The Lockheed L-149 Constellation

This Lockheed L-149 is an addition to the Lockheed L-49 Constellation airliner released by our team for use in FS9. The original L-149 was modified from L-49 aircraft and so is this package. The documentation therefore only deals with the differences between the versions – apart from operating weights and some changes to the fuel system, the aircraft are otherwise identical. For your convenience, the complete L-49 manual is also available in the aircraft's main folder.

Enjoy flying the Lockheed Constellation!

Historical Note:
The Lockheed L-149 Constellation long range conversion

After a production run of 88 C-69 and L-49 aircraft, the production of the first generation of the constellation came to an end. The first L-649 flew on 19th Oct. 1946, but Lockheed also had a long range variant on offer, the L-749, and it turned out to be more popular with the airlines than the shorter-legged version.

The difference was a set of tanks installed in the outer wing panels, each holding 565 gallons or 3390 lbs of fuel. Since this required relatively little change on the rest of the airframe, the extra tanks were made available as a modification for the first-generation aircraft. It could only be installed on L-49's that had been upgraded to L-49D or E standard, allowing a MLW of at least 83'000 lbs. MTOW was raised to 100'000 lbs. Engines and propellers would remain the same, resulting in less take-off power and the lack of propeller reverse compared to second generation aircraft. Externally, the main difference was the presence of the fuel dump ports for the outer wing tanks on the wings trailing edge between aileron and flaps.

While sources sometimes differ, it appears that a total of 14 aircraft were converted to L-149's. PAA was the first to do so and converted a total of 8 their aircraft, 7 of them were later sold on to Panair do Brasil, which made it the second largest operator of this type. El AL had 3 converted, KLM 2 and a one more was owned by American Overseas Airlines. KLM's aircraft were converted prior to delivery to the airline and KLM used to refer to them as 'L-49', while El Al called their aircraft 'L-249'.

The L-149 were used on long-range services, but just as the standard L-49 Constellations, the L-149 were eventually retired when jets became available and the last were scrapped in 1974.

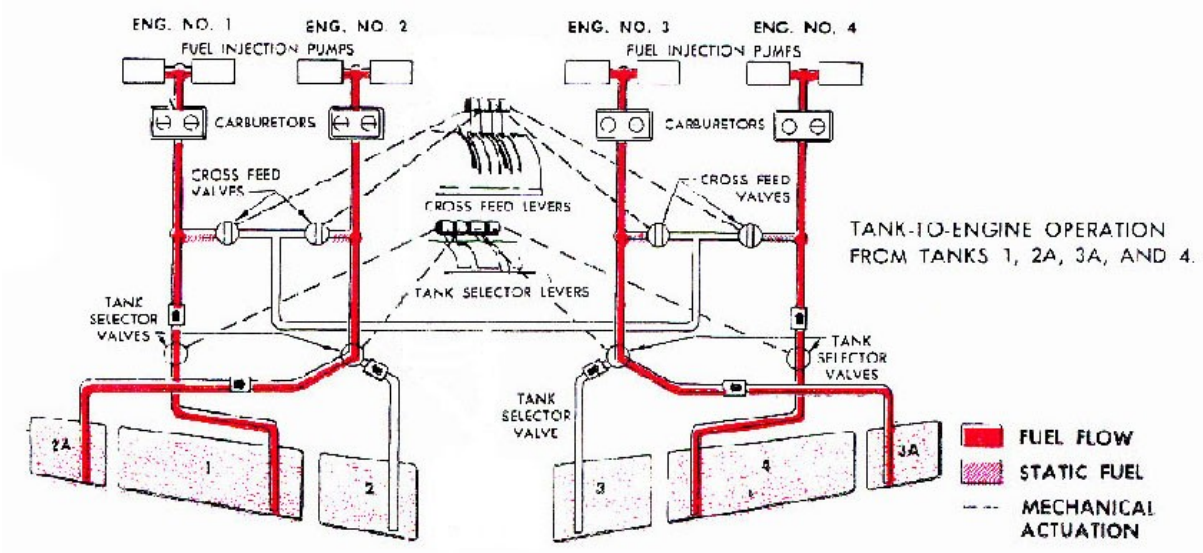
Sources:
Marson, P. J.: The Lockheed Constellation. Air Britain, 2007
Wilson, S.: Lockheed Constellation. Aviation Notebook Series. Notebook Publications, 2001

Tank system layout

The original L-049/C-69 had 4 tanks installed, one behind each engine in the inner wing section, numbered 1 to 4 from port to starboard, like the corresponding engines. In the 149 and 749, extra tanks were installed in the outer wing sections. These tanks are named 2A and 2B and are connected to the respective tanks in the inner wing section. A diagram of the fuel system is shown below.

Note that tanks 2 and 3 are depicted smaller than tanks 1 and 4 – they have less capacity since the main gear wheel wells run through them. The tank valves can be opened and closed by 4 levers on the right side of the Flight Engineer's main panel. All tanks are connected to a crossfeed system that allows feeding any engine from any tank.

The main tank levers 2 and 3 have three positions – 2/3, 2A/3A and OFF. Note the three-position valve in the fuel system diagram – it is not possible to feed the engines from tanks 2 and 2A or 3 and 3A at the same time.



Flight Simulator 9 uses its own naming system for the tanks (see the following table).

The total fuel capacity is, from port to starboard:

Tank 2A	565 gallons	3390 lbs	FS: LeftMain
Tank 1	1555 gallons	9330 lbs	FS: External1
Tank 2	790 gallons	4740 lbs	FS: Center2
Tank 3	790 gallons	4740 lbs	FS: Center3
Tank 4	1555 gallons	9330 lbs	FS: External2
Tank 3A	565 gallons	3390 lbs	FS: RightMain
Total	**5820 gallons**	**34920 lbs**	

A Fuel Tank Totalizer gauge is placed on the FE panel indicating the total content of the fuel tanks. The content of the individual tanks can be read from the fuel tank subpanel available by clicking the fuel panel SimIcon.

Compared to the L-49, some minor changes are made to the L-149 FE panel. The fuel selector levers for tanks 2/3 have intermediate stops for tanks 2A/3A and the fuel tank gauges 2 and 3 on the upper FE panel have dual

needles for both inboard and outboard tank. The fuel pump switches have been moved from the lower FE panel to the Auxiliary Control Stand subpanel.

Fuel loading
Once fuel requirement is calculated, we will have to distribute the fuel accordingly in our tanks. We will try to distribute the fuel as evenly as possible. Here's how we do it:

- Any amount of fuel up to 4 * 790 = 3160 lbs will be distributed equally between tanks 1 and 4. At 3160 lbs, tanks 2 and 3 are full, 1 and 4 are still about half empty.
- The next 4 * 565 = 2260 lbs will be distributed equally between tanks 1, 4, 2A and 3A. Now tanks 2A and 3A are filled up as well, but we have 200 lbs remaining in tanks 1 and 4 each.
- Any fuel above 5420 lbs will be split equally between tanks 1 and 4.

The Constellation will be set up with tanks 1 to 4 open and all crossfeed valves closed by default. Engine 1 will feed from tank 1, engine 2 from tank 2 and so on, the "tank to engine" configuration.

We will try to limit cross-feeding and avoid having fuel in the outboard tanks on landing which will put bending stress on the wing spar, so we will use this sequence during flight:

- Take-off and initial climb in "tank to engine" configuration.
- Then we will use any fuel above 5420 lbs (=4*(790 + 565)) to get equal amounts of fuel between tank 1 and 2+2A as well as 4 and 3+3A. At climb power, this will be only a matter of minutes. To do so, open all crossfeed valves and set tank levers 2 and 3 to "closed". Now fuel from tank 1 will go to engine 1 and also through crossfeed valve 1 into the crossfeed system and via crossfeed valve 2 to engine 2. Have a look at the tank system layout if you feel confused. Open tanks 2 and 3 once tanks 1 and 4 are down to 1355 lbs (=790+565).
- Next we will use fuel from the outboard wing tanks – set tank levers 2 and 3 to tanks 2A and 3A. Crossfeed valves can be closed now.
- Once tanks 2A and 3A are empty, we will return to the "tank to engine" configuration for the rest of the flight.

The Team

Volker Böhme:	GMAX, research, procedures, documentation
Luis Pallas:	flight dynamics and gauges
Bill Tyne:	wingview angles, lights, exhaust effects
Stefan Werner:	Textures, flight test

Further contribution:

Maarten Brouwer:	Textures (KLM)
Doug Dawson:	Supercharger and Fuel Dump code
Frank Gonzales:	Textures (TWA)
Manfred Jahn:	Original GMAX files, support and modelling
Hans-Jörg Naegele:	Original panel

Milton Shupe:	Gauge code and textures
Jan Visser:	Original VC textures
John H. White:	Original engine model

In memory of John Howard White (FsDzign)