**Some history**

Expeditor Mk. 3s where were basically D18S airframes ordered as transports and navigation trainers for the RCAF - 280 planes totally. They were also used by other European NATO countries where Canada had training commitments. Modifications include:

* Mk. 3N: navigation trainer with astrodome and two trainee stations in the cabin,
* Mk. 3NM: navigation trainer with modified floor mounts to allow 5 transport seats,
* Mk. 3TM: transport with modifications to allow use as navigation trainer,
* Mk. 3NMT(S): 20 Mk.3Ns modified in 1960 as (Special) Navigational Trainer personnel transport: the first navigation training station was removed and 3 chairs installed;
* Mk. 3NMT: 3NMTS models which later had the remaining navigation station removed in 1964 to become 3NMT with 5 cabin seats.

Civil disposals of these 1950s built RCAF Mk.3s occurred in small numbers at various times over their Canadian military service. The final bulk disposal of the type occurred in 1968.

**Package description**

This version of Beech 3NM package provides:

- a new instrument panel and a radio-controls overhead as they could be configured in 1950-60s with a set of old-style radio- and navigation gauges;

- new flight dynamics, providing spinnablity, which makes you to be careful when maneuvering at a low speed;



- an early model of the Lear L2 autopilot;

- realistic operations, so you must always keep your eye on the engine and airspeed gauges, or you can lose your engine, flaps and undercarriage; you should also follow the exact procedure to start the engine;

- improved sound;

- two liveries: Beech 3NMT (cn A-673/CA-73) with civil registration N6126, operated by Buckeye Air Freight (later Buckeye Air Service) in 1970-78; Beech 3NM ((cn A-894/CA-244) with civil registration N9540, since 2002 being operated by Hardin Enterprises Inc, St Helena CA.

**Vintage navigation systems**

For air navigation purpose Beech Expeditor Mk3 in their early 1950s was equipped with both primary navigation instruments like a directional gyro, a magnetic compass and a combination of two - slaved gyro-magnetic (gyrosyn) compass, and radio-navigation aids including low-frequency direction finder (ADF) and VHF VOR/ILS navigation system.

A directional gyro is operated by aircraft vacuum system and not magnetically slaved. It is equipped with a caging knob to adjust manually the apparent drift of the gauge reading due to the earth’s rotation.



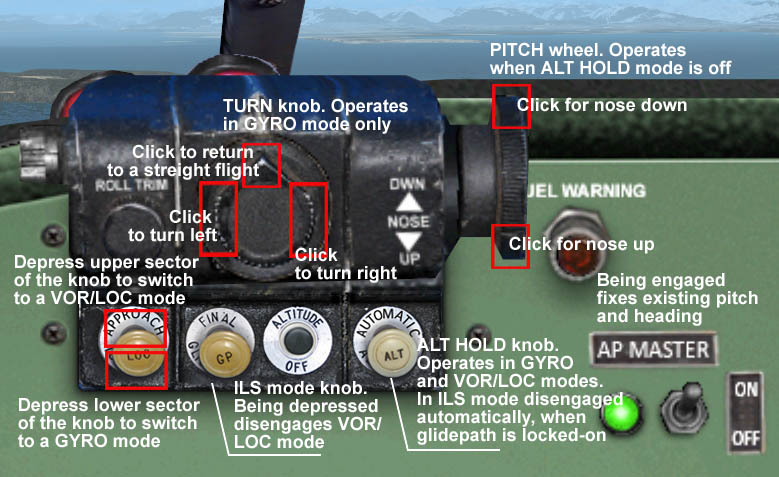
A slaved gyro-magnetic system is electrically operated and consists basically of a transmitter, located in the right wing tip, which serves as a reference for slaving the gyros to the earth’s magnetic field,   
a panel-mounted indicator, providing compensated compass reading by means of a needle that moves across a fixed 360-degree dial, and an inverter, required to convert DC power into AC power for the gyrosyn operations. The gauge also has an indicating pointer, controlled by a knob, which shows a desired flight direction.

Radio-navigation systems of the Expeditor Mk3 included a low-frequency directional finder AN/ARN-7 (including panel-mounted I-81A radio-compass) and VHF radio receiving set AN/ARN-30 which can be well-recognized through its fuselage-mounted V-type antenna and two panel-mounted gauges: ID-48 cross-pointer meter and ID-322 course selector/TO-FROM indicator. The ID-48 gauge did not have any controls and provided only a course/glide-slope deviation and a marker beam detection indication. The ID-322 with its controllable pointer allowed to choose a desired VOR/ILS course and, working in OMNI mode, indicated a direction TO or FROM a source of a radio-signal.



ID-48 cross-pointer ID-322 course selector I-81A radio-compass

**Autopilot**

Originally Expeditors Mk.3 was not certified to be equipped with automatic pilot systems. But as it was a late modification of D18S (starting from cn A-601), so after civil conversion, being actually a D18S, it optionally could use autopilot (IMHO). So I decided to equip my 3NM with early version of Lear L2 system which was widely used with GA aircraft. As many other automatic control systems of that time (Collins AP-101, Sperry A-12, Pioneer PB-10, etc.) the L2, installed in full configuration, provided coordinated turn, desired heading and altitude hold and could follow VOR/ILS beam.

**Realism**

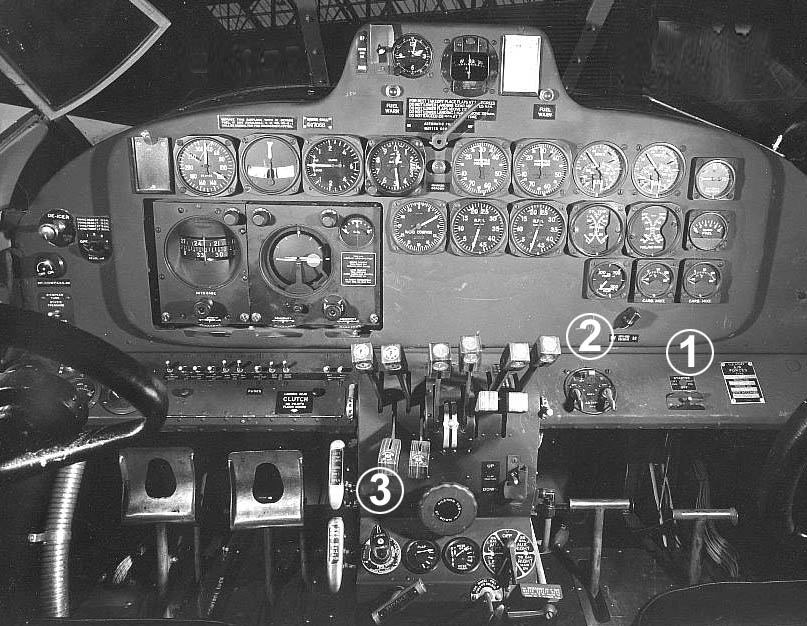
Realistic operations of the aircraft is provided by RealEngine gauge\_v1.1, designed by Gunter (teson1), which I tuned to D18S standards. So be attentive and always keep your eyes on MP, RPM, cylinder head and oil temperature. Remember, that R-985-14B engine, if not upgraded to E18S standard, when taking-off at sea-level pressure altitude, can produce 450 HP (at 36.5 in. Hg with 2300 rpm) for only 1 minute. And maximum allowable cylinder and oil temterature is 550 degrees F (286,6 degrees C) and 200 degrees F (93,3 degrees C) respectively. Despite the instrument panel you can control all that data using RealEngine pop-up panel (Shift+3). Due to the RealEndine gauge you must also control the airspeed at take-off and landing not to damage flaps and landing gears. In case of overspeed they become inoperable.

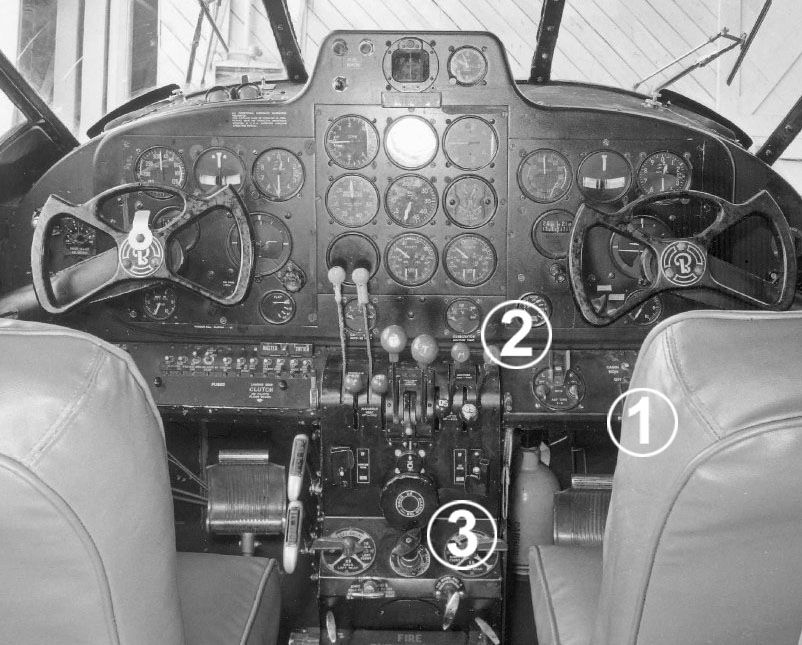
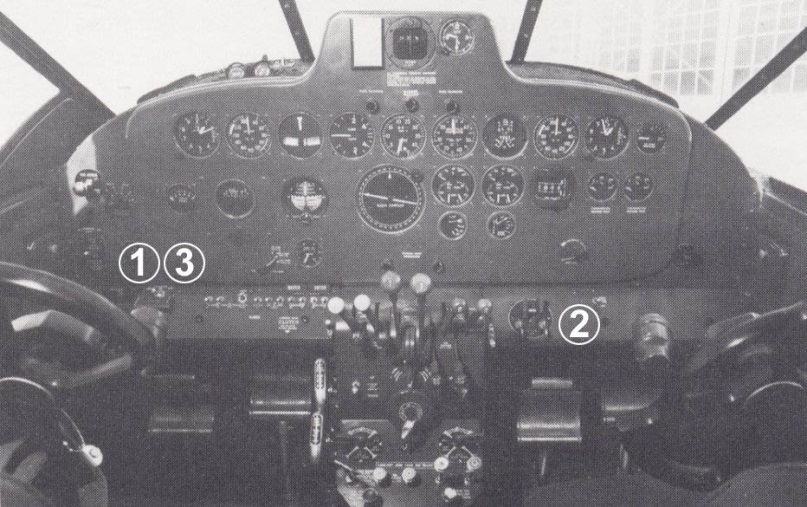
 Due to improvement of flight dynamics, which make the plane spinnable, you should also be attentive when maneuvering at a low speed.

**Engine start-up**

To compare to pre-war (C18S/C-45F type aircraft) and early post-war Beech 18 models (D18S/C before 1949), the engine starting system of Twin Beeches of 1950s (D18S/Expeditor Mk.3, C-45H/G Expeditor, E18S, G18S, H18S) became more sophisticated. The old starting system included two direct cranking starters, operated by a single toggle-type starter switch (single-pole double throw type switch which is springing loaded OFF in the center position, and ON when held in either extreme position labelled LEFT engine or RIGHT engine), which initiated either engine starter directly. In addition to starter a new system also included an ignition booster and an electric primer (C-45H/G Expeditor, E18S, G18S, H18S) per each engine, operated by an engine selector, initiating the electrical circuit of the respective units on the engine selected, and respective functional switches/buttons, located under a safety cover. Approximately beginning with RCAF Expeditor Mk.3 production start, a hand-operated wobble-pump at D18Ss, using for increasing a pressure in a fuel system before engine start-up, was changed to electrical fuel boost pumps (one per each engine, and it was a default equipment for all following Beech 18 models). Apart from other models, D18S/Expeditor Mk. 3s kept the manually-operated push-pull primer. A round-type ignition switch (a master switch and two individual magneto selectors) was changed to an in-line 4-switch unit (two switches per each engine).

The following are options of Beech 18 engine starting system controls, where:  
1 - starter unit switch, 2 – ignition switch, 3 – primer

    
 UC-45F C18S

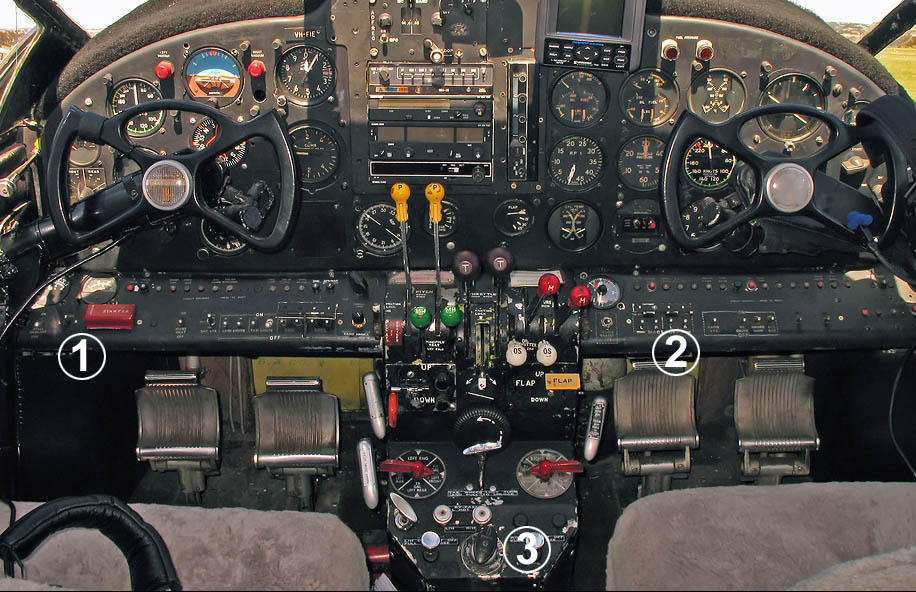
 

D18S cn A-203 (1949) D18S cn ? (late 40s-early 50s).

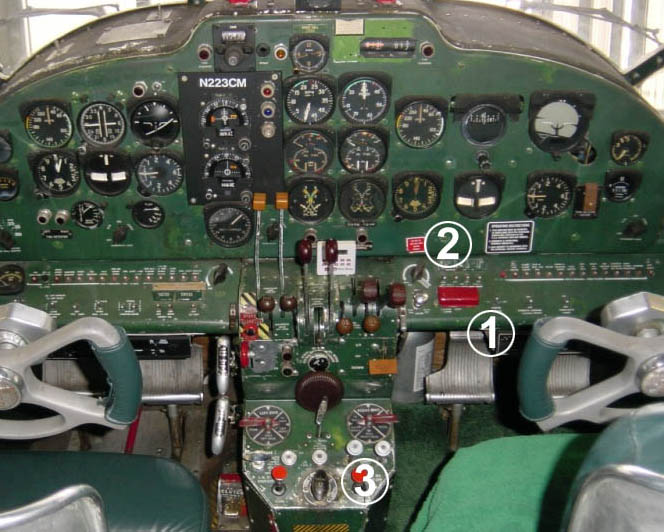
Presumably this plane has a C-45H type start-up controls,

as a default primer location at the pedestal is empty

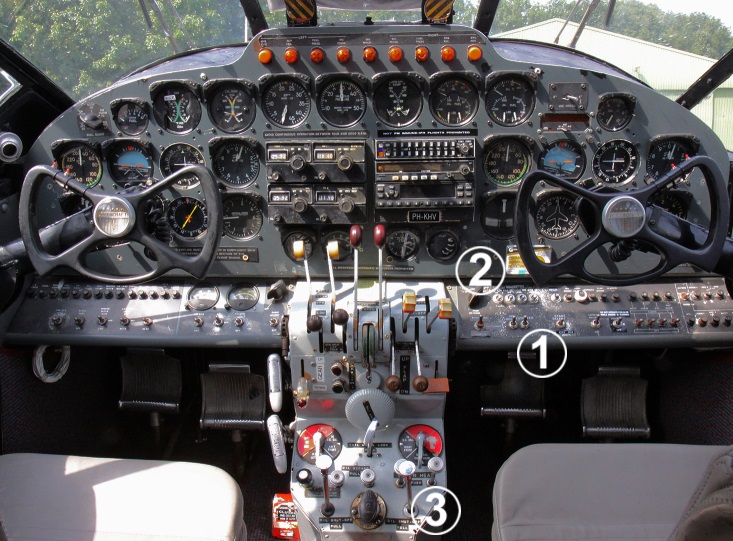
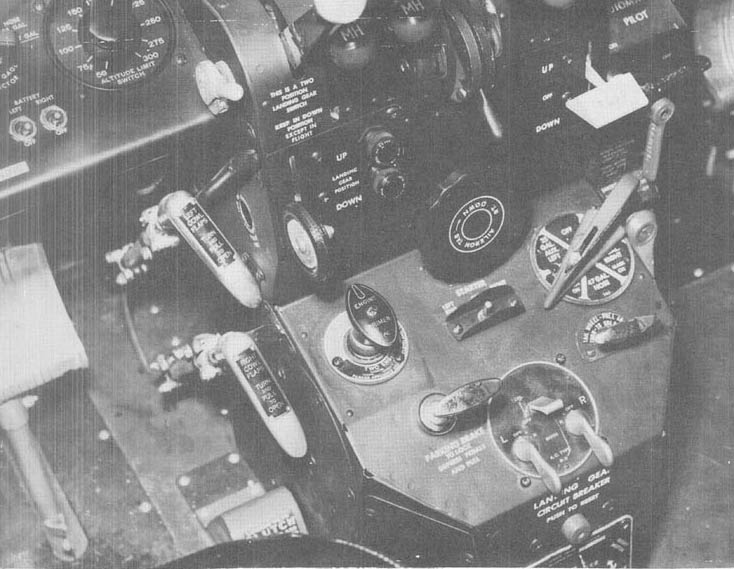
Contemporary view (2010s)

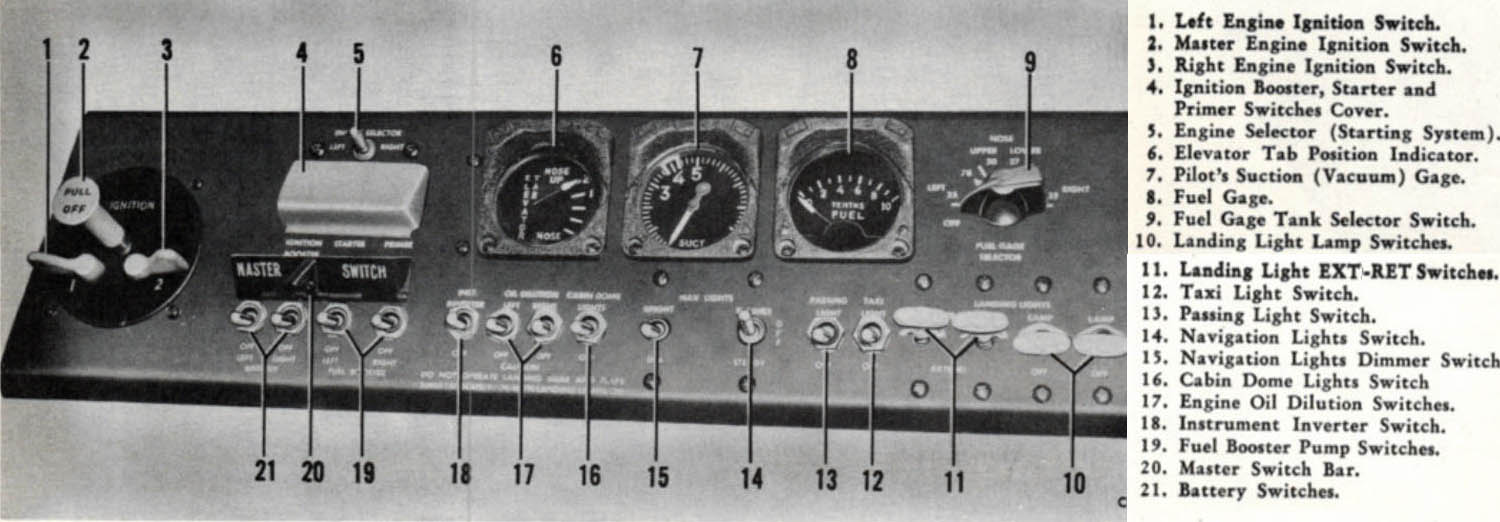
D18S cn A-177 D18S cn A-808

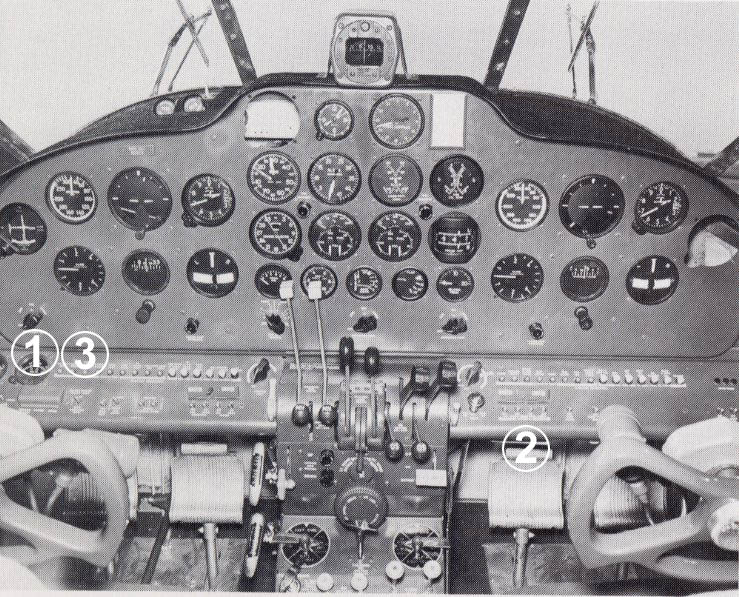
3NM cn A-853/CA-203 3NM cn A-873/CA-223

3NMT cn A-904/CA-256 SNB-5: all starting controls are pedestal-located



C-45G/H left lower electrical panel with engine-starting controls

E18S cn ? (1954) E18S cn BA-2

The starting procedure of the 3NM Expeditor is programmed rather close to a real-life one, so you should follow a strict starting sequence to start the engine. Unfortunately due to FSX limitation I could not find the way to simulate the ignition booster. So, in this case the starter and the ignition booster switches move simultaneously. But as for other stages (opening the throttle, raising fuel pressure by using the boost pump and priming), you will not fire the engine without passing them.

The real-life starting procedure is as follows:

*Pre-start check*  
- parking brakes ON  
- fuel selector NOSE TANK  
- cowl flaps ON  
- carburetor heat OFF  
- propeller FULL FORWARD  
- throttle CRACKED (1/8 open)   
- mixture RICH  
- battery ON\*  
- anti-collision lights ON  
 - radios OFF  
 - tail wheel UNLOCK

*Starting procedure (right engine first)*

- MP gauge CHECK  
- fuel boost pump ON  
- primer 3-4 strokes   
 for warm engine,  
 7 for cold  
- stater selector RIGHT ENGINE  
- depress starter at least 8 blades  
- ignition switches ON  
- ignition booster DEPRESS\*\*  
*(after engine started)  
-* oil pressure CHECK (20 psi within 20 secs)  
- suction gauge CHECK  
- left engine repeat same sequence  
- generators ON  
- inverter/slaved compass (gyrosyn) ON

\* When engine is being started from internal power source. In case of the external power source use  
the battery is switched on after both engine are started and the external source is disconnected. The latter is not simulated.  
\*\* Not simulated

**Radio-controls panel**

Originally Beech Expeditor Mk3s had a standalone radio-control overhead panel assembly, combining remote control units of the most part of the plane radio-equipment. The receiving units, being rather bulky, were located mainly in the aft part of the fuselage. Original radios included several HF, UHF and VHF communication stations, above mentioned LF and VHF navigation equipment and marker-beacon and glide-path signal receivers. Due to FSX limitations the controllable frequencies are available only in the VHF range (in my case – COM1, COM2 and NAV1). The marker-beacon/GS receivers are simulated only as visual indicators at the main instrument panel and the radio-overhead respectively. The radio-overhead pop-up can be open with Shift+4 key combination.

**Installation instruction**

1. Unzip the Beech 3NM\_Expeditor\_v.2 package to any temporary folder.

2. Download the original Milton Shupe’s FS9 versions of passenger and cargo D18S from Simviation or Flightsim (D18SVC4.zip and d18scarg.zip) and unzip them to any temporary folder.

3. Follow the steps in the diagram bellow:

