before engaging the autopilot for best results.

NORMAL OPERATING PROCEDURE FOR AUTOPILOT PB-10 to engage the autopilot:

- AP Circuit breaker — IN
- AP Inverter Switch — ON
- Autopilot switch — OFF
- Servo disconnect levers — OFF/disconnected
- Altitude control switch — OFF (inhibit.)
- Gyro caged — (2 minutes delay at start) Gyro Beacon light will blink when delay is finished
- Clutch switch — Press IN after Gyro is caged
- Servo disconnect levers — ON/connected
- Autopilot Switch — ON
- ALT CNTRL Switch — ON (if desired for pitch control)

There is no autopilot altitude control nor auto throttle on the Super Constellation.
Pilot must maintain a constant airspeed during lock & glide auto approach unless you select Fully managed AI approach.

From time to time, and due to the quantity of data used by the auto pilot system, the aircraft may enter a vertical oscillation, dive, or abruptly depart in an uncontrolled turn. Disconnect Clutch, turn off AP and use the ERA levers to disconnect the auto pilot then slowly reconnect them and turn AP back on

To avoid such problems, Auto pilot should be disengaged and reengaged every two hours and the pilot must always have his safety belt fastened during the flight.

OSCILLATING SIGNALS: It can occur due to a failure in the automatic pilot follow-up circuit and will be evident by the oscillating movement of the controls.

- Operate the pilot's or co-pilot's yoke clutch button to cut the A.P.
- Pull out the pedestal clutch switch to cut the A.P.
- Or move the servo disconnect lever axis in default to off (then gradually to on) to rearm the axis.

AUXILARY HYDRAULIC and ELECTRIC BOOSTERS

The most important thing at all times is to be able to steer the aircraft.

All hydraulic commands for elevator and rudders are managed by HYD1 system.
HYD 2 is a backup to HYD1 in case of HYD1 failure.

After a total Hydraulic (1+2) failure, rudder and elevator can be managed by an electric power via Generator 1-4 or in emergency procedure using connection direct to battery power.

As last resort, the pilot can deactivate any form of control boost (hydraulic or electric) and manage all the commands manually by disconnecting electric boosters for elevator and rudder with switches above.
Or the aileron, elevator and rudder booster levers shown below

BOOSTER ELEVATOR and RUDDER

BOOSTER AILERON

There is no electric BOOSTER backup for ailerons due to a short distance of the aileron.

Using the controls in manual mode reduces the all-axis travel by 30%.

The pilot and co-pilot must operate the control wheel in pairs and use their physical strength to move them.

BMEP

BMEP - Brake Mean Effective Pressure is a design to evaluate the performance of an engine or to compare different engines.

The formula for British horsepower is

$$BHP = \frac{BMEP \times 29.5 \times 18 \times \frac{6.312}{12} \times \frac{RPM}{2}}{33000} = \frac{BMEP \times RPM}{236}$$

the power settings, the propeller RPM at which it is made to run, the manifold pressure at the carburetor outlet and the amount of fuel needed to produce power required.
But he doesn't know the real effort required from the mechanical parts of the engine to effectively run. This has to be calculated and is a constant the FE uses to set power configurations and understand how engines are performing.

This mechanical effort is proportional to the explosion pressure that occurs in the cylinder on the bottom of the piston minus the friction loss in the engine

The BMEP makes it possible to monitor the conditions under which the engine delivers its power, in order to avoid fatiguing/stressing it.

BRAKE system

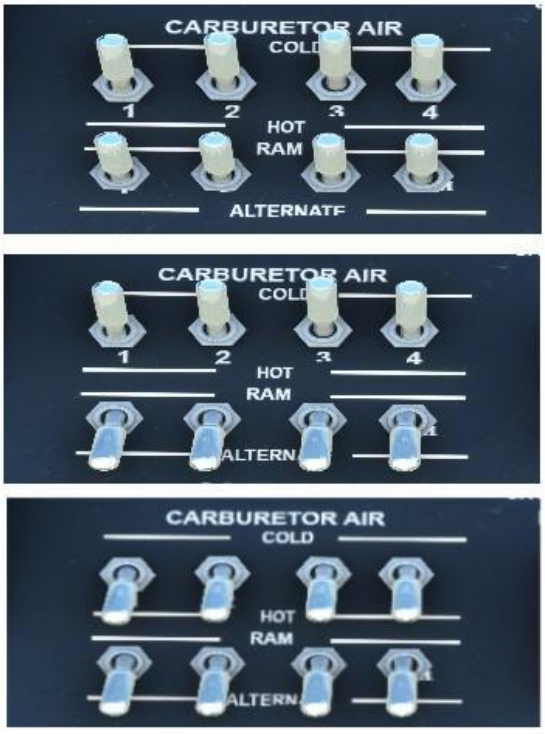
Work in progress

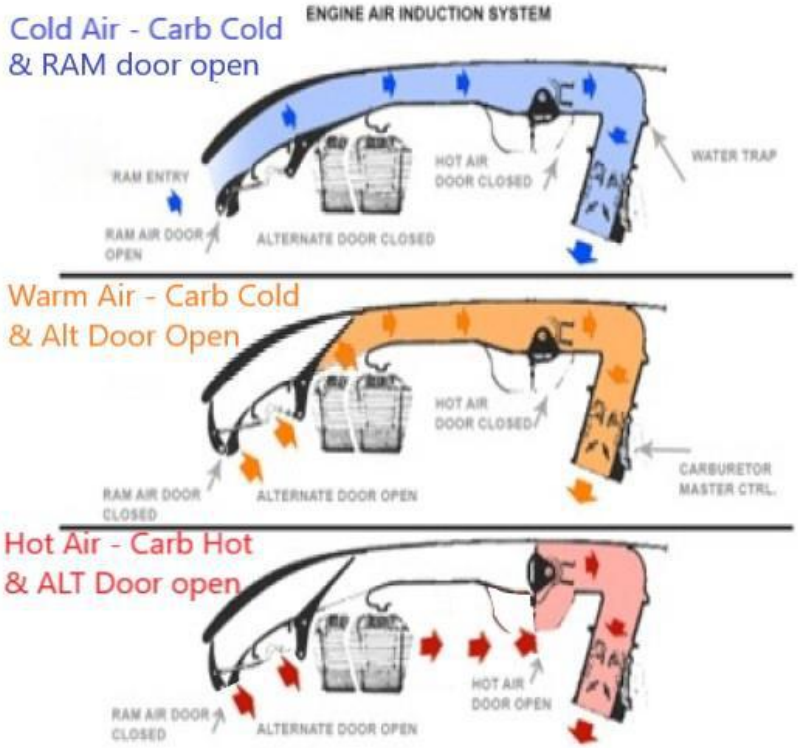
CARBURETOR and ENGINE INDUCTION system

Each engine utilizes a direct fuel injection system which consists of a carburetor, fuel flow divider, two injection pumps, and a fuel-injection nozzle for each cylinder.
The carburetor unit sense the amount of air passing through it and meters the correct proportion of fuel from the fuel metering chamber of the carburetor to the two injection pumps that are mounted on each side of the rear crankcase section of each engine.
Each injection pump is geared to the engine and contains nine plungers which time and distribute the metered fuel to the cylinder combustion chamber

Carburetor Alternate Fuel source
An alternate fuel source is provided within the fuel master control. This alternate fuel flow is intended to supply fuel flow for maximum cruise horsepower when the normal metering differential pressure is partially or totally lost, such as might occur during icing conditions.

The alternate fuel source is designed as an emergency system and not as a replacement for the normal alternate air, preheat, and alcohol procedures recommended for combating impact ice.





ENGINE ALTERNATE AND RAM AIR INDUCTION SYSTEM
Carburetor inlet temps are critical for an engine to meter fuel correctly and not experience icing conditions. A series of cowling devices/flaps are installed to help you manage the inlet temps to the carburetor.

- An induction scoop and duct, located in the top of each engine nacelle, collects and directs cold air directly to the carburetor. This setting should be used in any flight conditions that are warmer (no icing)
- An alternate air door allows warmer air from the cowling captured from in front of the cylinders. This setting should be selected during light icing conditions or when precipitation is present and carb temperatures are below the green on the carb temp indicator(s).
- A hot-air door, located in this duct ahead of the carburetor, allows hot air obtained from the behind the cylinders to increase carb air temperatures when flying in the coldest conditions. This should only be used if the WARM setting isn't sufficient to raise carb air temps into the green area on the carb temp indicator(s)

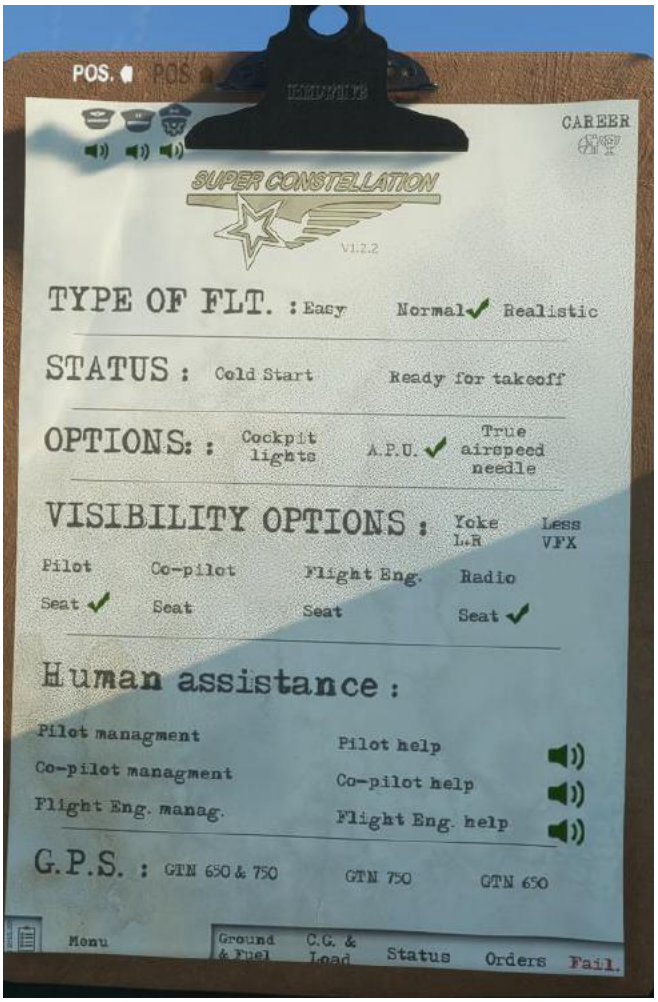
Key switch settings for Carburator Air temps: (refer to picture above)

- Cold Air needed: Carb Air Switch up (Cold) and RAM/ALT switch up (RAM)
- Warm Air needed: Carb Air Switch up (Cold) and RAM/ALT switch down (ALTERNATE)
- Hottest Air needed: Carb Air Switch down (HOT) and RAM/ALT switch down (ALTERNATE)

Clipboard

MENU page

Icon: The upper left area contains the information of A.I for pilot / copilot /Flight engineer and for their dedicated help/voices



You can hide/show the clipboard by clicking on the CLAMP
You can alternate from position left to center position by clicking on upper left picto "pos." arrow.

Type of FLIGHT (FLT):

Easy (by default)
- No Feathering
- No De-icing auto
- Doors and traps auto managed
- Parking chocks auto managed
- indicator to help with autopilot
- Warning lights available on all panels

Normal:
- Management of traps and doors
- Management of parking chocks
- Management of fuel tanks
- Management of feathering
- Management of de-icing
- Management of all motor parameters
- No debugger available in flight

Hard Mode:
- Very realistic to manual processes, procedures and failures. You will not get helpful guidance on FE charts for example and failures can be catastrophic.

Status: Cockpit lights: all night and red cockpit lights on at 50 % brightness
Cold start: all switches off / all engines off/ aircraft in parking mode/ parking brake on
Ready to fly: all engines on
Ready for take-off: Ready to fly, including cowl flaps, take-off flaps and parking brake on

Options: Cockpit lights: all night and red cockpit lights on at 50 % brightness
APU: (on ground only) install /uninstall APU for civilian versions
True Air Speed (TAS) needle: hide /show TAS needle

Visibility option: Hide or show seats, 3D pilot, co-pilot, F.E. or radio and yokes left and right. Seats can be turned back on with the clip board or by clicking on the black box mounted on the floor below the seat.
Less VFX: will remove heat blur and reduce all smoke and fire Visual effects.

Human assistance
- Pilot, co-pilot or flight engineer management enables A.I. to work for you automatically. (Check tips for pilot)
- All orders for each post can be sent from the "Orders" page
- Pilot, Co-pilot or Flight Engineer Help selection, enables help and information audibly, however you will have to do the work/adjustments manually if A.I. is disabled.

Trim sensibility
Some users (Bravo yoke/quadrant for example) have sensitivity issues. Use this option to adapt Trim wheel sensitivity to your device configuration.

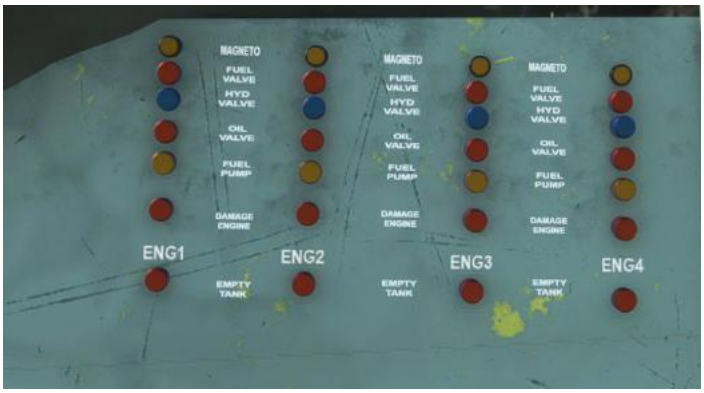
TABS for Checklists / Menu /Ground & Fuel/ C.G. & load / Orders /Fail.
Access to the other pages of the clipboard

G.P.S.
You can hide/show GTN 750 or 650 or both. This GPS is available for free on https://pms50.com/ and *must be installed in your community folder prior to enabling it on the clipboard*.

EASY MODE – NORMAL MODE – HARD MODE

The Normal mode or standard version is without added simplification or difficulties/challenges (failures)
The Hard mode is not available at the moment.

The easy mode adds some diagnostic help lights and bugs (heading, descent, etc).



Overhead flight engineer:

The four lines represent the four engines.

A light on indicates a problem.

An engine cannot start if one of the systems is faulty.

Yellow lights help to check the autopilot

If AP ON CLUTCH light is on: Autopilot (A.P.) is caged for more than 120 seconds, Autopilot clutch button has been pressed in, emergency shutoff A.P. is not engaged, all three A.P. axis servo disconnect levers are on and there is nothing inhibiting the A.P.

Engines can be damaged if they are operated at MAX power setting for more than 2.5 minutes. (During take-off for example)
The red light illuminates if the motor is in standard overload condition.
The red-light flashes slowly when the engine exceeds 50% fatigue and before performance degradation without ground maintenance.
The red-light flashes rapidly when the motor reaches or exceeds its failure level.

Managing the mixture is difficult from the pilot's position as the levers are placed in front of the Flight Engineer position.
Green light // AutoRich position
No light // between AutoRich and 30% lean
Yellow light // mixture near 10% lean
Blue light // 10% Lean (for Cruise power)
Red light // mixture off – shut-down of engine

GROUND & FUEL page

REPLENISHMENT ON GROUND

These options, available only on ground, allow you to fill and/or recharge essential elements for the flight

GROUND MAINTENANCE
These options, available only in parking, allow you to repair the broken device(s):
Tires & landing gear
Ailerons, elevators and rudder
Flaps
Windshield
Most technical failures

CHECKLIST MANUAL:
A quick access to all the manual pages both normal and emergency.

FUEL LOAD ON GROUND
Press on text to replenish selected elements (on ground)

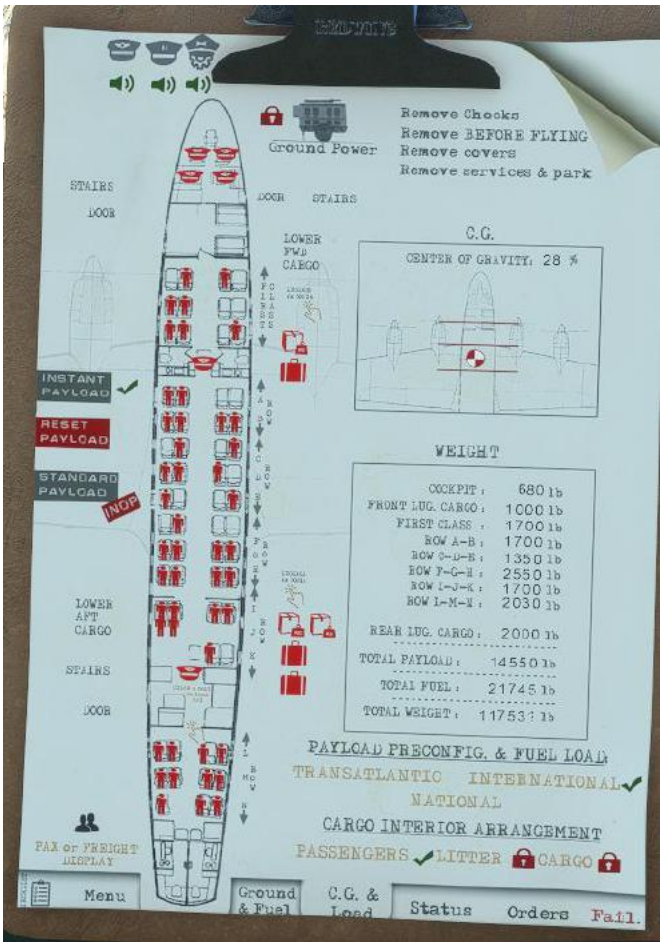
Press the recycle icon to reset all data or configuration

Transatlantic Flight, international Flight and National flight are QUICK LOAD button options.
Press the text to load an auto-configuration. (12h, 6h or 4 hours flight including 2 hr, 1 hr and 30-minute reserve fuel load for air diversion to another field)

You can also reset the full fuel config and/or add/remove 25 gallons of fuel on each tank.

Optional Wing tips display are available on this page; however, usage of this fuel tank is not available in this version for now.

C.G. & LOAD page



LOADING PAGE AND EXIT MANAGMENT

All exit and cargo doors are managed on the top-view map of the "Connie".

Press on text to active/remove or open/close element.

Redwing Ground power is available here on/off

C.G. & WEIGHT

All data elements are updated as soon as you press "Instant payload" after selecting a preconfigured passenger load (TRANS,, INTER. or NATIONAL flight) or manually added passengers by clicking on their locations.

You can press few times on certain locations to increase load (luggage for example).

Press "Reset Payload" to remove Loading and Fuel config

PAYLOAD PRECONFIG & FUEL LOAD
Those options are also available on the Ground& Fuel page.

PAX of FREIGHT DISPLAY let you show or hide 3D display of payload (PAX Display is not available in this version)

CARGO ARRANGEMENT on ground select Passengers, litter or cargo version for MATs or BATCAT Livery.

A specific inside cargo version is pre-installed for Warning Star versions

STANDARD PAYLOAD is not available in this version. This option will allow a realistic and delayed loading according to the opening of doors and presence of stairs. Unlike "INSTANT PAYLOAD", each PAX/freight...Etc. loading will take some time.

AFTER EACH MODIFICATION, ALL THE DATA FLASHES, WAITING FOR YOU TO VALIDATE THE NEW LOAD BY PRESSING "INSTANT PAYLOAD".

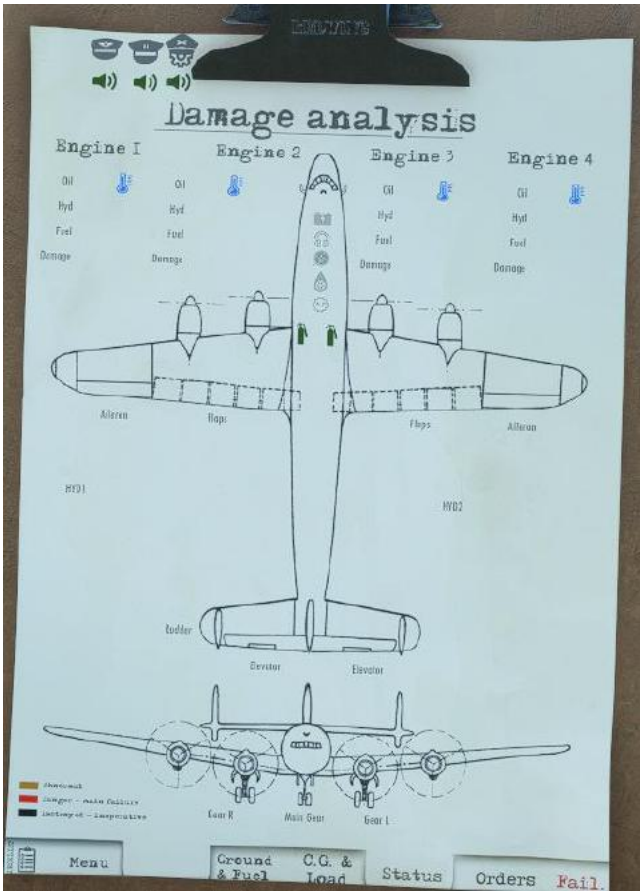
STATUS page

DAMAGE ANALYSIS

Give all the technical information of all onboard systems.

Empty data:	all is ok
Amber:	Warning of a problem
Red:	Becoming a critical problem
Black:	Unavailable, destroyed or broken.

Include structure and engine damage, system pressures, temperatures, , fire detection and icing conditions amoung other issues.



ORDERS page

ORDERS MANAGMENT

Press on the label of the role (Pilot, Copilot, pr Flight Engineer) to active/deactivate it (also available on menu/first page).

Checklist available to use are highlighted
Checklist that is blinking, is in use currently
Green check to the left of the checklist indicates a finished checklist
You can pause, resume, or restart a checklist by clicking on it again

An automatic checklist executes all processes and actions. The voices of the pilots, co-pilots and flight engineers inform you about the current events while they are occurring if the event being executed is within the responsibility for one of the roles you selected.

POWER Management

By default, only the " NO. MANAG.". is available before the engines are started.
The next available order will be highlighted.
On the ground, only "max power" is accessible until take-off has been achieved.

It is advisable to set the propeller pitch (full), mixture (rich), and throttles (idle) on your computer hardware devices if you require A.I. Flight Engineer controlled power.
As some joystick systems could create conflicts.

If you want to take over the Flight Engineer type adjustments, you have to select "NO. MANAG.". Otherwise, it will reapply its settings as soon as possible.

"Descent power" asks the AIFE to apply the descent parameters on the engines to generate an airspeed reduction below 190 kts and to allow extension of the flaps to 60% prior to landing approach.
"Approach power" set approach parameters.

As soon as the power is set, it automatically gives the control of engine power back to the pilot ("NO. MANAG." will be highlighted when this occurs) and lets you manage the descent and the final approach power settings for landing if you have not selected Copilot to manage the landing for you.

Cruise MANAGEMENT:
When A.I.F.E is managing cruise power a mechanic icon is visible.
F.E. will manage all oil cooler flaps according to oil temperature, Engine COWLER flaps according to cylinder temp. and al fuel system.

NO MANAG.
Press NO MANAG. To take manual control of power, throttle, mixture, propeller levers, cowl flaps, oil flaps and fuel system.
If you try to modify those parameters, levers or switches while A.I.F.E. is enabled, he will move the changed items back to the correct A.I.F.E. managed settings. If you see this happening, please press NO MANAG to take manual control.

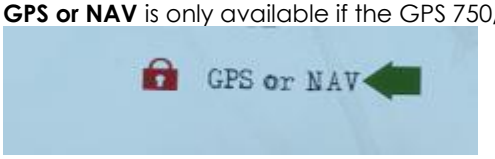
AUDIO HELP MANAGMENT
A pictogram is visible if you have selected the audio help for co-pilots and flight engineers.
Each crew member will give you indications of their current actions, possible problems and warnings.

A non-exhaustive list of the crew's words is available in the appendix A.

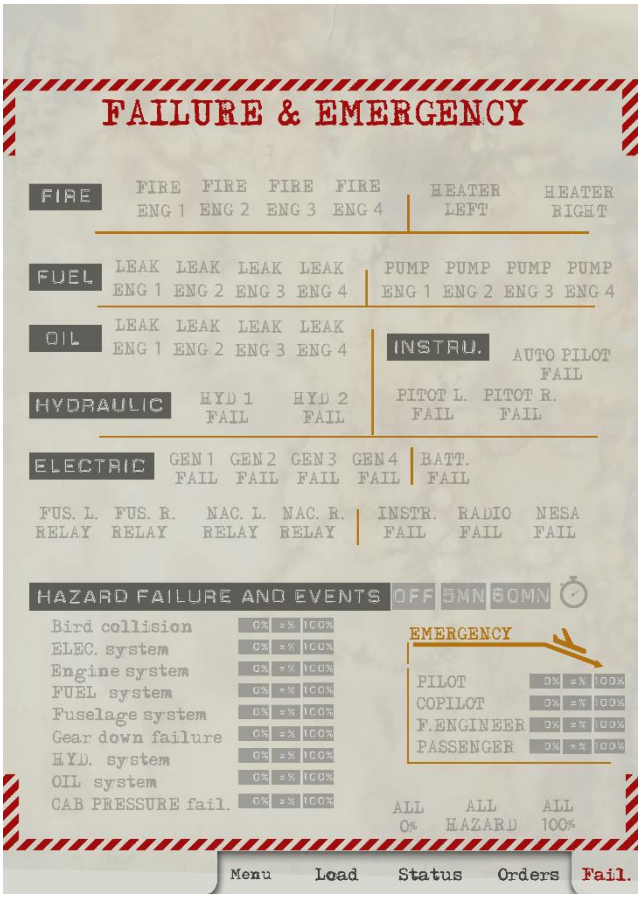
PILOT and COPILOT

All A.I. are mentioned in the TIPS FOR PILOT'S chapter 6.

GPS or NAV is only available if the GPS 750/650 is in use and correctly installed



FAILURE AND EMERGENCY PAGE



The top page allows you to create instant failures or solve them as needed.
The lower part "Hazard Failure and Events" allows the user to select, impose or remove some of the random failures during the flight.

Three buttons "ALL 0%", "ALL AHZARD" and "ALL 100%" allow you to simplify the random choices by selecting all of them, clearing all of them or making them all random.

Once the choices have been made, simply activate the HAZARD FAILURE AND EVENTS by switching from "OFF" to 5 MN for a failure triggering within 5 minutes or 60 minutes for a failure triggering within an hour.

Only one fault is activated at a time.
So, if you set several faults to 100%, the first available one will be activated.

The emergency zone allows the creation of events requiring a quick landing: passenger or sick crew **(W.I.P.)**
Please refer to chapter 11. Failures for more information

An unmanaged failure can trigger several other failures.

CHECKLIST PAGES

If AI.FE. auto checklist is used steps of checklist are dynamically displayed for normal checklists pages. You will see green checkmarks appear as items are completed

Clock & chrono.

LEFT INSTRUMENT
Press button of the left instrument to start/stop/reset chrono

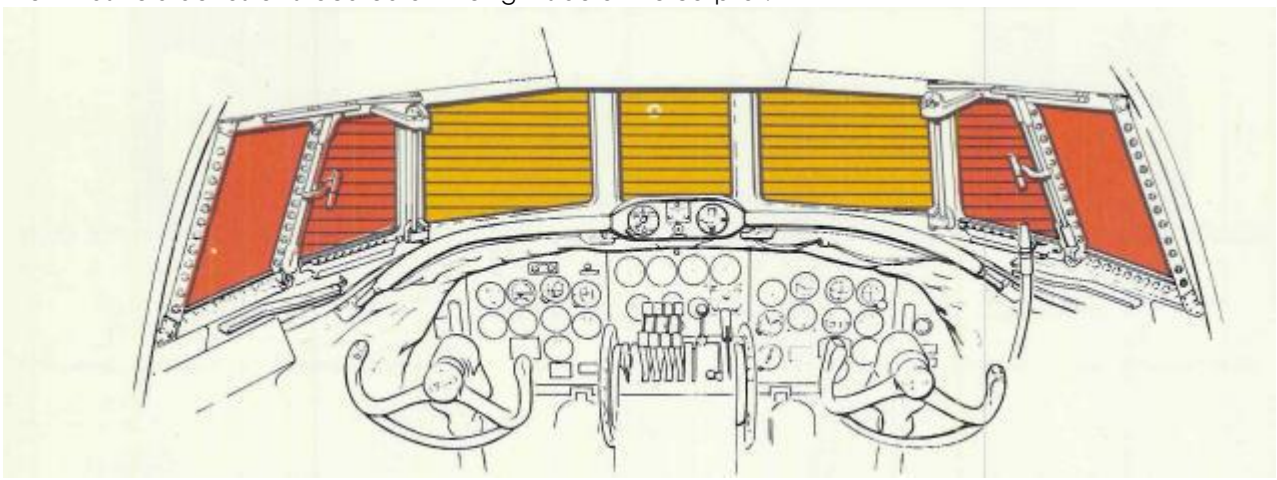
RIGHT INSTRUMENT
Eight day clock with sweep second hand

Press Set to modify minutes

Press Set a second time to modify hours

De-icing and NESA

WINDSHIELD
The windshield defroster is located on the right side of the co-pilot.



In orange: Windshield Defogging in Yellow: NESA anti-icing striped area: alcohol anti-icing (INOP)

Place the switch on low or hight to start windshield de-icing.
In case of trouble or failure press the "re init" button to reset the system

NESA system needs to be on (normal or inverted) to use all electric de-icing systems

IF A.I. COPILOT is selected, he will automatically switch ON all de-icing elements in icing conditions as needed during the flight.

In case of fogging use the blower pull tag on left side of pilot panel and right side of co-pilot panel

PITOT HEATER AND MAST DE-ICER

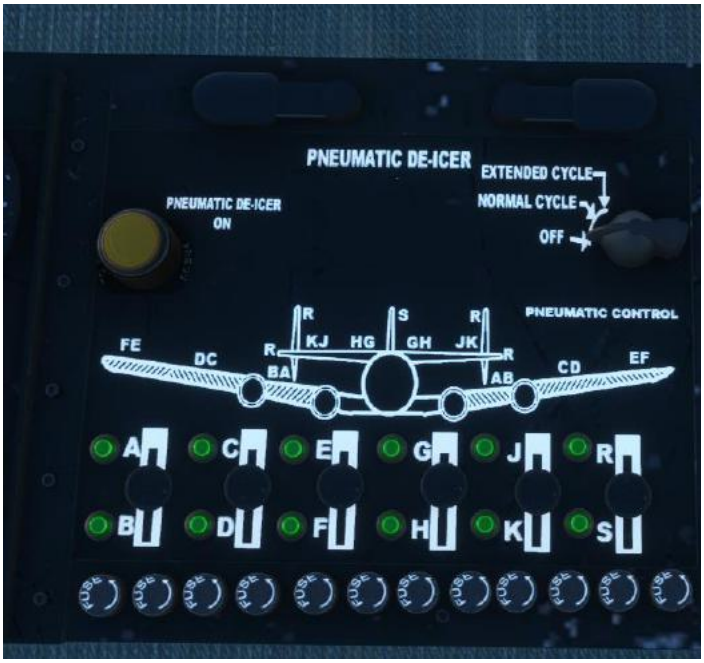
Two lights indicate the correct operation of the left and right pitot heaters

PNEUMATIC DEICE SYSTEM

Ice may be removed after it has formed on the fuselage, nose radome and leading edges of the wings and empennage, by electronically timed, pneumatically inflated and deflated rudder botts cemented to the surfaces. Pressure and vacuum for the pneumatic system are supplied by four engine-driven air pumps.

The two outboard pumps supply pressure and the two inboard pumps provide vacuum for normal operation, but can be used as pressure sources in an emergency.

Two instruments indicate the pressures on the lower left pilot panel



The de-icer boot timer is located in the flight station below the pilot's switch panel. The electronic tier establishes the inflation-deflation for continuous duty in flight.

Normal cycle for a 60 second cycle and extended for a 90 second cycle.
Ten solenoid-operated manifold de-ice distributor valves deliver alternate pressure and vacuum to the de-ice booster segments.

A green led indicate pressure in the segment.

Six, three position switches between the row of cycling lights, permit out -of sequence inflation of any individual boot segment. This will cause the green light to blink when manually selected.

The system needs 30 seconds after start-up to be operational.

IF A. I. PILOT is selected, he will automatically switch ON all de-icing elements in icing conditions

Propeller Alcohol De-icing LH and RH knob or Electric Carburetor De-icing 1 2 3 4 switches are located in the MJB panel left of Flight Engineer desk

IF AI. F.E. is selected, he will automatically switch ON all de-icing elements in icing conditions

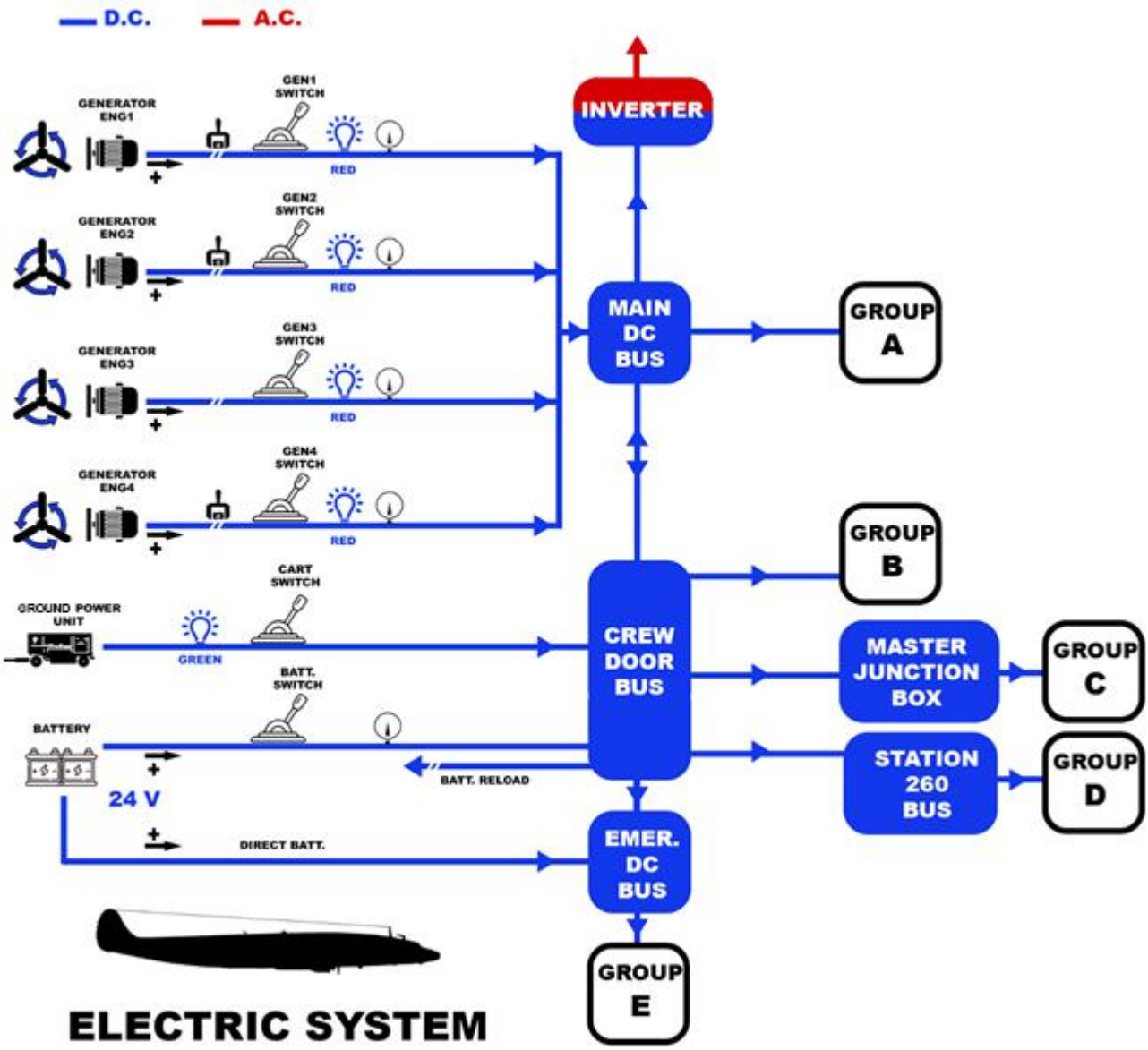
Direction Indicator, Gyrosyn compass and Gyro flux gate statics

Direction indicator indicates the magnetic heading of the aircraft. The gyro flux gate transmitter, mounted in the left wing, senses the aircraft heading changes, because of its change of position in the earth's magnetic field, and transmits an electrical signal to the Flux Gate direction indicator.

The Gyrosyn Compass system provide an accurate, stabilized indication of the aircraft heading throug 360 degrees of azimuth.

A switch is mounted on the pilot's instrument panel and has two positions. In SLAVED GYRO, the direction indicator is managed by the gyro flux gate transmitter to indicate heading. In FREE GYRO the gyro is operate as a free direction gyro.

Electric system



Group A.

Blast tube shut-off
Cowl flaps actuators
Call system
Feathering pumps
Flight station aux heaters
Galley power
Razor outlets
Recirculating fans
Starters
Wash Water system
Cabin light
Cabin overhead light
Landing light
Lavatory lights
Passenger read lights

Group B.

Air cond. system
Fire detection indicators
Galley power control
Reserve engine oil system
Reserve engine oil control
Crew com overhead
Supercharger
Oil pressures warn
Reading lights control

Group C.

Auto pilot control
Flight path control
Aux. Fuel pumps
Cowl flaps control
Eng. Starter control
Primer control
Inverter control
Landing light actuators
Oil cooler flaps actuators
Propeller control system
Reverse lock actuator
Anti-icing carb alcohol pumps
Propeller alcohol pumps
Windshield alcohol pumps
De-icing antenna mast
Pitot heaters
Windshield de-fogging
Wipers
Wing& emp de-icer timer
Anti-icer fluid Qty
Super charger oil temp.
Carburettor air temp.
Cylinder head temp.
Fuel Qty
Oil In temp.
Oil out temp.
Oil Qty
OAT temp.
Hydraulic fluid Qty
Reserve oil Qty
Tachometers
Synchroscope
Doors warn. Light
De-ice pump warn. Light
FI panel light
Fuel press. Warn. Light
HYD press. Warn. Light
Landing gears warn. Lights
Leading edge lights
Navigator's desk
Nose light
Oil press. Warn. Light
Ordinance light
Parking brake lights
Pilot's chart compass light
Pedestal lights
Pilot's dome light
Pilot's inst. Panel light11
Prop. position warning light
Radio desk light
Wheel well

Group D.

Prop. Voltage booster

Group E.

C2 compass
Electric elevator trim tab
Emergency inverter
Flare release
Generator protection
Emergency Rudder booster
Emergency Elevator booster
Radio power lights
Pilot glareshield white light

ELECTRIC BREAKER, FUSE and TRIPPER system

Fuse breaker or tripper have two states ON or OFF.
They can be pulled or lowered for off position manually but are generally shut-down by a failure or an electrical surge.
A popping sound is usually heard when this occurs.
They can be manually switched to ON position if the problem is resolved.

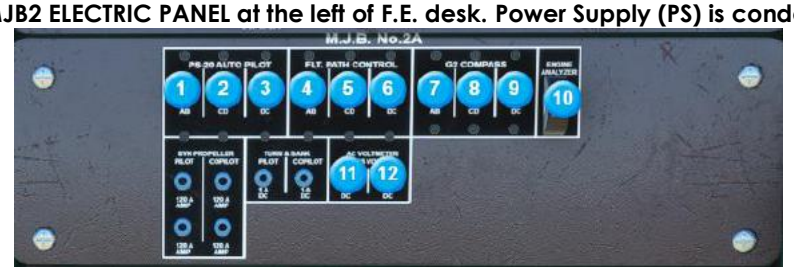
ON/pushed/dark

OFF OR TRIPPPED / pulled in red

ON/up

OFF/down

MJB2A is located under MJB2 ELECTRIC PANEL at the left of F.E. desk. Power Supply (PS) is condensed below for space.



01. A.P. AC Phase 1 PS (INOP v1.9.)
02. A.P. AC phase 2 PS (INOP v1.9.)
03. A.P. DC PS (INOP v1.9.)
04. FLT path AC Phase 1 PS (INOP v1.9.)
05. FLT path AC Phase 2 PS (INOP v1.9.)
06. FLT path DC PS (INOP v1.9.)
07. G2 compass AC Phase 1 PS (INOP v1.9.)
08. G2 compass AC Phase 2 PS (INOP v1.9.)
09. G2 compass DC PS (INOP v1.9.)
10. Analyzer on/off
11. AC voltmeter (INOP v1.9.)
12. DC voltmeter (INOP v1.9.)

One of AC and/or DC electrical failure could deactivate Autopilot, flight path or G2 Compass.

MJB3 is located under MJB2 & 2A ELECTRIC PANEL at the left of F.E. desk.

01. Pilot, copilot, center panel lights & radio lights
02. Dome light (red or white) & F.E. desk lamp
03. F.E. panels
04. Compass & pedestal panels
05. Carb RAM/ALT. 1
06. Carb RAM/ALT. 2
07. Carb RAM/ALT. 3
08. Carb RAM/ALT. 4
09. Fire warning lights - pilot
10. Fire warning lights and doors - F.E.
11. Wing flaps synchro test.
12. External position lights
13. External flash/beacon lights
14. External extending taxi lights
15. External taxi lights
16. External landing lights – Left side
17. External landing lights - Right side
18. External landing gear motor – Left (INOP.)
19. External landing gear motor – Right (INOP.)
20. External cargo compartment lights (INOP.)
21. External noise operational lights (INOP.)
22. Spark control - Master (INOP.)
23. Carb. de-icer heater 1
24. Carb. de-icer heater 2
25. Carb. de-icer heater 3
26. Carb. de-icer heater 4
27. Oil cooler flaps motor 1
28. Oil cooler flaps motor 2
29. Oil cooler flaps motor 3
30. Oil cooler flaps motor 4
31. CHT 1 2 3 4 & supercharger 1 2 temp.
32. Stater switch
33. Oil pressure & Carb temp 1 2 3 4
34. Instruments lights - Pilot & copilot
35. Instruments lights - F.E.
36. Pneumatic de-icer timer
37. Nesa windshield heater
38. Radio mast de-icer
39. Windshield wipers
40. Anti-icer fluid pumps (props and windshield?)
41. Anti-icer fluid quantity display
42. Pitot heater - left
43. Pitot heater - right
44. HYD2 to HYD1 cross-feed
45. Windshield defogging blowers
46. Cockpit other blowers

FEATHERING & SYNCRHONIZATION system

Master auto-feather is a guarded switch to arm the auto feathering system.

It is only used for take-off.

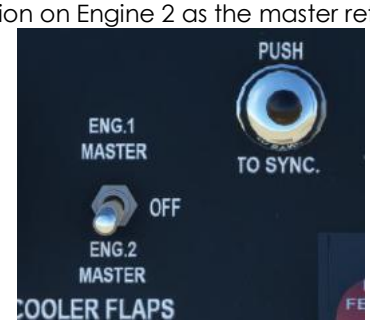
If one engine BMEP falls below 72 to 82 BMEP for more than 2 seconds, the propeller of the engine affected will be automatically feathered to prevent a drag effect from the failed propeller and allow the crew to continue the take-off.
Only one engine can be auto feathered at any time

To manually feather a propeller, remove the cover and pull the red feather button of the engine 1 2 3 or 4

A procedure must be followed to unfeather a propeller.
Currently a WORK IN PROGRESS

The four engines of the Connie can be synchronized to have the same rpm.
To increase or decrease the RPMs, the flight engineer influences the pitch of the propellers.
This process essentially provides a perfect engine sound for the passengers.

On switch allows 3 choices for master reference of RPM for the other three engines.
1. Off (middle position)– meaning no reference engine as master
2. position on Engine 1 as master reference, or finally
3. position on Engine 2 as the master reference



The flight engineer can desynchronize or modify the automatic synchronization by pressing the spring-loaded switches, increasing or decreasing up to +/- 300 rpm for each motor.

Pressing the "push to sync" button after master reference switch is set will start or reset all sync changes depending on the selection of the sync switch. Sometimes you will need to turn master reference switch to OFF, press Sync to reset, select master (1 or 2) and press the sync button.

The synchroscope is an instrument with three needles.

Each needle represents the synchronization of a motor with the selected reference motor.

If the motor is too slow, the needle turns contraclockwise.

If the motor is too fast, the needle turns clockwise.

FIRE DETECTION SYSTEM

Thin wisps of BLUISH-GREY SMOKE from exhaust and cowl flaps area mean:

Oil leaking onto exhaust stacks and vaporizing, not a dangerous condition providing oil leak is not excessive.

- No instrument indications except for possible drop in oil quantity.
- No action is necessary unless fire develops.
- If fire occurs, follow emergency engine fire procedure(s).

GREY-BLACK SMOKE coming from exhaust mean:

Probable Cause: Indicates too rich mixture.

- There will be no instrument indications
- .

Remedy:

- On ground increase throttle
- In flight, lean mixture according to the manual leaning procedure.

BLACK SMOKE coming from exhaust mean:

Probable Cause: Damaged or worn-out piston rings permitting cylinder to pump oil. At night, this condition appears as fire, however, it is only hot oil burning in exhaust stack and exhaust stream.

- No instrument indication

Remedy:

- Monitor condition

BLACK SMOKE coming from accessory section means:

BLACK SMOKE caused by oil leak in accessory section. Fire detector lights for zone 2 and 3 will come on if fire occurs.

Remedy:

- Follow emergency engine fire procedure(s).

BLACK SMOKE with ORANGE YELLOW coming from accessory section means:

SMOKE AND FIRE caused by fuel fire in accessory section, generally caused by broken fuel line.

- Low fuel pressure may be indicated.
- Fire warning lights, zones 2 and 3 will come on.

Remedy:
Follow emergency Engine shut-down procedure.

- Prepare to abandon aircraft if fire does not go out quickly.

BLUE-BLACK SMOKE WITH FLASHES OF ORANGE coming from exhaust means:

Cause: Detonation fouled spark plugs or fouled fuel injection nozzle.

- If detonation continues engine failure may be imminent.

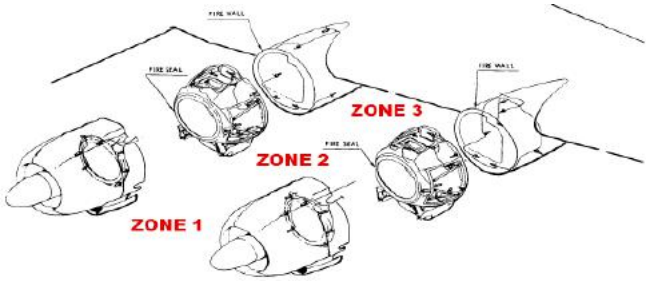
Remedy:

- Enrich mixture and increase cowl flaps setting if CHT is high.
- If engine continues to be rough and low on power,
    - shut-down according to approved shut-down procedure.

FIRE EXTINGUISHING SYSTEM

The airplane is equipped with two systems: one to detect the presence of fire and to relay this information to the flight station by means of a warning bell and warning lights, and the other system to extinguish the fire by smothering it with extinguishing agent.

The presence of fire in the engine nacelles, cabin heaters, nose radome and auxiliary power unit is detected by heat-sensing thermal switches.



The switches in Zone 1 (color coded blue) close to complete the warning light circuit if the ambient temperature rises to 316°c. Those in Zones2 and 3, the cabin heater and nose radome are color coded in red and close to complete the warning light circuit when the ambient temperature is 232°c.

Two red master fire warning lights are installed in this system, one on the flight engineers lower instrument panel and the other on the center of the flight station instrument panel (station 260 bulkhead), visible to both pilots.

Test levers are actuated to test lights, circuit, and bells for each area.

Breakers under test levers can be used to inhibit a circuit (and the associated alarm sound)

ENGINE FIRE EXTINGUISHING PROCEDURE

1. Shut down engine per CAA approved airplane operating manual

2. Cabin heater fire extinguisher selector valve must be in "off" position.

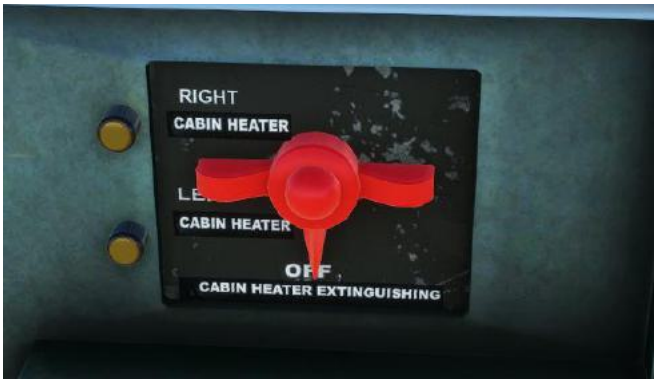
3. Set engine fire extinguisher selector valve to fire location (Eng. 1, 2, 3, or 4)

4. Turn & Pull either extinguisher control handle to discharge Co2.

WARNING - DO NOT USE SECOND EXTINGUISHER CONTROL UNLESS FIRE PERSISTS.

CABIN HEATER(S) FIRE EXTINGUISHER

Select Left or Right Cabin Heater to extinguish using the knob. Amber Indicator lights will notify you of the Heater that is on fire.



FLAPS

Flaps are a sustentation system (commonly called a Fowler flap) to modify wing curve and fly at low speed without stall.
Super Constellation flaps are managed by the HYD2 system and a lever on the center console (shown below).
In case of HYD1 system failure HYD2 system help HYD 1 in backup to maintain hydraulic pressure for 3 axis commands, but flaps are not available in this case.

There are twelve flap sections, ten of which are located in the inner wing panels (five in each wing) and two in the wing center section, (one on each side).

The lever for flaps operation is located on the right of the center pedestal.

There are 4 positions for flaps:

- 0% up position
- 66% takeoff and approach pos.
- 80% position
- 100% landing position

An indicator on the center panel displayes flaps position in real time.

To avoid non synchronised flaps in case of failure of the left or right side, the L1049 have an automatic wing flap shut-off system.
A switch and light is placed on the co-pilot's panel to test the system.

Press the test switch and check the red light to verify all flaps operations are blocked.

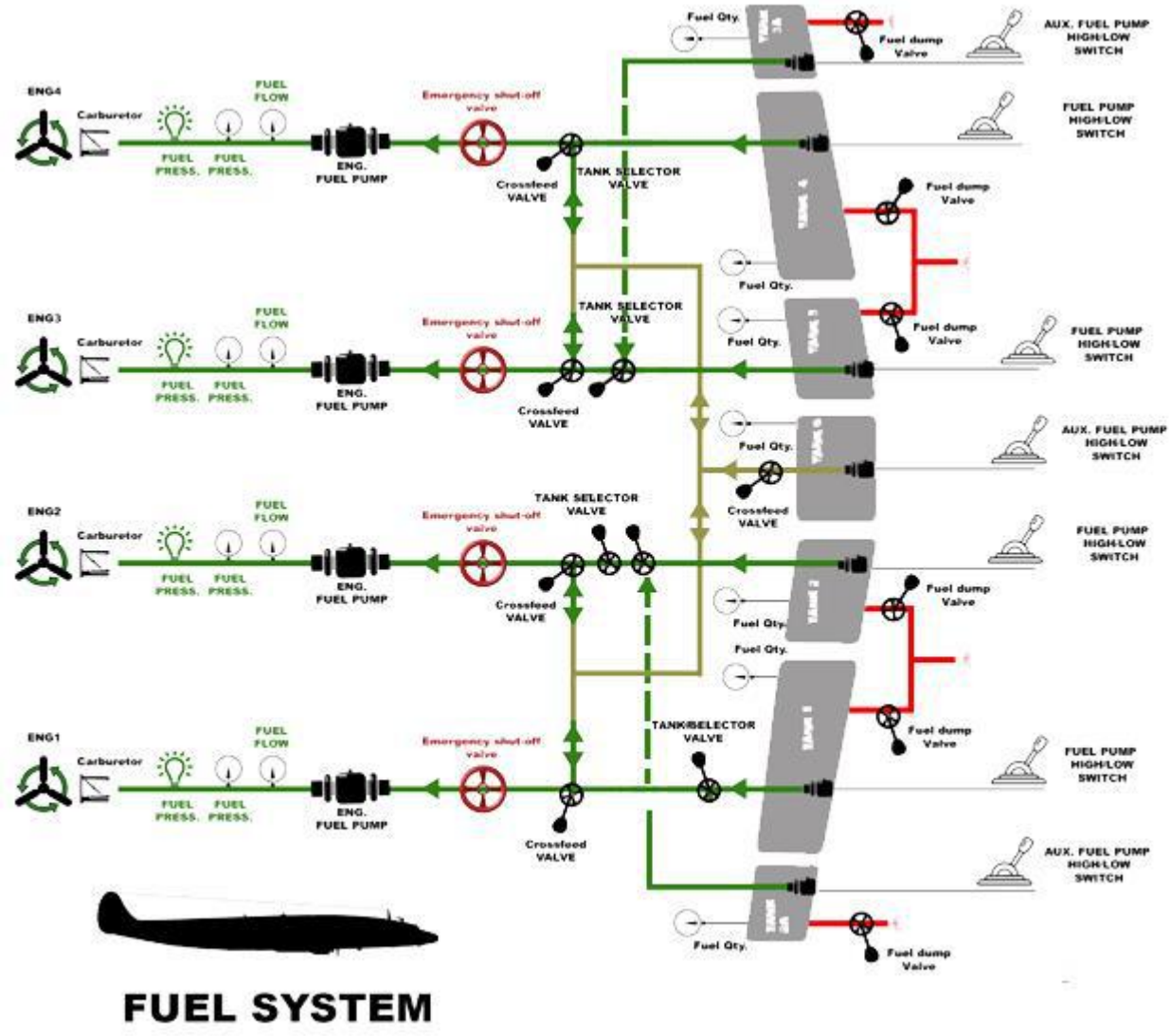
See hydraulic section for axis command boosters and HDY 1/HYD2 limitations in case of failure.

In fact, flaps "take-off" is 60% and approach is 66% for the same lever (60% take off) position. This means the 66% approach lever position is not simulated for simplicity.

In the event that the wing flaps fail to operate by normal means, the flaps may be extended or retracted manually by engaging a hand crank in a shaft-and-gear mechanism and opening a bypass valve, but the two access doors in cabin are not simulated here for simplicity.

FUEL SYSTEM

The overhead emergency lever shutoff the fuel admission for each engine.



Tank selector 1 links tank 1 to ENG1
Tank selector 2 links Tank 2 or 2A to Eng 2 (tank 2A is linked to Left tip 2B tank if available)
Tank selector 3 links Tank 3 or 3A to Eng 3 (Tank 3A is linked to right tip 3B tank if available)
Tank selector 4 links Tank4 to ENG4

A cross feed system enable transfer fuel from engine to engine and from center fuel tank 5 to each engine.

There is a priority between tanks 1 2 2A 3 3A 4 and tank5.

Electric pumps are not sufficient to close a circuit because mechanical pumps continue to suck up open tanks. To avoid problems, it is essential to close tanks that will not be used.

FUEL LOAD					FUEL USAGE PROCEDURE (Do not take off with less than 150 gal. in each of tanks 1,2 ,3 and 4)					
< 5420 GAL.	> 5420 GAL. < 5820 GAL.	> 5820 GAL. < 6220 GAL.	6220 GAL. (400 GAL. IN TANK 5)	> 6220 GAL.	ENG	1	2	3	4	
1	1	↓	↓	↓	TANK	1	2	3	4	Take-off, climb and cruise until tanks 2 and 3 are empty
		1	1	1	TANK	1	2	3	4	Take-off, and climb until cruise altitude is reached
		↓	↓	2	TANK	1	5	5	4	Until 400 gal. + 1/2 the excess over 400 gallons is used out of Tank5
		2	2	↓	TANK	1	5	5	4	Until Tank5 is empty.
		↓	↓	3	TANK	5	2	3	5	Until Tank5 is empty.
		3	3	4	TANK	1	2	3	4	Until Tank 2 and 3 are empty.
	2*	4*	↓	↓	TANK	1	1	3a	4	Until the quantity of fuel in tank 1 is equal to that in tank 2a.
	3	5	↓	↓	TANK	1	2a	4	4	Until the quantity of fuel in tank 4 is equal to that in tank 3a.
2	4	6	4	5	TANK	1	2a	3a	4	To end of flight and landing

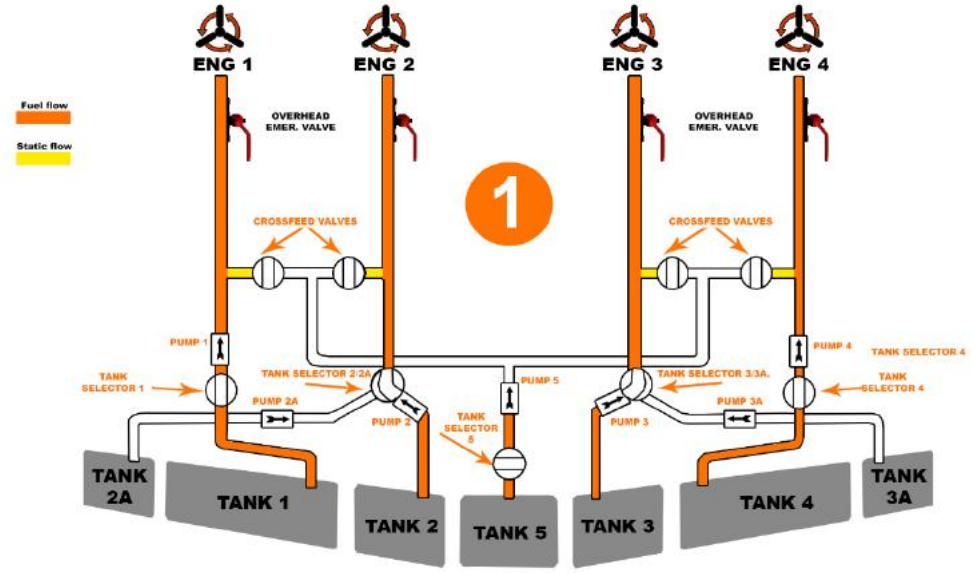
(*) Momentarily switch engines 2 and 3 to operate from tanks 2A and 3A if cross-feed is to be established after tanks 2 and 3 are empty.

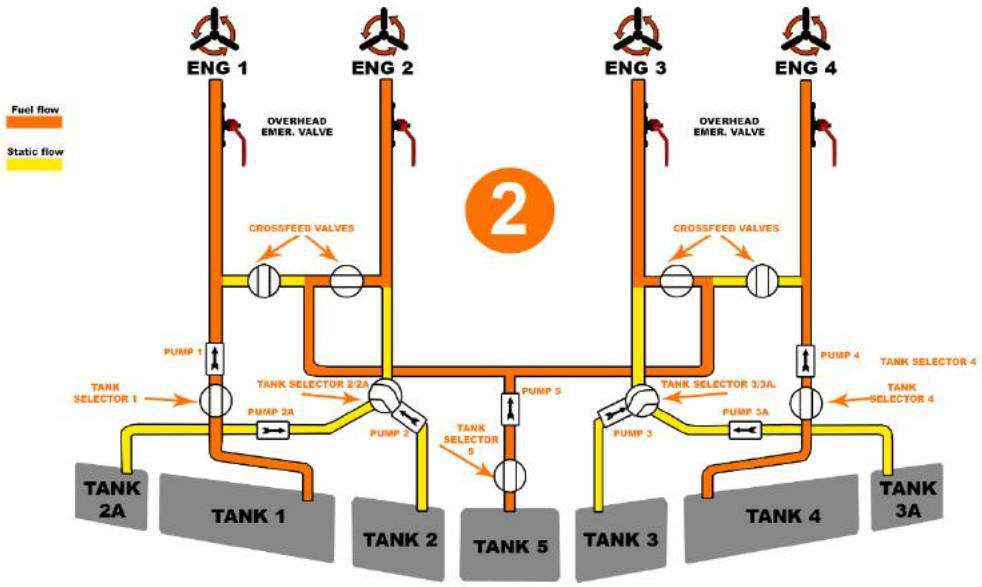
HOW TO USE THE CHART:

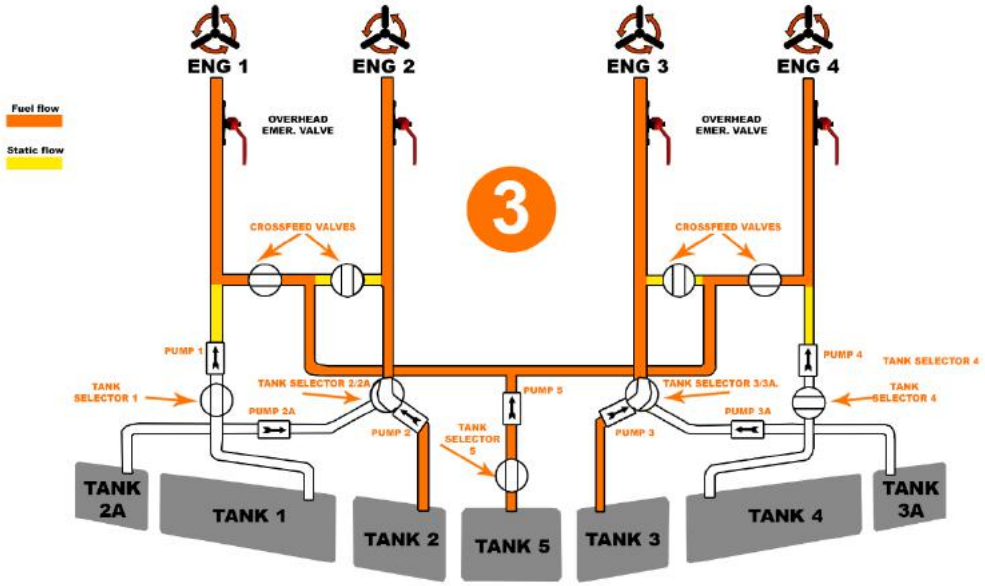
#1 Enter the column at the left top corresponding to the fuel load and read down the column to the number1.
#2 Read the procedure at the right of number 1 and adjust fuel feed (tank selectors, booster pumps and cross-feed levers) as shown.
#3 Continue feed until instructions of the note are completed.
#4 Return to originally selected vertical column and complete the fuel usage procedures in numerical sequence as shown.

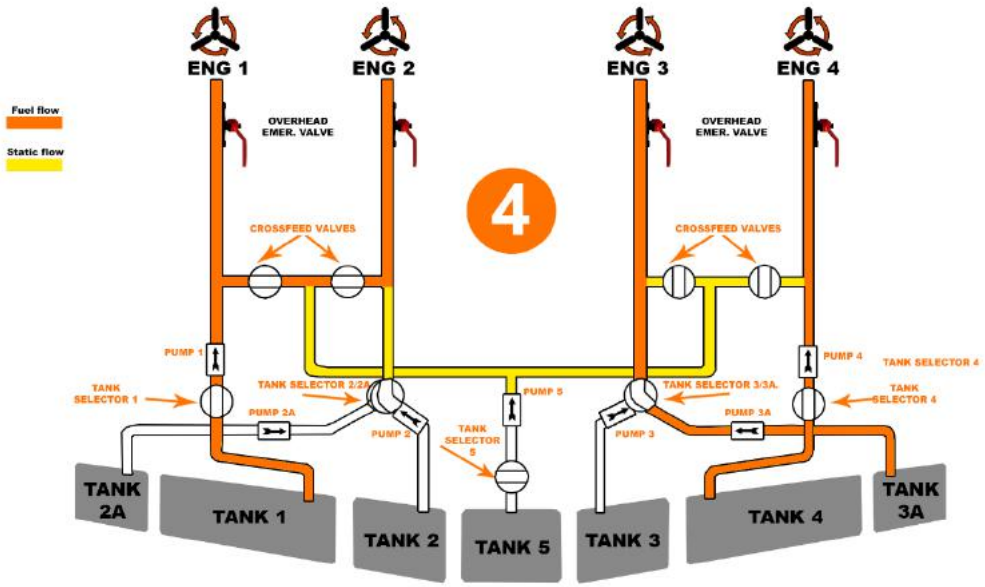
For example:
For fuel level 5420 to 5820 (column 2)

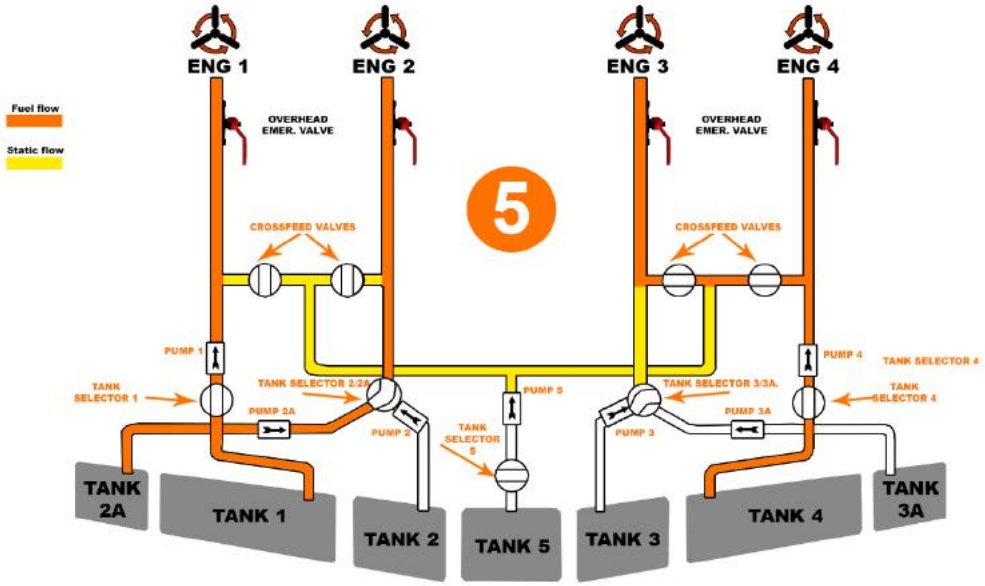
26. #1 is tank boost pumps and tank selectors for Eng1 from tank 1, Eng2 from tank 2, Eng3 from tank 3, and Eng4 from tank 4 until tanks 2&3 are empty, then
27. #2* with Boost pumps and tank selectors for Eng 1 fed from tank 1, Eng 2 fed from tank 1(Crossfeeds needed), Eng 3 fed from tank 3a AND Eng 4 fed from tank 4 until tank 1 matches tank 2a, then
28. #3 with Boost pumps and tank selectors for Eng 1 fed from tank 1, Eng 2 fed from tank 2a, Eng 3 fed from tank 4 (Crossfeeds needed), AND Eng 4 fed from tank 4 until tank 4 matches tank 3a
29. #4 with boost pumps and tank selectors Eng 1 from tank 1, Eng 2 from tank 2a, Eng 3 from tank 3a, and finally Eng 4 from tank 4 to land

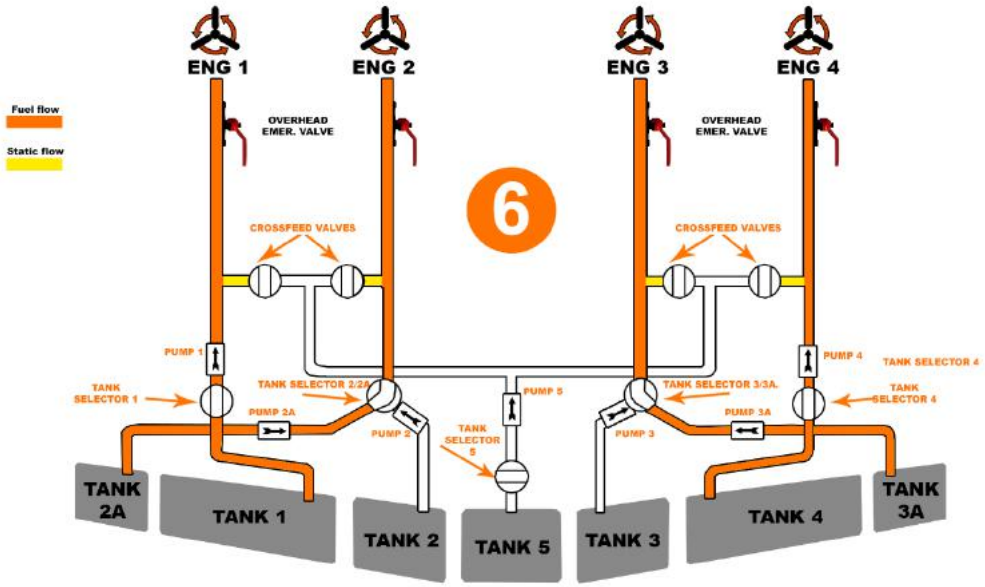

ENG 1
ENG 2
ENG 3
ENG 4
Fuel flow
Static flow
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
1
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 3A
PUMP 2
TANK SELECTOR 5
PUMP 3
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A


ENG 1
ENG 2
ENG 3
ENG 4
Fuel flow
Static flow
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
2
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 3A
PUMP 2
TANK SELECTOR 5
PUMP 3
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A


Fuel flow
Static flow
ENG 1
ENG 2
ENG 3
ENG 4
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
3
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 2
TANK SELECTOR 5
PUMP 3
PUMP 3A
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A


Fuel flow
Static flow
ENG 1
ENG 2
ENG 3
ENG 4
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
4
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 2
TANK SELECTOR 5
PUMP 3
PUMP 3A
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A


ENG 1
ENG 2
ENG 3
ENG 4
Fuel flow
Static flow
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
5
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 3A
PUMP 2
PUMP 3
TANK SELECTOR 5
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A


ENG 1
ENG 2
ENG 3
ENG 4
Fuel flow
Static flow
OVERHEAD EMER. VALVE
OVERHEAD EMER. VALVE
6
CROSSFEED VALVES
CROSSFEED VALVES
PUMP 1
PUMP 4
TANK SELECTOR 4
TANK SELECTOR 1
TANK SELECTOR 2/2A
PUMP 5
TANK SELECTOR 3/3A
TANK SELECTOR 4
PUMP 2A
PUMP 3A
PUMP 2
PUMP 3
TANK SELECTOR 5
TANK 2A
TANK 1
TANK 2
TANK 5
TANK 3
TANK 4
TANK 3A

Gyro HORIZON

The Copilot's Gyro Horizon is operated by a.c.power while the pilot's is vacuum operated.

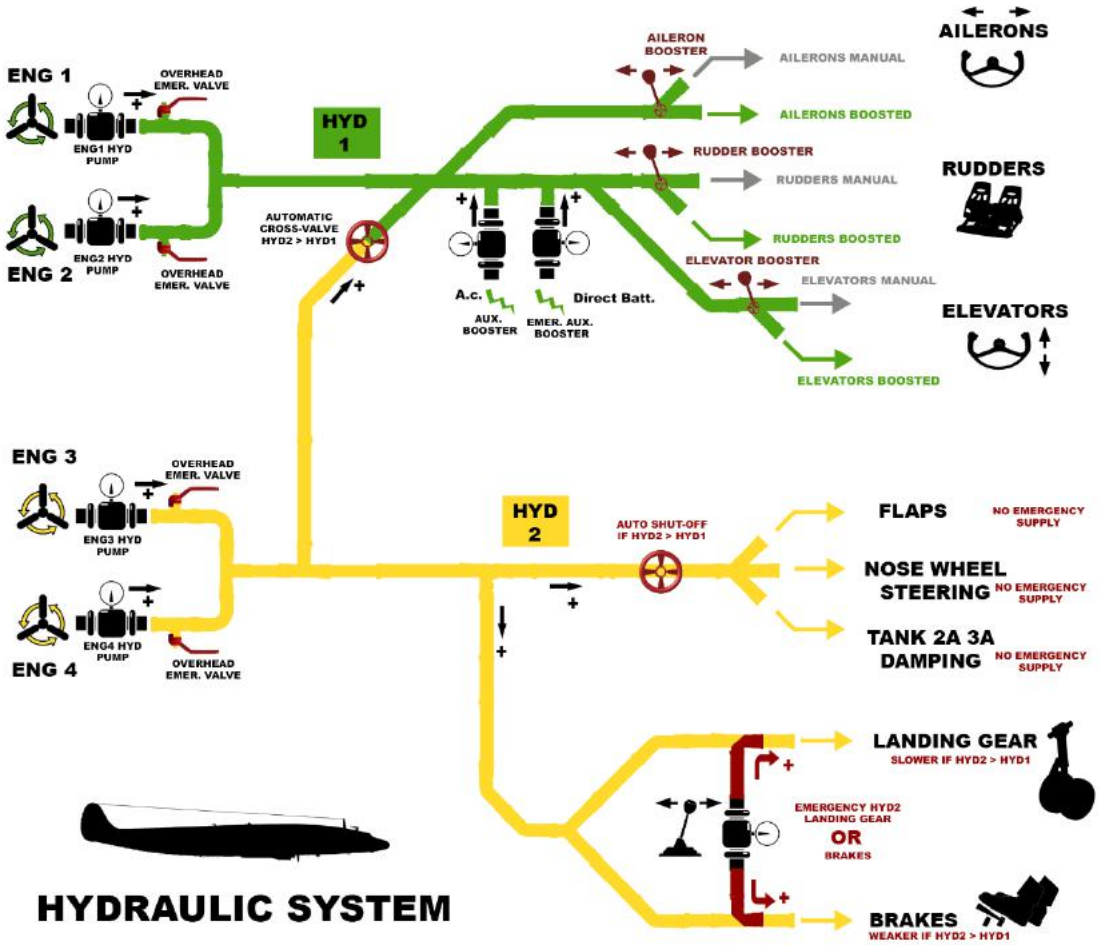
It indicate horizon position for VFR and IFR flight.

Hydraulic system

Two hydraulic systems and one emergency hydraulic system are implemented in the L-1049

The primary system "HYD1" supplies pressure for operation of all the surface control boosters (ailerons, elevators and rudders)
HYD1 pressure is provided by Engine1 and Engine 2 pumps

The secondary system "HYD2" supplies pressure for operation of the landing gear, brakes, nose wheel steering, wing flaps and fuel dump valves of tanks 2A and 3A
HYD2 pressure is provided by Engine 3 and Engine 4 pumps



The secondary system can supply power to the primary system in case of failure (but primary cannot supply secondary)
However, if HYD2 supplies HYD1, some operation of the secondary system HYD units may be slower or unavailable
See figure 9.2.A

The Emergency system is a separate reservoir and a hand pump. It is provided to use in emergency braking or emergency landing gear extension.

Four emergency shut-off levers on the Pilot's Overhead control quadrant are able to shut-off then HYD valve from their respective engine.

IN CASE OF FAILURE

Rudder, aileron and elevator are very important for the flight. All the axes are hydraulically assisted.
In case of HYD 1 failure, HYD2 assist the axis.
In case of HYD1 & HYD2 failure, electric (A.C. from generators) boosters (Elevator and rudder)
In case all generator failure (all engines shut down) a direct to bat (DC) emergency booster is still available (Elevator and rudder)
In case of other troubles, the hydraulic assistance can be shutoff to manage the axis manually with 30% of movement (The physical force of pilot and co-pilot on the yokes)

When HYD2 is replacing HYD1 (switch cover "ON" overhear F.E.). Nose wheel, fuel dump valves for tank 2A and 3A and flaps are not available. Landing Gear down position will take longer due to reduced power and brakes pressure will be weaker, so plan on slower brake response.

When HYD2 is in failure, Emergency brake OR Emergency landing gear (only to down position) have to be selected.

Expect 3 minutes and 245 (25 in the game) full strokes of the emergency hand pump to extend and lock all gears

Ignition analyzer controller

The system can be used on the ground or in flight to detect, localize and identify engine ignition abnormalities.
A 3-inch face-up cathode ray tube mounted on the F.E. desk display patterns.

Two knobs placed near the floor of the F.E. desk are used to select engines 1-4 and each of the 18 cylinders one by one to see the ignition conditions

Normal pattern slow sweep – 18 spark plugs fired by two magnetos on one complete engine cycle

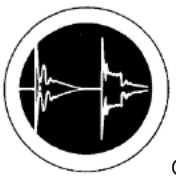
Normal pattern fast sweep – For the cylinder selected and the next cylinder fired by the magneto

First stage of High-tension - Dirty sparks or damaged cigarette spring at the park plug

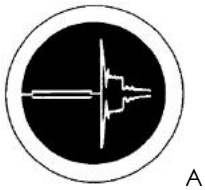
Second stage of High-tension - Dirty sparks or damaged cigarette spring at the park plug

9 normal patterns instead of 18 – Ground between magneto and distributor

Open primary circuit – Presence of foreign substance insulating electrical contact between the points



Open in the lead form the distributor to the cylinder mounted oil



A ground in the primary lead from the distributor to the cylinder mounted oil

LANDING GEAR

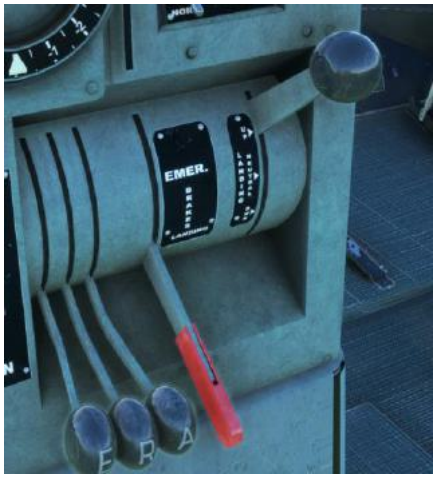
The aircraft is equiped with a fully retractable tricycle landing gear.
Landing gear doors are mechanically operated by the gear oleo pneumatic shock struts, and lie fush with the airplane contour when the gears are retracted.

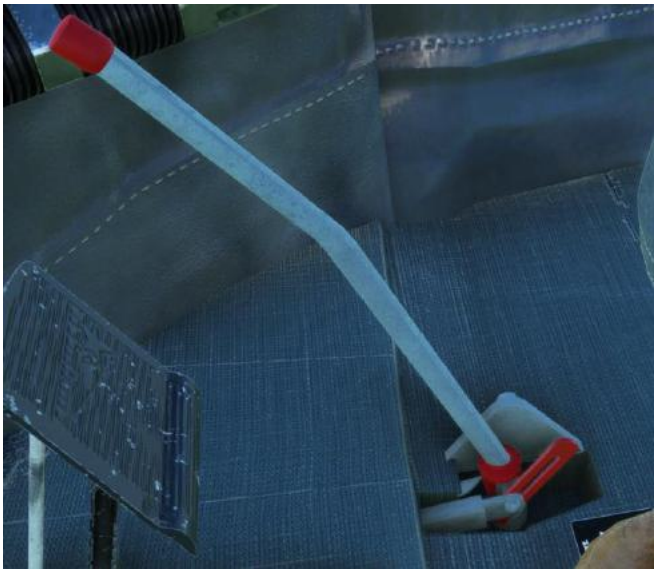
The HYD2 system provides the hydraulic pressure to operate the uplocks, downlocks and actuating cylinders which extend and rectract the landing gear.

The nose gear wheels are cambered 12° to help forward castering.

Landing gear control lever is located on the right aft face of the center control stand and actuates the landing gear selector valve by control cables.

It has three notched positions: UP, NEUTRAL and DOWN , but the neutral position is not simulated here for simplicity





In the event that HYD2 system does not supply sufficient pressure the landing gear can be extended by means of a hand pump system.

Hydraulic fluid for the hand pump is taken from an emergency extension hydraulic reservoir and its directed to the uplocks, gear actuating cylinders and downlocks through separate hydraulic lines.

Expect 3 minutes and 245 full strokes (25 in the game) of the emergency hand pump to extend and lock all gears.
See HYDRAULIC section for more information's

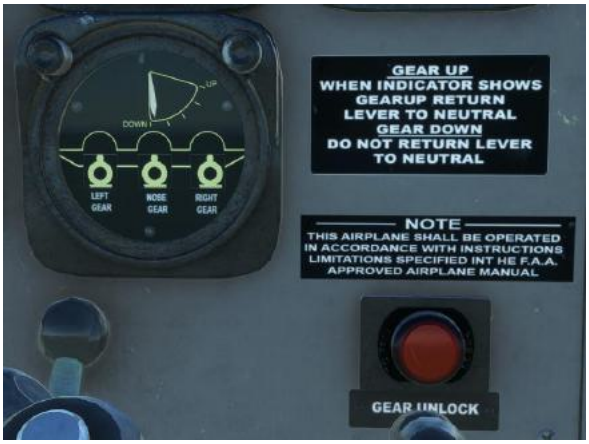
No emergency means provided for gear to retraction.

The center panel landing gear indicator display the state of all the gears.

- Three green : the langing gear is down and locked, ready for landing
- All off: the landing gear is full up and all the landing gear doors are closed and locked
- Left red: the landing gear is operating up or down and/or the doors are open and unlocked
- Right red or one of the green light off : Failure in the landing gear.

Short nose version (AIRFRANCE)

Long nose (TWA) version



Military version (MATS – WARNINGSTART BATCAT)

LIFE RAFT

Two 20-man life rafts are installed on the left and right inner wing.

The left and right life raft release handles are installed in a box under the cockpit access door.

A third life raft is available in the galley coat closed and another in the aft coat closed, but they are not simulated here.

Pull the handle to inflate the raft.

Check emergency procedure for more information

LIGHTS - EXTERNAL

Nose light is fixed to the nose gear on certain versions and in the nose of the aircraft for no radar versions.

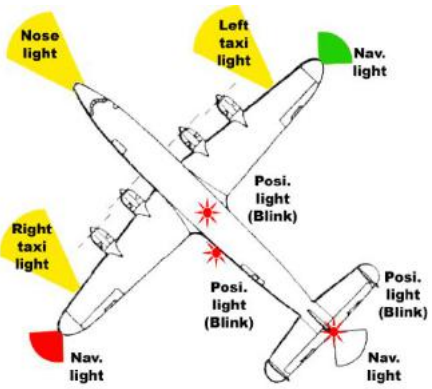
Landing lights left and right are under wing. They can be retracted to point ground or extended to point forward aprons.

Leading edge lights is use to light wings left and right to check engines and ice formation

Navigation lights are red white and green lights

Position lights are red beacon (blink) lights over and under the aircraft.

Main switches for lights are positioned on the left side pilot's panel

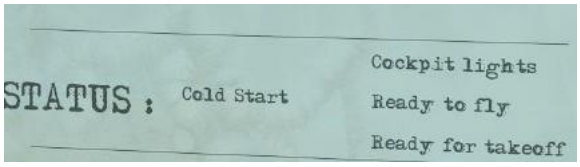


Landing/Taxi light switches both left and right and Extend/OFF/Retract switch are positioned on the overhead panel.

You can also find the Ordinance lights for no smoking (sound/light) and fasten seat belt (sound/lights).

At start and in case of total light failure, you can activate the hand light by pressing ALT+L

You can switch on/off all cabin light on the mane menu page of the clipboard



LIGHTS - INTERIOR

Left side pilot's panel:

- Panel lights switch, and a panel light knob dim/bright manages the pilot's instruments background
- Chart lights switch, and a panel light knob dim/bright manages the left light of pilot's instrument panel
- An Overhead knob (OVHD FLOOD) OFF/DIM/BRIGHT manages the upper left pilot's light for all the pilot's seat area A center knob OFF/DIM/BRIGHT manages the center instruments background A cabin knob OFF/DIM/BRIGHT manages all the passengers cabin lights.

Right side co-pilot's panel:

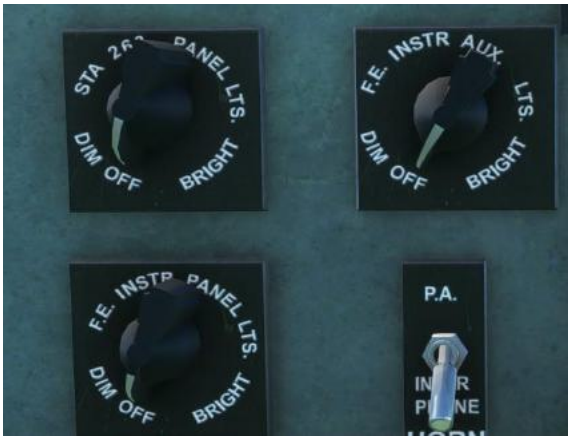
A Panel lights switch, and a panel light knob dim/bright manages the co-pilot's instruments background

A Chart lights switch, and a panel light knob dim/bright manages the right light of co-pilot's instrument panel

An Overhead knob (OVHD FLOOD) OFF/DIM/BRIGHT manages the upper right co-pilot's light for all the pilot's seat area
A pedestal rear light switch manages the rear pedestal light.

On the flight engineer (F.E.) upper roof panel, three dimmer knobs are managing :

- F.E. Light levers (instruments aux.)
- STA 260 wall in the back of the cockpit (STA260 F.E. panel LTS)
- All F.E. instruments backlighting (F.E. instrument panel).



A main dome light knob and a red/white light switch are positioned on the MJB2 panel.

Two glare shield knob on the pilot's and copilot's sides are managing the red and the white glare shield lights.

An additional knob on the overhead panel is manages all the overhead lights

At start and in case of total light failure, you can activate the hand light by pressing ALT+L

MAGNETO - INGNITION

Four off/right/left/both knobs are positioned on the upper panel to operate the four engines magnetos.

Check the start-up procedure section for more details.

MARKER BEACON RECEIVER

The marker beacon is used as a navigating and landing system.

In the 1960's landing procedures included outter, middle and inner markers that were used for identifying specific points on the final approach.
In present day, only outer marker is sometimes still in use.

Three lights (Blue, Amber and White) are installed on the pilot's and the co-pilot's instrument panels. The marker lights on when the aircraft fly over it.

The length of time during the indicator lights glow depends upon the speed of the aircraft.

Outer Marker	BLUE	400Hz dashed tone Light on-off in dashes
Middle Marker	AMBER	1300Hz dotted tone on-off in dots
Inner Marker	WHITE	3000Hz steady tone Steady light

NOTEBOOK FLIGHT ENGINEER

Click on the notebook to open it on the desk and display first page

MENU PAGE

Display all charts on desk will place all the charts on the desk to help to check RPM, BMEP, TAS and MAPS according to power management, altitude, and weight

Dynamic Charts will add red areas to dynamically read datas.

Search and repair a fuse or **a light bulb** are not functional in this version

Manage all flight engineers once option will act as a temporary AI.F.E. to help you to manage all datas including fuel system, oil and cowl flaps without maintain an A.I. F.E. at all time.

AI PILOT / COPILOT /F.E. and dedicated **VOICES** are status reminder pictograms to manage A.I. and A.I. HELP from this place

CONSUME PAGE

Used to view levels and quantities for:

- HYD. 1 & HYD. 2
- OIL TANK 1, 2, 3, 4 and reserve
- BATTERY LEVELS
- ANTI-ICE ALCOHOL left & right
- Oxygen Quantity
- CO2 FIRE EXTINGUISHER 1 & 2

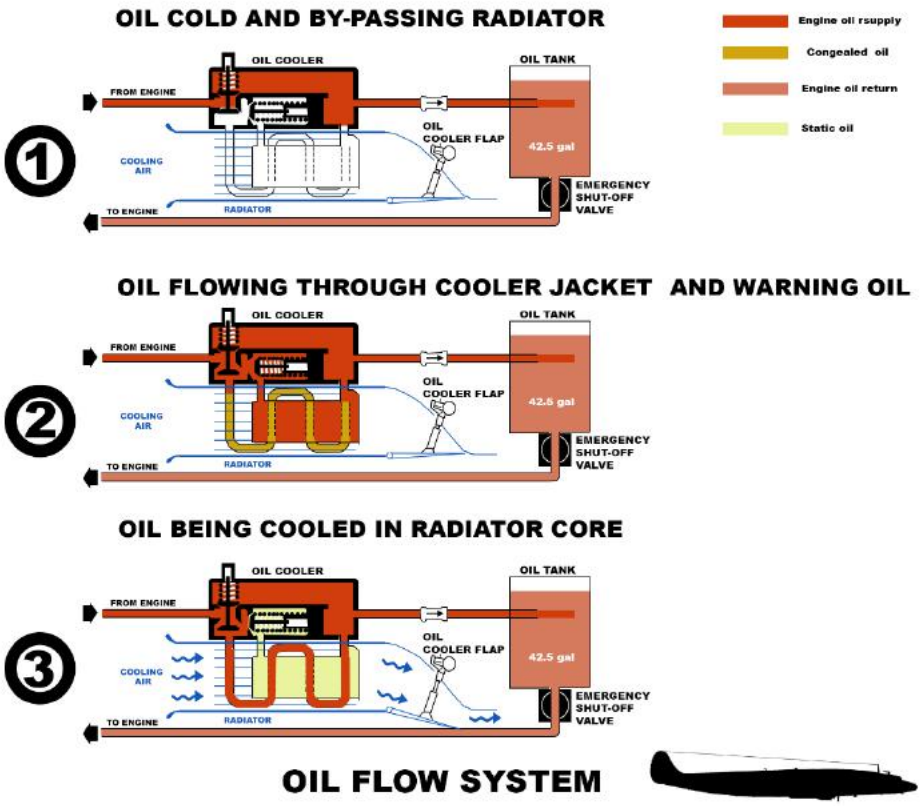
Summary of fuel configurations and displays of Fuel Config 1 2 3 4 5 6

Instant selection of Fuel configurations is functional since V2.0
You can select the picture to set up tank/pump configurations instead of flipping on/off fuel pumps, Crossfeeds etc.

However, it will be beneficial for you learn the intricacies/complexities of the fuel system to really enjoy this magnificent plane.

OIL ENGINE SYSTEM

Each engine oil tank has a volume of 42.5 US. Gallons (354 Lbs or 159 litres).
A cold oil has a high viscosity and high pressure, opening or closing valves in the oil cooler core.
A hot oil is fluid and have a lower pressure.



When the oil is cold the oil cooler core is heating the fluid (1)

When the engine is started at low temperature, the hot oil from the oil cooler core is heating the oil in the radiator jacket (2)

When the oil is hot (normal operation), the oil is pathing through the radiator and is cooled according to the opening of the cooler flap (3)

In cruise mode with AI.F.E. cowl flaps and oil cooler flaps are managed by F.E. to prevent overheating or cold shock conditions

In "realism" mode, the oil temperature can quickly increase on the ground and in flight if the cowl flaps are not judiciously positioned.

Above 90 °Celsius, a white-blue smoke will come out of the exhausts

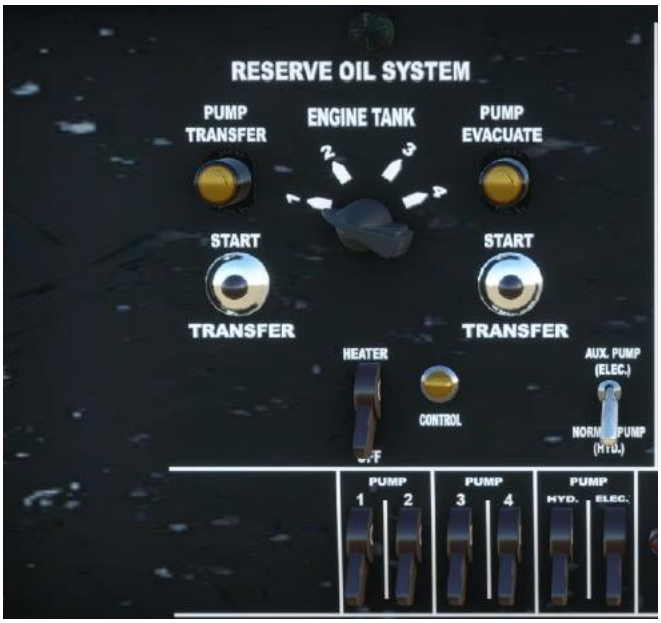
Above 100 °Celsius, the motor will misfire and lose power

Above 130°, the oil may catch fire, causing irreparable damage to the engine.

AUXILLIARY OIL TANK & CONTROL

A RESERVE OIL tank of 67 US. Gallons (558 Lbs or 253 litters) is located in the left stub wing adjacent to the No.5 tank.

A control Panel is located on station 260 panel.



A heater breaker and a control light when on, starts a heating cycling until 74°C to prevent oil congealing at low operating temperatures.

Use the knob to select for tank 1, 2, 3, or 4 for the transfer operation.

Press start transfer to transfer oil from reserve to selected engine tank (until full tank or empty reservoir)

Press start pump evacuate to transfer oil from tank selected to reserve (until full reserve or empty tank)

A two-position transfer pump selector switch, labeled "NORM. PUMP (HYD)" and "AUX. PUMP (ELECT.) selects the desired pump.

In case of HYD2 and HYD1 failure use the AC electric pump instead of the hydraulic pump to transfer oil.

In case of HYD2 and HYD1 failure use the AC electric pump instead of the hydraulic pump to transfer oil.

Outside air temperature

Although the temperature sensor is not a flight instrument, it has nevertheless its place in this chapter because the crew of an aircraft must have an accurate indication of the outside temperature, to know for example its deviation from standard conditions or to detect icing conditions
OAT or outdoor air temperature is also called "SAT" static temperature indicator.

This indication is influenced by the speed of the aircraft and therefore the heating of the mass around the aircraft.
Ice build-up can also change the parameters

Oxygen system

The aircraft is equipped with a high-pressure oxygen system.
Pilot, co-pilot, F.E. and Radio have separate Oxygen controls.

A green on/off lever will open and close Oxygen supply to masks.

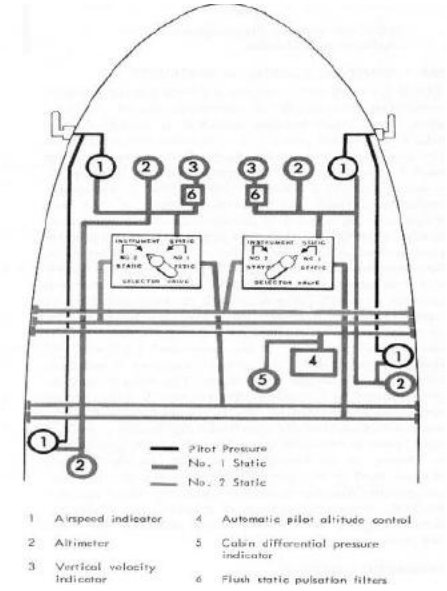
Pressure gage regulator indicates % of oxygen and a diluter knob can be set to NORMAL oxygen or 100% OXYGEN (in case of cabin smoke for example).

An orange DILUTER DEMAND REGULATOR SAFETY PRESSURE CONTROL LEVER can be set to OFF in normal position or ON in case of leakage in the mask.

In case of depressurization or failure of the cockpit, you will have to put your mask on and manage your OXYGEN SYSTEM MASK pressure to avoid a loss of consciousness.
The use of an Oxygen mask is essential above 10,000 ft due to hypoxia affects.

PITOT STATIC SYSTEM

Work in progress

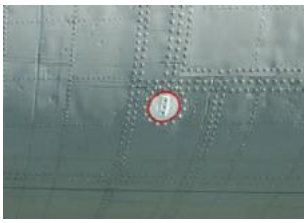


The pitot-static system includes the pitot systems through which impact air pressure is transmitted to the airspeed indicators and the static system through which outside static air pressure is transmitted to the altimeters, airspeed indicators, vertical speed indicators, cabin deferential pressure indicator, and altitude control of the automatic pilot.

Two separate pitot systems are provided, each of which includes a pitot head installed on the lower fuselage nose.
The left pitot head supplies impact air pressure for the pilot's and a navigator's airspeed indicators. Five separate static systems are provided, each of which consists of a pair of flush-type static fitting installed on either side of the fuselage nose or fuselage barrel.

Four systems, pilot first, and second and copilot's first and second statics, are installed to provide the pilot and copilots with two independent sources of static pressure.


Pitot


flush-type static

Copilot static 1 or 2 selector

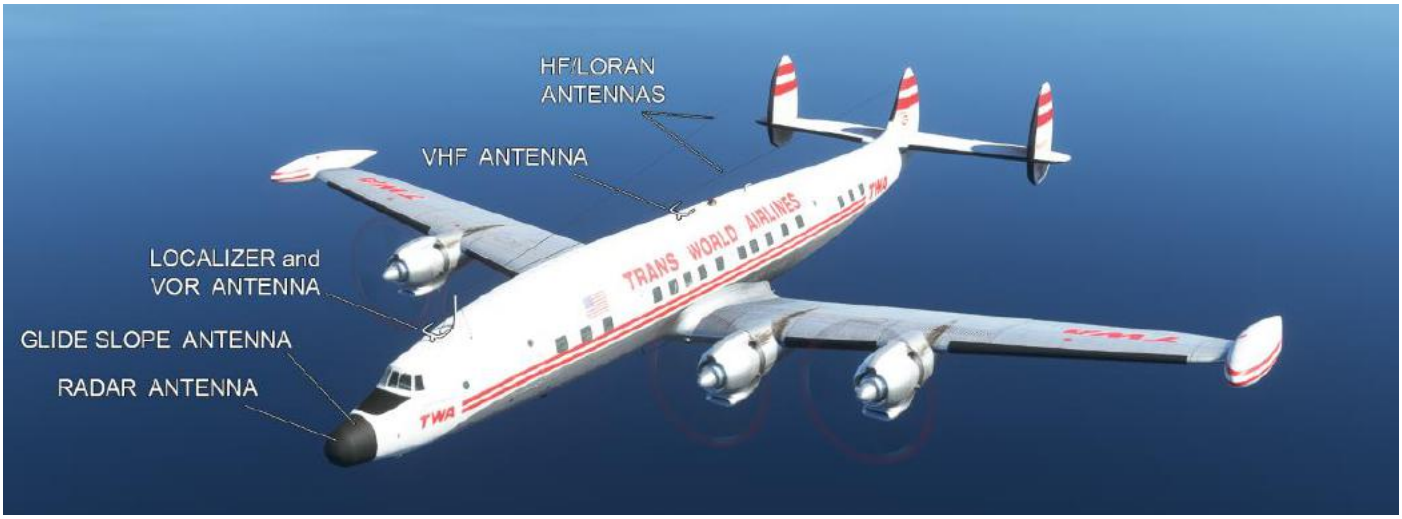
The selection of either system is by a static selector valve ont the pilto's and copilot's instrument panels. The pilot's static system provide static pressure for the pilot's altimeters, airspeed indicator, and vertical speed indicators.
The copilot's system supplies the same instruments on the copilot's and the flight engineers's panel as does the pitlot's static system.

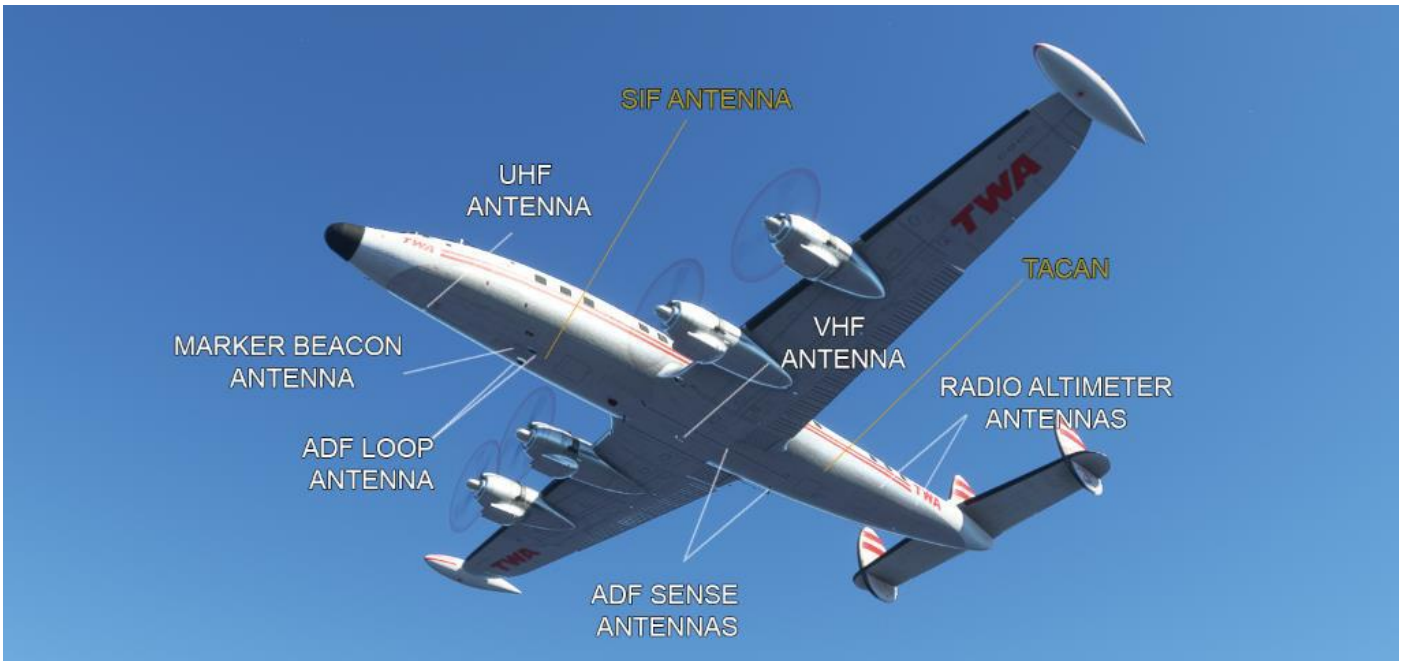
The fifth static system provides static pressure to the cabin differential pressure indicator and to the altitude control of the automatic pilot.

Pitot heater switches left and right are on the right side of copilot

Caution! In case of obstruction (icing), deterioration or destruction (example volatile impact), the data of the instruments are altered, even false and put in danger the continuation of an IFR flight.

RADIO ANTENNA DIAGRAM





RADIO ALTIMETER / AVQ-6-9

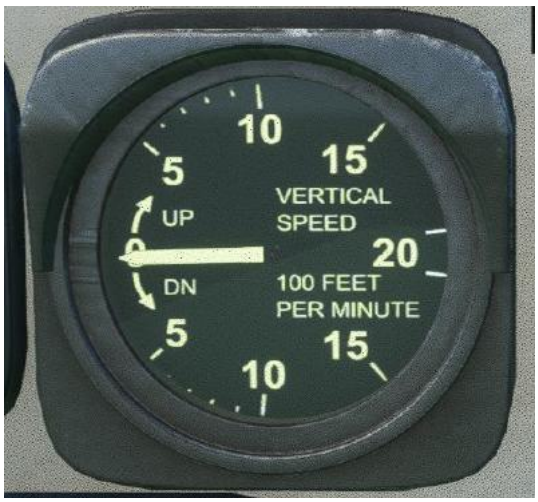
The system gives visual indication of the aircraft altitude above ground (height)and has a normal range from zero to 20,000 feet.
Two flush antennas (AC. Current) are utilized by a transmitter-receiver, one under the left wing and the other under the right wing.
The radio altimeter indicator readings are more accurate under 500 ft. A knob can be used to select the bug limit altitude.
It can be used for decision height information.

Three altitude limit warning lights operate in conjunction with the range limit switch

- Red below the limit selected altitude
- Amber at the set altitude
- Green above the selected altitude

Altimeter RAC_AVQ9 is a long-range Altimeter RAC_AVQ9 and Altimeter RAC_AVQ6 is short range altimeter for 400 to 4000 ft precision.
The AVQ9 will be rendered inoperative by an interlocking relay when AVQ-6 is in use to avoid interferences

RATE OF CLIMB



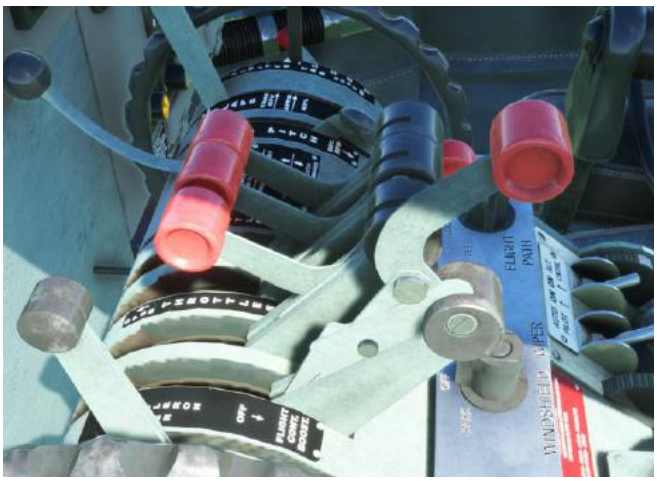
The variometer provides the vertical speed V_z of the aircraft, i.e., the vertical component of the speed of the aircraft in relation to the air mass.

The vertical speed indicator shows the vertical speed only with a certain delay and poor accuracy. Faster than the altimeter to determine the start of a climb or descent, the variometer should not be considered as a piloting instrument, but rather as a trend instrument. But despite these drawbacks, it provides sufficiently useful information for calculating slope, climb or descent times.

We add an indicator bug to show the rate of climb selected via the AP ALT switch for the autopilot.
This bug was not in the real plane. Use the "easy mode" on the clipboard to enable this altitude indicator bug.

REVERSE

The main role of the reverse is to slow down an aircraft on the ground during its landing, especially if it is heavy and traveling at more than 150 kt, because the length of the runways and the slow progress made on the braking systems on the landing gear level are not always sufficient to stop the plane in good safety conditions. Even more so, if the runway is contaminated (wet, snowy, icy, etc...), and the aircraft lands too fast, or the wind becomes unfavorable, it can be very difficult to stop the plane before the end of the runway.



Controllable pitch propellers have blades that can rotate to have a different angle of attack depending on the phase of flight.

This "propeller pitch" allows to obtain an adapted efficiency at high and low speed, but it also offers the possibility to direct the propeller's thrust forward, which corresponds to the reverse mode used on piston engines.

The reverse can safely be used to reverse plane direction without any pushback help from a tug. WIP

Reverse levers (RED) are placed over the throttle levers (BLACK)

A reverse lock override lever on the pedestal inhibits the reverse until the tree wheels are on the ground.
This inhibition can be overridden by pushing front the lever to apply reverse thrust with only left and right main gears on ground.

Do not apply the brakes in the event of a reverse for push-back. The aircraft could end up on its tail. Turn off the reverse and push throttle forward before applying the brakes.

STARTER

Engine selector knob, starter press-button, primer press-button and start selector warning light are positioned on the bottom of the MJB2 panel.

Check the start-up procedure section for more details

SUPERCHARGER

Cruise atlitude over 10,000 ft with a pressurized cabin is essential to reduce fuel flow and manage a direct transatlantic flight.
The Supercharger lever for each engine have two positions low and high blower.

To climb or cruise above 10,500ft, first reduce manifold pressure to 20 inHg or less, then switch supercharger control from low to high blower position. (This is automatic currently via MSFS) After manifold pressure stabilizes, restore throttle to obtain required manifold pressure to achieve the desired climb or cruise power settings.

Do not exceed 40 in Hg in low blower and do not make more than two shift within five-minute interval or the engine may be damaged.

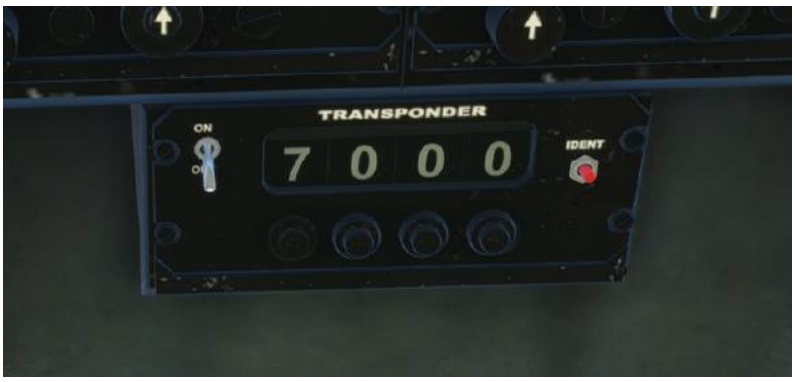
The shift to HIGH blower should be made at the altitude at which the BMEP drops below 40 inches and you cannot maintain/recover that by adding throttle.
SUPERCHARGER IS AUTOMATED BY ASOBO SCRIPT

TACAN W.I.P.

TRANSPONDER

This system is sending to ATc a 4 digit code (MODE A or squawk code) received by radar antenna on ground.

A transponder help air traffic contro to identify your plane.



TRIM

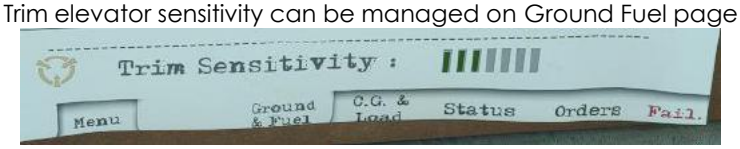
A trim system manages mechanically or electrically the commands to help pilot during flight.
The trim for example adjusts the pitch of the command to maintain a constant climb on the yoke without the need of the pilot to pull the commands.

Elevator manual control system (pilot's and copilot's) is connected by cable to the elevator walking beam. A hydraulic booster system assists the pilot to manage the elevators at far end of the airplane.

An elevator electrical switch is available on the Yoke.

In case of emergency faillure this electrical system can be overpass to use only the manual system by a lever labeled "electric elevator trim tab clutcher lever"

Trim elevator sensitivity can be managed on Ground Fuel page



Rudder trim and aileron trim are two big knobs labelled on the pedestal console.

An instrument on center panel displays all the three-axis trim in progress.
RUDDER - AILERON - ELEVATOR

Turn bank indicator and inclinometer

The turn indicator or Turn coordinator, is usually associated with a ball tilt indicator.

- it detects the speed of rotation around a vertical axis;
- It measures the rate and direction of turn;
- It controls the regularity of the turn… to avoid drifting

The rate of turn is the rate of change of heading of the aircraft.
This is the number of degrees divided by the time in seconds.
The turn is said to be standard or rate = 1 if the aircraft completes 360° in 120 seconds, i.e., 3° per second.

During taxiing, check the correct operation of the needle and the ball:

- on the ground during a left turn: the needle must be on the left and the ball on the right,
- on the ground during a turn to the right: the needle must be on the right and the ball on the left

VOR

VOR (VHF omni range) is a radio electric positioning system used for navigation via VHF frequencies.

Switch on NAV1 on the lower panel and select a NAV frequency (VOR or LOC)

Use the OBS knob to select a radial for the VOR on the HSI (Horizontal Situation Indicator)
Vertical needle indicate direction to follow to 'catch' the radial.

You can read Magnetic position of the VOR on the Green background RMI.
Single arrow is for VOR1 on pilot side and double arrow for VOR2 (vice versa on co-pilot side).

WINDSHIELD WIPER

The windshield wiper command knob is located on the centre control panel.

A low and high position let select the speed of the wiper.

In OFF positon wipers are stopped and in PARK postion, they are reset to the first park position.

ZERO-READER _ ILS (WORK IN PROGRESS and may substitute HSI)

The Zero Reader system electronically combines the aircraft's attitude, heading, altitude and radio information and displays the results on a single indicator.

The Zero Reader indicator consists of two bars, one vertical and one horizontal, which, when centred, indicate to the pilot that the aircraft is on the pre-selected track or that the attitude is correct for returning to the selected track.

Such a trajectory may require the use of the system as a flight instrument, as a navigation instrument using radio system signals, as an aid on landing approaches in adverse weather conditions, and as a climb indicator for go-arounds.

To maintain any selected flight plan with the Zero Reader, it is necessary to observe only one indicator, and to maneuver the aircraft in pitch and roll so that the indicator bars are centred.

The center selection knob allows selection of one of the four positions marked LEFT, FLIGHT INST., RIGHT, and APPROACH.

Turning the knob also causes a blue-yellow or yellow-blue pattern to appear through two triangular openings in the dial, depending on whether the selected flight path requires the blue sector to be to the left or right of the flight path. If the proposed flight path is without radio, black appears in these openings.

Altitude control is introduced into the system by the small knob to the right of the center button marked ALT.
This button has two positions marked ON and OFF. When the altitude control is off, a green light at the bottom left of the switch is illuminated. When the altitude control is on, the altitude control signals are applied to the horizontal bar of the indicator. To prevent conflicting signals from being sent through the system simultaneously, a mechanical interlock disconnects the altitude control when the switch is in the APPROACH position.

When the center selector switch is in the APPROACH position, all signals present in the VOR-LOC. and (blue) RIGHT position remain in effect, except that the altitude control signals are replaced by glide path signals and are applied to the horizontal bar of the indicator. When the centre switch is in the (blue) LEFT position, the indicator bars receive the same signals as in the FLIGHT INSTANT position but a radio navigation signal is also added to the vertical bar. The source of this signal may be a normal localizer leg for outbound flight, the reciprocal localizer leg for inbound flight, or the VOR beam range, provided the blue sector is to the left of the flight path.

In the VOR-LOC. (blue) position of the knob, the directional detection of the radio signals is reversed, compared to the (blue) LEFT position, so that the vertical bar of the indicator will provide a correct indication when flying the localizer in a normal approach direction with the blue sector on the right. This knob position is always used when flying a VOR range or when departing on the reciprocal localizer.

When the knob is in the APPROACH position, all signals present in the VOR-LOC (blue) RIGHT position remain in effect, except that altitude or pitch trim are replaced by glide path signals. These signals are applied to the horizontal bar of the indicator. The approach go-around system is designed so that when the go-around button is depressed, the appropriate pitch correction is displayed on the horizontal bar of the indicator.

The overshoot is depressed by the pilot in the event that an approach is deemed unsatisfactory, but the go-around pushbutton is only connected when the selector is in the APPROACH position.
This action disconnects the glide slope signals from the horizontal bar of the indicator and establishes a biased climb signal on the horizontal bar. In the event that another approach is made, it is necessary to move the centre control knob away from the APPROACH position and then back to the APPROACH position to restore normal system operation.

10. OPERATION MANUAL TABLE

10.1 Operational Airspeeds (wing level and 1G load factor)

Gross Weight Lbs. x1000	V_S	V_{SO} 60%	V_{SO} 80%	V_{SO} 100%	V_1 or V_R	V_2	V_{CLIMB}	V_{APP}	V_{ATT}
90	98	88	81	78	88	99	113	110	101
100	104	92	85	82	94	105	120	117	107
110	109	97	89	86	99	110	125	122	112
120	114	101	93	90	104	115	131	127	117
130	119	105	97	94	109	120	137	132	122
140	123	109	100	97	113	123	142	136	126

Speed IAS in Knots (Kts) displayed on Airspeed indicator
V_S: Stall IAS gear down and no flaps
V_{SO}: Stall IAS for landing (Flaps 100% and gear down)
V_{SO}%: Stall IAS with % flaps (gear up or down)
V_1: Rotation IAS
V_2 Lift off IAS
V_{CLIMB}: IAS for best rate of climb
V_{APP}: IAS for approach
V_{ATT}: IAS over threshold for landing

10.2 Takeoff Performances with Distance (Ft)

10.3

Gross Weight Lbs. x1000	IAS Kts	SEA LVL	1,000 Ft	2,000 Ft	3,000 Ft	4,000 Ft	5,000 Ft
90	98	1400	1400	1400	1600	1800	1900
100	103	1700	1700	1700	2100	2200	2400
110	108	2200	2200	2200	2600	2800	3000
120	113	2700	2700	2700	3200	3500	3800
130	118	3300	3300	3300	3900	4200	4600
140	122	4200	4200	4200	4900	5300	5600
Thrust Factor	52	51.8	51.4	52.6	53.6	55.5	55

Runway dry, no wind, no slope, no obstacle.

Thrust Factor: Low Blower, max power

10.3 Distance from liftoff to Clear 50ft Obstacle

Gross Weight Lbs. x1000	IAS Kts	SEA LVL	1,000 Ft	2,000 Ft	3,000 Ft	4,000 Ft	5,000 Ft
90	99	300	300	310	350	360	420
100	105	350	350	350	400	420	540
110	109	450	450	440	530	580	680
120	114	600	600	590	680	720	880
130	119	750	750	740	830	1000	1200
140	125	900	900	890	1050	1200	1500

Distance from lift-off to Obstacle
Runway dry, no wind, no slope, no obstacle.

10.4 POWER SETTINGS LOW BLOWER

Engine RPM	Altitude Ft	SEA LVL	2,000 Ft	4,000 Ft	6,000 Ft	8,000 Ft	10,000 Ft	12,000 Ft	14,000 Ft
2900	POWER	MAX. POWER / 5min maximum / CHT 250°C							
	BHP	3400	3400	3185	2970	2750	2550	2350	
	BMEP	277	278	260	245	225	208	190	
	MAP	59.5	58	57	56	55	54.5	54	
2600	POWER	METO POWER / No time limit / CHT 245 °C							
	BHP	2800	2825	2850	2685	2490	2320	2160	2010
	BMEP	255	256	259	245	226	210	196	182
	MAP	52	51	50	49	48.5	47.5	47	46.5
2500	POWER	CLIMB POWER / No time limit / CHT 230 °C							
	BHP	2080	2095	2110	2120	2135	2145	2105	1955
	BMEP	196	198	199	200	201	202	199	185
	MAP	34	34	34	34	34	34	34	34

Mixture AutoRich, Retarded Spark 20°, Humidity 80% max., Fuel Octane 145.

10.5 POWER SETTINGS HIGH BLOWER

Engine RPM	Altitude Ft	10,000 Ft	12,000 Ft	14,000 Ft	16,000 Ft	18,000 Ft	20,000 Ft	22,000 Ft	24,000 Ft
2600	POWER	MAX. POWER / 5min maximum / CHT 260°C							
	BHP	2510	2525	2550	2500	2325	2175	2050	
	BMEP	118	230	232	227	210	197	185	
	MAP	51	50.5	50	49.5	48.5	48	47.5	
2600	POWER	METO POWER / No time limit / CHT 245 °C							
	BHP	2410	2425	2440	2450	2325	2175	2035	1900
	BMEP	218	219	220	222	210	195	185	170
	MAP	49.5	49	48.5	47.5	47	46.5	46	45
	POWER	CLIMB POWER / No time limit / CHT 230 °C							
	BHP	2080	2090	2105	2120	2133	2090	1930	1785
	BMEP	196	197	199	200	201	198	182	170
	MAP	44	44	44	44	44	44	44	44

HIGH BLOWER uses only over 10,000 Ft
Set RPM and BMEP to obtain max MAP

10.6 Rate-of-Climb Ft/min – METO LOW BLOWER

Gross Weight Lbs. x1000	IAS Kts	SEA LVL	2,000 Ft	4,000 Ft	6,000 Ft	8,000 Ft	10,000 Ft
90	180	2260	2230	2200	2050	1875	1700
100	180	1960	1925	1875	1775	1600	1450
110	180	1700	1675	1625	1525	1375	1200
120	180	1500	1475	1425	1300	1125	1000
130	180	1300	1250	1225	1125	900	800
140	180	1125	1150	1050	925	775	650

LOW BLOWER 2600 RPM 170 Kts IAS / COWL FLAPS 30% / OIL FLAPS 35%

10.7 Rate-of-Climb Ft/min – METO HIGH BLOWER

Gross Weight Lbs. x1000	IAS Kts	10,000 Ft	12,000 Ft	14,000 Ft	16,000 Ft	18,000 Ft	20,000 Ft	22,000 Ft	24,000 Ft
90	180	1775	1725	1700	1650	1500	1350	1150	975
100	180	1500	1450	1425	1375	1250	1075	900	750
110	180	1275	1225	1175	1125	1000	825	700	525
120	180	1050	1000	950	900	775	625	500	350
130	180	850	900	750	700	757	425	300	250
140	180	700	625	575	525	400	275	150	

HIGH BLOWER 2600 RPM 170 Kts IAS / COWL FLAPS 40% / OIL FLAPS 40%

10.8 IGNITION SPARK RETARD / NORMAL

(Except checklist overwise)

POWER	< 2400 RPM	2400 RPM	2500 RPM	> 2500 RPM
MAX POWER	NORMAL	NORMAL	NORMAL	NORMAL
METO LOW BLOWER	NORMAL	NORMAL	NORMAL	NORMAL
METO HIGH BLOWER	RETARD	RETARD	RETARD	RETARD
CRUISE LOW BLOWER	NORMAL	NORMAL	NORMAL	RETARD
CRUISE HIGH BLOWER	NORMAL	RETARD	RETARD	RETARD
DESCENT LOW BLOWER	NORMAL	NORMAL	NORMAL	RETARD
DESCENT HIGH BLOWER	NORMAL	RETARD	RETARD	RETARD

10.9 Cruise POWER LBS/h

	Sea LVL	5,000 Ft	10,000 Ft	15,000 Ft	20,000 Ft
Gross Weight			90,000 Lbs.		
BHP	970	1000	1120	1210	1345
BMEP	143	148	145	137	148
RPM	1600	1600	1810	2075	2135
TAS	143	152	208	224	245
MIXTURE	AutoRich	AutoRich	Lean	Lean	Lean
BLOWER	Low	Low	Low	Low	High
Fuel Flow	405	430	465	515	560
	Sea LVL	**5,000 Ft**	**10,000 Ft**	**15,000 Ft**	**20,000 Ft**
Gross Weight			100,000 Lbs.		
BHP	1110	1140	1230	1380	1455
BMEP	163	160	150	147	156
RPM	1600	1680	1900	2220	2205
TAS	190	196	210	232	246
MIXTURE	Lean	Lean	Lean	Lean	Lean
BLOWER	Low	Low	Low	Low	High
Fuel Flow	450	470	510	580	600
	Sea LVL	**5,000 Ft**	**10,000 Ft**	**15,000 Ft**	**20,000 Ft**
Gross Weight			110,000 Lbs.		
BHP	1223	1260	1360	1475	1545
BMEP	169	168	160	151	160
RPM	1645	1765	2005	2300	2260
TAS	196	201	218	236	250
MIXTURE	Lean	Lean	Lean	Lean	Lean
BLOWER	Low	Low	Low	Low	High
Fuel Flow	495	510	560	615	630
	Sea LVL	**5,000 Ft**	**10,000 Ft**	**15,000 Ft**	**20,000 Ft**
Gross Weight			120,000 Lbs.		
BHP	1345	1386	1498	1622	1730
BMEP	181	179	168	158	170
RPM	1755	1845	2105	2420	2400
TAS	201	207	224	269	256
MIXTURE	Lean	Lean	Lean	Lean	Lean
BLOWER	Low	Low	Low	Low	High
Fuel Flow	540	560	610	675	700
	Sea LVL	**5,000 Ft**	**10,000 Ft**	**15,000 Ft**	**20,000 Ft**
Gross Weight			130,000 Lbs.		
BHP	1523	1570	1696	1784	1938
BMEP	182	184	176	175	183
RPM	1970	2010	2240	2405	2500
TAS	206	216	230	235	265
MIXTURE	Lean	Lean	Lean	AutoRich	AutoRich
BLOWER	Low	Low	Low	High	High
Fuel Flow	615	630	685	760	**1250**
	Sea LVL	**5,000 Ft**	**10,000 Ft**	**15,000 Ft**	**20,000 Ft**
Gross Weight			140,000 Lbs.		
BHP	1660	1711	1848	1941	2109
BMEP	183	184	186	184	192
RPM	2140	2195	2350	2500	2600
TAS	211	218	234	248	270
MIXTURE	Lean	Lean	Lean	AutoRich	AutoRich
BLOWER	Low	Low	Low	High	High
Fuel Flow	675	695	750	**1280**	**1395**

10.10 DESCENT and APPROACH

Flight phase	BLOWER	RPM	IAS Kts	BMEP	Cowl Flaps %	Oil Flaps %	Wing Flaps %
Descent over 10,000 ft	HIGH	1800	295	120	On req.	On req.	0
Descent below 10,000 ft	LOW	1700	295	110	On req.	On req.	0
Descent Emergency clean	LOW	2600	293	idle	100	100	0
Descent Emergency Gear and flaps	LOW	2600	155	idle	100	100	100
Downwind	LOW	2600	140	On req.	On req.	On req.	60
Base / turning final	LOW	2600	135	On req.	On req.	On req.	80
Long final Approach	LOW	2600	On req.	On req.	On req.	On req.	100
Missed Approach <110 Lbs.	LOW	2900	On req.	Max.	40	40	60
Missed Approach > 110Lbs	LOW	2900	On req.	Max.	40	40	100

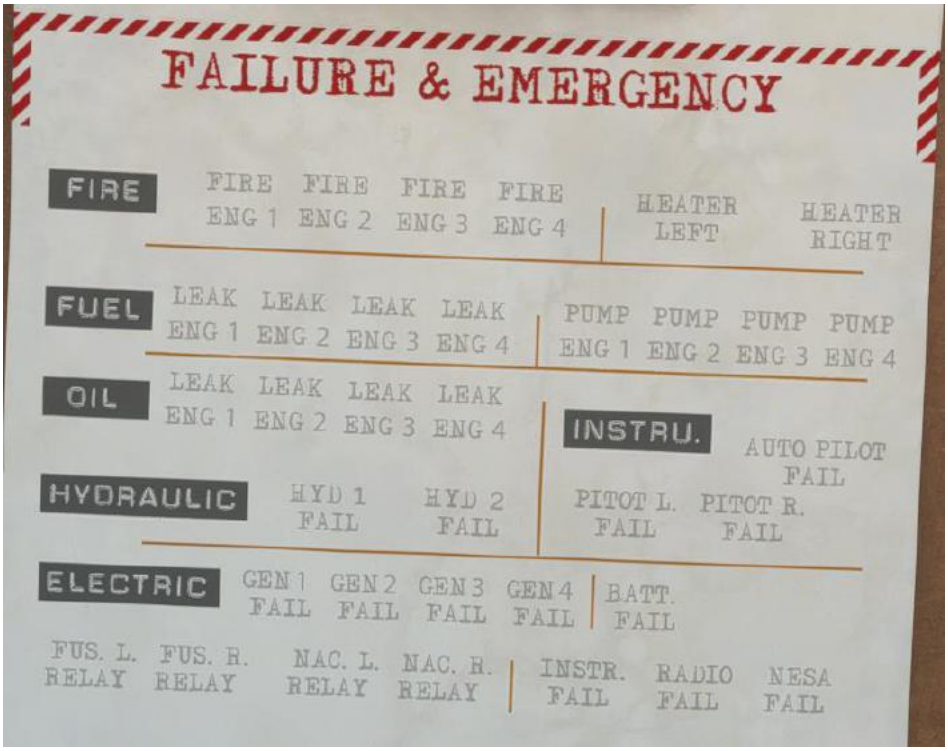
10.11 FUEL USAGE PROCEDURE

TOTAL FUEL GALLONS	QUANTITY PER TANK – GALLONS			
	1 & 4	2 & 3	2A & 3A	5
1000	250	100	150	0
1200	300	150	150	0
1400	350	150	200	0
1600	400	150	250	0
1800	450	150	300	0
2000	500	150	350	0
2200	550	150	400	0
2400	600	150	450	0
2600	650	150	500	0
2800	700	150	550	0
2860* (2A &3A)	715	150	565*	0
3000	750	185	565*	0
3200	800	235	565*	0
3400	850	285	565*	0
3600	900	335	565*	0
3800	950	385	565*	0
4000	1000	435	565*	0
4200	1050	485	565*	0
4400	1100	535	565*	0
4600	1150	585	565*	0
4800	1200	635	565*	0
5000	1250	685	565*	0
5200	1300	735	565*	0
5400	1350	785	565*	0
5420* (2 & 3)	1355	790*	565*	0
5600	1445	790*	565*	0
5800	1545	790*	565*	0
5820 (1 & 4)	1555*	790*	565*	0
6000	1555*	790*	565*	160
6200	1555*	790*	565*	380
6400	1555*	790*	565*	580
6550* (ALL)	1555*	790*	565*	730
**NOTED TANKS FULL AT QUANTITIES SHOWN*				

11. Failures

11.1 Instant failures

Upper part of the clipboard failure page creates instant failures: FIRE, FUEL, OIL, HYDRAULIC, INSTRUMENTS, or ELECTRIC



Use this for training and to create rapid action events for you to address.

11.2 External control damages

Fuselage can be damaged due to excessive overspeed conditions as follows:

Aileron visual damage over 310 kts (normal limit 296 kts)
Rudder visual damage over 305 kts (normal limit 296 kts)
Elevator visual damage over 300 kts (normal limit 296 kts)
Flaps visual damage over 220 kts (normal limit 180 kts flaps 60)

11.3 Gear damage

At touchdown several factors are analyzed to detect the quality and impact speed of the landing.
If the landing is too hard on one leg or if speed is over 150 kts, a tire will explode.

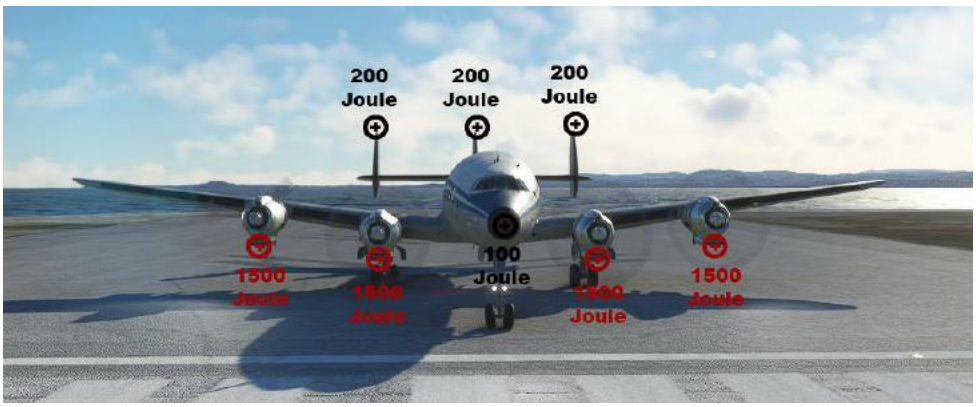
Rolling on the rim causes sparks and smoke, even a fire.
The damaged wheel will cause significant braking and prevent standard rolling characteristics significantly.

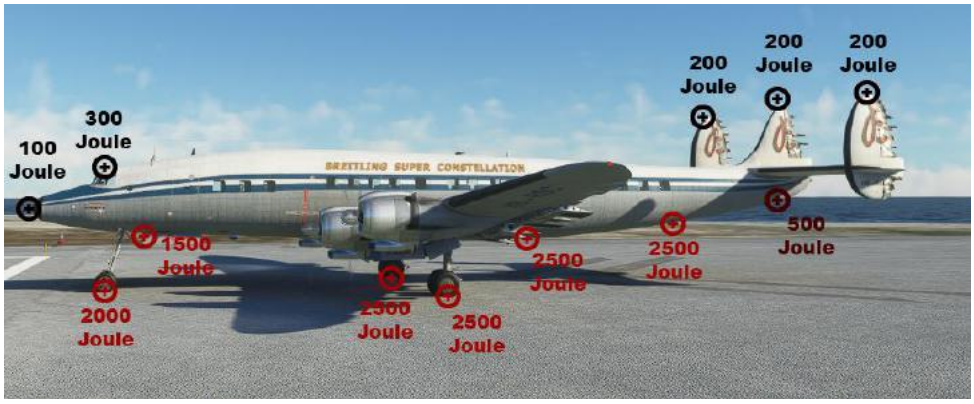
The nose wheel is more fragile than the main gear.

If you hit it too hard with the nose wheel, the landing gear can collapse and the plane will end up on its nose.

The MSFS crash concept is based on impact zones and joules.

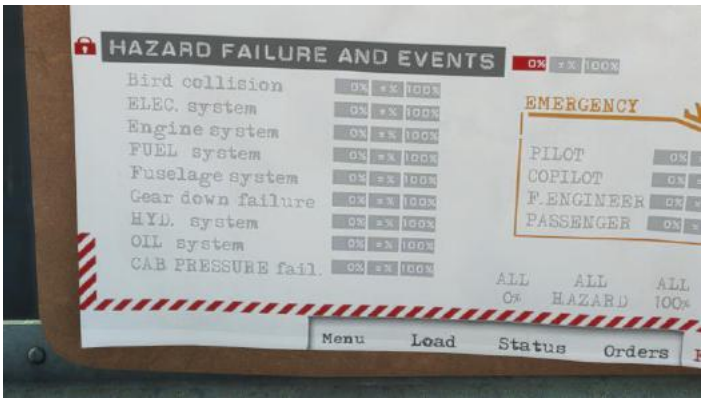
If you land "softly" enough without hitting the fragile areas, the plane will not destroy itself.





11.4 Hazard failure and events

The second part of the clipboard failure page generates random failures.
The delay is selectable from 0% (OFF), within 60min or within 5min.



At 0% no failure will occur. For other delays (60 min or 5 min) , you can activate/deactivate failures of your choice before random selection.

After 60 seconds, a random process selects one of the main failures and will enable the selected trouble within a random delay between 0 to 60 minutes or 0 to 5 minutes depending on your selection

It is possible to de-active all hazard failure or only some specific failures. Three scenario buttons (bottom right) can manage them; All 0% (Sets all to 0%), All Hazard (enables all set to random), or All 100% (sets to 100%),

Some main failures have specific activation characteristics. Others have sub-systems of failures.
There should not be more than one or two failures at same time, with the exception of a failure causing another failure. Like an electrical (generator) failure causing a fire on an engine.

Bird collision	5 %	
	Elec system	15 %
	ENG system	10 %
	Fuel system	10 %
	Fuselage	10 %
Gear down failure	10 %	
	HYD	10 %
	OIL	10 %
	CABINE PRESSURE	10 %
	EMERGENCY LANDING	10 %

11.4.1 Bird collision

Hazard 5% (only if altitude less than 3000 ft)
Other failures may occur.

- 50 % pitot system left
- 50 % pitot system right

11.4.2 ELECTRIC system

Hazard 20%
Sub failure

10% Generator 1 overheat (use breaker/ if not: init elec fire after 3 min + sick pilot or copilot or FE after 5mn)
10% Generator 2 overheat (use breaker / if not init elec. fire after 3 min sick pilot or copilot or FE after 5mn)
10% Generator 3 overheat (use breaker / if not init elec. fire after 3 min sick pilot or copilot or FE after 5mn)
10% Generator 4 overheat (use breaker / if init elec. fire after 3 min sick pilot or copilot or FE after 5mn)
5% Instrument BUS (init elec fire after 3 min)
5% Radio BUS (no more RADIO) /if not OFF init elec. fire after 3 min)
5% NESA BUS (no more pneumatic De-Ice or Electric Window heat / if not off init elec. fire after 3 min)
10% Battery / not charging and will be flat rapidly
5% Fuselage relay left (no more oil dilution)
5% Fuselage relay right (no more oil dilution)
5% Nacelle relay left (no more feathering cowl flaps reverse or synchro on ENG1 and 2)
5% Nacelle relay right (no more feathering cowl flaps reverse or synchro on ENG 3 and 4)
15% Electrical fire (isolate systems then extinguisher) if not after 4 min other failure cumulable

All GEN failure = aux booster on will empty battery
All GEN+BATT failure = no fire detection + no feathering system

11.4.3 ENGINE system

Hazard 10%

Sub failure

- **10%** FIRE ENG1 (LVL1+1 min=LVL2=1 min=LVL3+1min=LVL4)
- **10%** FIRE ENG2 (LVL1+1min=LVL2=1min=LVL3+1min=LVL4)
- **10%** FIRE ENG3 (LVL1+1min=LVL2=1min=LVL3+1min=LVL4)
- **10%** FIRE ENG4 (LVL1+1min=LVL2=1min=LVL3+1min=LVL4)
- **10%** FIRE HEATER LEFT (LVL1+1min=LVL2=1min=LVL3+1min=LVL4) (no more heater L)
- **10%** FIRE HEATER RIGHT(LVL1+1min=LVL2=1min=LVL3+1min=LVL4) (no more heater R)
- **10%** PROPELLER 1 OVERSPEED (Loose ENG1 due to feathering) if not risk of decoupling within 3 min
- **10%** PROPELLER 2 OVERSPEED (Loose ENG3 due to feathering) if not risk of decoupling within 3 min
- **10%** PROPELLER 3 OVERSPEED (LooseENG3 due to feathering) if not risk of decoupling within 3 min
- **10%** PROPELLER 4 OVERSPEED (Loose ENG4 due to feathering) if not risk of decoupling within 3 min

Fire Engine lvl 1 (black smoke) = fire detection zone2&3 (need 1 Extinguisher to stop fire)
Fire Engine lvl 2 (black smoke + flame) = fire detection zone2&3 (need 1 Extinguisher to stop fire) + oil ENG failure 50% + fuel leak 50% + FUSELAGE amber 100%
Fire Engine lvl 3 (2 smoke + 1 flame) = fire detection zone1+2&3 (need 2 Extinguisher to stop fire) + oil ENG failure 50% +fuel leak 50%
Fire Engine lvl 4 (2 smoke + 2 flames) = fire detection zone1+2&3 (cannot be extinguish / and can put fire to other engine or to the wing (20% every 2 min) + oil ENG failure 50% + fuel leak 50%
Fire in wing cannot be extinguished and can put fire to adjacent engine (20% every 2 min) + elec fuselage failure + NACELLE 100% (no more cowl flaps reverse starter feathering and synchro on this side)
FIRE EXTINGUISHER is effective only if ENG is OFF AND RPM is < 1000 AND COOLER flaps are closed else no effect on fire

11.4.4 FUEL system

Hazard **10%**

Sub failure

- **15%** PUMP ENG 1 (tank 1 unusable, must crossover and restart engine)
- **15%** PUMP ENG 2 (tank 2 unusable must crossover and restart engine)
- **15%** PUMP ENG 3 (tank 3 unusable must crossover and restart engine)
- **15%** PUMP ENG 4 (tank 4 unusable must crossover and restart engine)
- **10%** FUEL LEAK ENG 1 (Loose ENG 1 due to fuel pressure)
- **10%** FUEL LEAK ENG 2 (Loose ENG 2 due to fuel pressure)
- **10%** FUEL LEAK ENG 3 (Loose ENG 3 due to fuel pressure)
- **10%** FUEL LEAK ENG 4 (Loose ENG 4 due to fuel pressure)

11.4.5 FUSELAGE system W.I.P.

Hazard **10%**

Sub failure

- **33%** Lower fuselage fire (hostess + ventilation) if not passenger problems within 5 min
- **33%** Cabin fire (hostess + ventilation) if not SICK passenger problems within 5 min
- **33%** Cabin depressurization

11.4.6. Gear down failure

Hazard **10%**

Sub failure

- **30%** Nose Gear not locked (25% gear will go up on touchdown-75% normal land)
- **20%** Nose Gear not full down (use emergency procedure or land as it is)
- **15%** Left Gear not full down (use emergency procedure or land gear up)
- **15%** Right Gear not full down (use emergency procedure or land gear up)
- **20%** No gear down due to HYD failure (use emergency procedure or land gear up)

11.4.7. HYD system

Hazard **10%**

Sub failure

- **20%** HYD 1 leak (lock HYD 1 to save HYD oil quantity) if not HYD leak 1
- **20%** HYD 2 leak (lock HYD 2 to save HYD oil quantity) if not HYD leak 2
- **40%** HYD 1 fail = HYD2 backup (loose of some systems)
- **20%** HYD 2 fail = (loose of some systems)

11.4.8. OIL system

Hazard **10%**

Sub failure

25% Oil leak ENG 1 (use reserve to replenish) if not… no oil no engine + smoke
25% Oil leak ENG 2 (use reserve to replenish) if not… no oil no engine + smoke
25% Oil leak ENG 3 (use reserve to replenish) if not… no oil no engine + smoke
25% Oil leak ENG 4 (use reserve to replenish) if not… no oil no engine + smoke

11.4.9. CAB PRESSURE W.I.P.

Hazard **10%**

Sub failure W.I.P.

11.4.10. EMERGENCY LANDING W.I.P.

Hazard **10%**

Sub failure

10 % SICK PILOT (no more AI available)
10 %SICK COPILOT (no more AI available)
10 %SICK F.E. (no more AI available)

11.5 Easy -Normal -Realism modes

Easy mode:

- by default, no hazard event – but user can add them
- All failures are displayed in the failure page and in the status page
- Easy mode can be change to normal or realistic mode even in flight
- External control visual failures (aileron, rudder, elevator) have no impact on flight characteristics
- AI pilot copilot and/or F.E. can manage failures (W.I.P.)

Normal mode:

- by default, no hazard event – but user can add them
- All failures are displayed in the failure page and in the status page
- Normal mode can be change to easy or realistic mode even in flight
- External control visual failures (aileron, rudder, elevator) have impact on flight characteristics
- AI pilot copilot and/or F.E. can manage failures (W.I.P.)

Realistic mode:

- by default, hazard events are all selected – but user can modify them
- All failures are not displayed in the failure page neither in the status page
- Realism mode can be modified to another mode only on ground.
- External control visual failures (aileron, rudder, elevator) have impact on flight characteristics
- AI pilot copilot and/or F.E. cannot manage failures

12.VERSIONS – LIVERIES

AIRFRANCE // ident.: F-BGNJ
Short nose / Civil cockpit / 54 passengers cabin/ wing tank in option / A.P.U. in option

TWA// ident.: N6937C
Long nose / Civil cockpit / 54 passengers cabin/ wing tank in option / A.P.U. in option

KLM// ident.: PH-LKE
Shortnose / Civil cockpit / 54 passengers cabin/ wing tank in option / A.P.U. in option

MATS// ident.: MATS-52

Long nose / Military cockpit / CARGO – FREIGHT -LITTERY cabin / wing tank in option / A.P.U.

BATCAT USAF EC121-R (Vietnam Era)// Ident.: BATCAT

Long nose / Military cockpit / CARGO – FREIGHT -LITTERY cabin / wing tank in option / A.P.U. / specific antennas

WARNING STAR USAF EC121-D// Ident.: WS-555

Long nose / Military cockpit / Warning Star cabin / wing tank in option / A.P.U. / specific antennas / double radar

WARNING STAR NAVY EC121-WV// ident.: WV-326
Long nose / Military cockpit / Warning Star cabin / wing tank in option / A.P.U. / specific antennas / double radar

LUFTHANSA LH// ident.: D-ALIN
Shortnose / Civil cockpit / 54 passengers cabin/ wing tank in option / A.P.U. in option
Textures by EASYRAIDER

1049 C American Overseas Airlines// ident.: 131624
Shortnose / Civil cockpit / 54 passengers cabin/ wing tank in option / A.P.U. in option
Textures by Paul Grubich TEISCO and REDWING

BREITLING// ident.: HB-RSC
Long nose / Military cockpit / CARGO – FREIGHT -LITTERY cabin / wing tank in option / A.P.U.

1049 G Buffalo// ident.: C-GJKM
Long nose / Military cockpit / CARGO – FREIGHT -LITTERY cabin / wing tank in option / A.P.U.
Textures by EASYRAIDER

1049 FLYING TIGER// ident.: N69060
Long nose / Military cockpit / CARGO – FREIGHT -LITTERY cabin / wing tank in option / A.P.U.
Textures by Paul Grubich TEISCO and REDWING

13.Appendix A - Voices

13.1 Pilot voices and alert (other than checklists)

Max power	AI. Pilot and take off process
Gear up	AI. Pilot and take off process >> airborne and speed over 135 kts
METO power	AI. Pilot and take off process >> airborne and gear up
Flaps up	AI. Pilot and take off process >> airborne and alt over 500ft
Climb power	AI. Pilot and take off process >> flaps up and > 150 kts, 500ft
Approach power	AI. Pilot and approach process
Cruise power	AI. Pilot and take off process >> requested altitude reached
Reverse	AI. Pilot and landing process >> on ground and speed over 110 kts
Fasten seatbelt	AI. Pilot and turbulences or another problem / emergency
Prepare for landing	AI. Pilot and approach process >> less than 10 nm of runway
No go speed is XXX kts	Before take-off and according to altitude of airfield and weight
Rwy is wet, damp, flooded, snowed in	According to runway status

WORK IN PROGRESS

- Emergency process
- failures

13.2 Co-Pilot voices and alert (other than checklists)

Rotation	Take off process and nose gear no more on ground
Airborne	All gears no more on ground
Gear-up	after action and verification
Gear-down	after action and verification
Caution gear is down	airborne and over 1,500 ft after take-off process
Caution gear is up	under 350 ft
Warning gear is unlocked	Warning problem up but unlock
Warning landing gear problem	Warning other landing gear problem pressure normal / emergency
Warning front wheel problem	Warning wheel or tire front
Warning left wheel problem	Warning wheel or tire left
Warning right wheel problem	Warning wheel or tire right
Caution high speed according to alt	>295 kts under 5,000 ft / >270 kts under 10,000 ft / >240 kts under 15,000 ft
Caution over speed gear down	>165 kts and gear down
Flaps up	after action and verification
Flaps 60%	after action and verification
Flaps 80%	after action and verification
Flaps 100%	after action and verification
Caution overspeed flaps 60%	>190 kts and flaps 60%
Caution overspeed flaps 80%	>175 kts and flaps 80%
Caution overspeed flaps 100%	>155 kts and flaps 100%
Warning flaps problem	Warning pressure on or non-synchro flaps
500 400 300 200 100 50 30 20 10	Height over ground on landing process
Speed down	On runway and speed under 60 kts
Caution elevator damage	
Caution aileron damage	
Caution Flaps damage	
Auto pilot engaged	

Auto pilot off
Caution windshield icing

WORK IN PROGRESS
- Emergency process
- failures

13.3 Flight Engineer voices and alert (other than checklists)

Caution autopilot gyro no caged
Caution pitot icing in progress
Caution Low pressure Engine 1 2 3 4
Caution low fuel pressure Engine 1 2 3 4
Caution low oil pressure Engine 1 2 3 4
Caution High oil pressure Engine 1 2 3 4
Failure generator 1 2 3 4
overheat generator 1 2 3 4
I'm cutting generator 1 2 3 4
Nesa power on
Nesa power off
Instruments power off
Battery power off
Caution battery is flat
Caution battery is nearly flat
Low level fuel tank 1 2 3 4 2A 3A 5
Caution we are running low of fuel
Remaining autonomy 1 hour
Remaining autonomy 2 hours
Warning
Remaining autonomy 30 NM
Remaining autonomy less than 10 NM

Warning Fire eng1 2 3 4 Fire eng1 2 3 4

WORK IN PROGRESS