

N4781J RESTORATION LOGBOOK NOTES
of owner Michael Amerlan
8-18-0007 - 10-29-2008

4-1-07 I was offered the opportunity to take re-ownership of N4781J from my original buyer. Traveled to Montesano, WA to inspect aircraft. Found the aircraft had been well cared for and hangared there the entire time. There was less than 100 hours on it since I sold it. I enthusiastically repurchased the plane and spent about a week cleaning, inspecting and preparing her for the flight back to northern CA. Other than a low cylinder and problems with the original mags I had overhauled in 1997 the plane was virtually as it was when I sold it. For the return flight, I installed a new battery, did two oil changes, replaced the original Bendix mags with new overhauled, drained and thoroughly flushed the fuel system and put in new spark plugs. Due to that low cylinder, I was not able to annual it there so I applied for and was granted a ferry permit to fly the plane home from Montesano to Olympia and direct to 1O2. All systems performed normally throughout the flight.

Upon arrival, I set upon a continuation of the restoration I performed in 1996-97 which then included full chemical stripping, all new paint, all new glass, all new hoses, new wing root seals, new wing walk, new wingtips, overhauled instruments, interior panel restoration, all new scat and new motor mounts and other misc. enhancements. Now, with the passion for lost love returning home, I set upon taking *N4781J* to a new level.

This included additions of synchronized wingtip strobes, dual HID landing lights, dual taxi lights, panel mounted Garmin 496 with PCAS, a custom designed annunciator light panel, padded glare shield, panel mounted intercom w/ATC recorder, custom engraved Burlwood lower panel overlays, instrument lighting, JPI engine analyzer, JPI fuel totalizer, a vernier mixture control upgrade and a performance top overhaul with new port flowed cylinders. During this process, my IA, Tom Wasson inspected and supervised all work that I performed. I did not perform any work that I was not 100% capable and confident to perform in accordance with good shop practice and compliance with applicable FARs. This work began in earnest in early July of 2007 and was completed, inspected and all required 337s approved as of October 29, 2008. *For detailed images of the following log entries, view the enclosed photo disc.*

7-07 (1hr) Re-upholstered center console with new fabric. Had the old, deteriorating vinyl control column boot re-made. Installed and visually inspected for free and clear movement of control column. Tested free and clear.

8-18-07 (1hr) Tom came by, loosened the cylinder nuts and I removed all four cylinders. Tom thoroughly inspected the cam and lobes and confidently approved the lower case for continued service.

Pulled the exhaust system for a cursory inspection and to open up more space to clean the engine compartment. Tom discovered the muffler would require repair or replacement. Entire exhaust system was replaced with a virtually new (110hrs TTSN) set pulled from an A23 for a Power Flow exhaust system upgrade.

Installed new JPI EGT probes to absolute center of the exhaust pipes per JPI specs. Decided to send oil cooler out to Pacific Oil Cooler for reconditioning. Removed oil cooler, plugged oil lines to prevent contamination.

8-19-07 (40hrs est.) Preliminary fitting, install of wingtip strobe power supplies, inspected existing wing wiring, routing, fished new cables, tested and labeled all wingtip conductors. Installed combination strobe/position light assemblies on wingtips. Pre-wired break-apart wingtip lighting connection cables.

8-21-07 (1hr) Met with Tom to go over plan to complete annual and discuss required 337s for my planned enhancements and additions. Tom discovered 6-7 spots of inter-granular corrosion along the bottom flange of both outboard wing spars. He said this would have to be taken care of prior to annual. I removed the stabilator tips for Tom to inspect the rest of the aircraft for any other corrosion. None was found. Only light surface scale was noted. Tom prescribed light cleaning and a two-year ACF50 treatment plan to address this.

To address the lower flange issue, I researched and determined that Beech offered outboard spar kits to repair this somewhat common issue with the Beech 23 series aircraft. Apparently, this issue is caused by rust-laden water from rusted wingtip Tinnerman clips running down and standing on the bottom flanges of the factory un-primed outboard spars.

I ordered the full length Beech outboard spar repair kit and on arrival, determined that cutting the spar in two halves lengthwise would result in two, perfectly fitting tapered doublers with factory taper-matched lower flanges to replace the lower flanges of each wing. This approach avoided the need to disturb the original factory joiner of the main spar to the original outboard spars, thus preserving the perfectly serviceable upper section of the original outboard spars by just removing only the corroded lower flanges and replacing with the new flanged doublers, per Beech repair kit instructions and procedures. This repair effectively preserved the original factory spars while strengthening them.

Prior to embarking on the repair, I consulted with my IA, Tom Wasson, Steve Culbertson, IA and Bob King (retired Boeing engineer) on the viability of the proposed procedure, related shop practice and the ultimate integrity of this approach once completed. All were in agreement that this application of the new spar kit would be in accordance with approved shop practice and would actually enhance the original structural design load of both outboard wing sections.

8-31-07 (1 hr) To insure there was no further corrosion issues, especially in critical, main spar areas, I proposed that (4) new 1.5" inspection holes be cut into the lower, inboard wing areas. Tom agreed and supervised my location and drilling of the holes. This allowed for unlimited access to fully inspect the main gear attachment brackets, main spar gear attachment points and the main spar for any cracks or hidden corrosion. None found.

9-1-07 (5 hrs) Wing repair begins. Started de-riveting. Dremeled off pop rivets, drilled out all upper and lower wing rivets of the aileron well covers. Tested heat gun for breaking the skin/spar/honeycomb ribs epoxy bonds. Combination heat gun and dry ice worked best and least damaged the paint around the bonded areas.

9-2-07 (3.5 hrs) Completed same de-riveting on the LH wing as above.

9-5-07 (2 hrs) Hangar clean-up. Reorganize tools. More de-riveting. Tom dropped by inspected and approved all my work to date.

9-11-07 - 9-18-07 (19 hrs) More de-riveting, metal prep.

9-19-07 Ordered new Lycoming cylinders from Lycon with port flow option. Per Tom's recommendation, I ordered new prop bolts from American Propeller.

9-30-07 - 12-01-07 (110 hrs) Metal prep. Spar(s) fitting, finishing, epoxy stripping, spar rivet pre-drilling/deburring, scotchbrite scrub/wash of all parts/surfaces, allodyne, two-part epoxy Zinc Chromate primed parts/surfaces, all inner wing areas, cleco up. Inspection and approval of work by Tom Wasson, Bob King and Steve Culbertson. Final re-assembly, epoxy re-bonding and riveting.

10-19-07 - 10-20-07 (7 hrs) General cleaning firewall forward. Prep engine to repaint. Used Ly-Con's custom variation of Lycoming grey.

10-20-07 (4hrs) Installed JPI FS-450 fuel flow instrument display in center console. Fabricated a custom trim bezel (from a spare Flightcom bezel) for the display to trim clean the fabric around the instrument.

10-23-07 (6hrs) Tom came by to check on my work. Inspected and re-plugged crankshaft per AD compliance.

Made template to enlarge old 2" AN style directional gyro opening to accommodate a new style 3" directional gyro.

Re-coated engine and rocker covers with Ly-Con Grey.

10-24-07 (1 hr) Tom came by to assist with the installation of (4) new motor mounts.

10-25-07 - 10-26-07 (4 hrs) Replaced old AN DG with RC Allen #RC-18. Re-plumbed vacuum lines.

Removed old warped, faded panel radio N4781J call tag and replaced with new custom brass engraved tag.

11-21-07 (5 hrs) Strobe, landing, taxi, position wing light wiring/cable inspection, additions, re-routing, chafe proofing all cables with new Adel clamps.

11-22-07 (4 hrs) Fabricated a custom, non standard bezel from a surplus AN DG

bezel to Fiberlight the vintage AN pictorial horizon. The instrument was overhauled, custom repainted to my specs and yellow tagged in 1996.

11-23-07 (1hr) Airspeed pitot line leak test prior to closing up wings. (courtesy of Lonnie at Lake Aero) Tested good with airspeeds right in spec.

11-24-07 - 12-1-07 (49 hrs) XeVision Pulser location/fitting, HID lights, taxi lights, position lights, strobe power supply power wiring checks, installed, tested Pulser unit, created mini-split loom harness to route chafe-proof lighting wiring from center spar area to panel. Labeled all cables at wing tips and panel.

Horizon Hi/Lo vacuum pilot lights serviced (not used),

VOR indicator needle stripped of loose, flaking paint,

Fiberlight installation continued.

Altimeter upgrade to new military spec. unit (tested 100% accurate at Lake Aero's Avionics shop).

Designed sub panel to control Taxi and Landing lights with Pulse (WigWag) option using premium grade tso'd Beech toggle switch (Steady/WigWag) and tso'd Beech toggle breaker (Taxi Lights On/Off).

Installed Flightcom 403d on lower panel but later relocated both the intercom panel and the ATC recorder panel into center lower console. Designed and built (2) compact intercom four-place jack pods with audio in/out and stereo/mono switches.

12-7-07 (5 hrs) Removed the Narco loran and re-positioned the radio and transponder to accommodate an Air Gizmo GPS dock.

12-8-07 - 12-09-07 (1 hrs) Removed original throttle knob for restoration.

12-09-07 (4 hrs) Completion of GPS dock and radio stack repositioning.

Installed new DG vacuum line.

Installed new Hi/lo volt annunciator light module.

Annunciator light panel pre-fitting/fine positioning.

Last of Fiberlight sets installed.

12-12-07 (2hrs) Painted leather passenger side panel overlay and applied it to passenger side panel. Had glare shield upholstery work redone.

12-14-07 (1hr) Replaced loran antenna with Garmin GPS antenna.

Serviced ELT with new batteries. Tested good.

12-15-07 (5hrs) Re-fabricated new RH landing light lens frame.

Designed and fabricated an improved annunciator light panel retainer bezel.

12-16-07 (8hrs) Completed annunciation light panel pre-wire, test and install. Designed, installed and pre-tested TAXI / LANDING / WIG/WAG wiring and associated toggle switches. Tested good.

Relocated JPI Data port jack.

Fine-tuned function layout and color priority of the annunciator display.

1-5-08 (6hrs) Removed original push/pull mixture cable for vernier upgrade.

Relocated ATC Recorder panel to lower center console to free space for Avionics Toggle, and Landing/Taxi light legends. Re-moved parking brake handle/cable (previously retired per AD). Trimmed and fit mock panel overlay for Aircraft Engravers template. Tested burlwood design using vinyl sign stock.

1-6-08 (7hrs) Completed Avionics Master switch addition and associated wiring. Retired original Clixon 15A button breaker in favor of Potter Brumfield 20A toggle breaker. All avionics and instruments with the exception of the Davtron M655 are now powered from this toggle breaker, post the master switch toggle breaker.

Routed fuel flow sender cables, CHT/EGT sender cables through the firewall.

Completed all wing circuit wiring/switching. Labeled, tested and confirmed operational.

Extended the Davtron M655 harness to relocate it to upper left pilot panel. Unit was recently sent in for a new display unit and returned fully tested and yellow tagged.

Relocated the M655 temp probe from forward of the cabin door to below wing LH for more accurate sensing of ambient temps. Checked operation. Tested good.

1-9-08 (2hrs) Upgraded ATC recorder LEDs and completed install of ATC recorder panel.

1-13-08 (5hrs) Final source wiring for annunciation panel lights. EDM-700 and Fuel Scan annunciator lights.

Fuel Boost ON annunciator light wired and checked. Tested good.

Routed oil temp probe sender cable thru firewall and connected to EDM-700 display.

Switched out factory normally closed Hobbs oil pressure switch for identical tso'd

normally open version to illuminate low OIL PRES upon immediate loss of pressure (30psi). Tested during preliminary engine run. Tested good.

1-19-20-08 (16hrs) New vernier mixture cable fitting/install, cable retainer bracket design, fabrication, further fitting and install.

1-21-08 (5hrs) New exhaust system re-install (with Tom's help 1-2hrs). EGT probes install. Tom inspected and approved all work to date.

1-27-08 (5hrs) Mixture cable eyeball thru-firewall install and final adjustment of mixture control panel travel. Zinc Chromate primed new mixture control bracket.

Lubed all coaxial push/pull cables. Tom came by and inspected, approved the mixture control travel and operation.

Chafe protected mixture cable with a fiberglass embedded baffle material wrap. Exercised all cables repeatedly. All operate free, clear and smooth.

1-30-08 (3hrs) Alternator shop cleaned and tested. Tested 60A. Alternator re-installed.

Replaced original starter with new Sky-tec starter.

2-1 - 2-4-08 (21hrs) Newly powder coated baffles, new baffle seal fitted and installed. General inspection and approval of work to-date by Tom.

2-6 - 2-7-08 (14hrs) Installed all new scat tubing, Connected and dressed out all EGT/CHT/OIL Temp probe/fuel flow sender cabling.

2-4-08 (1hr) Re-installed prop. Tom came by and confirmed correct torque. Safety wired bolts and re-installed spinner.

2-10-08 (5hrs) Installed HID Landing Light and Taxi light reflector assemblies, XeVision power supplies, Whelen strobe power supplies made final connections to all. Tested. All tested operational.

2-11 - 3-5-08 (7hrs) Finish trim and adjustment of new baffle seals per Tom's advice to improve cooling. Tom dropped by, inspected and approved the new fit.

Installed new anodized aluminum Bonanza throttle and mixture control knobs.

3-8-08 (8.5hrs) Fabricating RH landing light lens and installing new TSO'd clear acrylic lens.

3-9-08 (6hrs) More annunciator panel wiring and center console wiring, (intercom, inline cig lighter fuse). Fuse is accessible from just inside rear right side panel.

3-15 -3-16-08 (19.5hrs) Final intercom/digital recorder wiring and test. General panel

wiring clean-up, instrument Fiberlight test. All tested good.

3-17 - 5-3-08 (240hrs est.) Wings and stabilator prep repainting, detailing. Prep and painting (1st attempt) all which resulted in unacceptable level of contaminants, orange peel and dry spots. So, more prep for attempt #2 that included full re-sanding of all painted wing and stabilator surfaces, with the addition of full chemical strip of flaps and aileron control surfaces, detailed dent, ding repairs throughout. All stripped areas fully prepped, Alodined, two part epoxy primed and re-painted (Jet Glo Matterhorn White).

New, enlarged wingtip graphic layout, taping, prep and paint, clearcoat and buff of improved fuselage, wing and stab tip graphics. Additional detail buffing of clear coat throughout.

5-4 - 5-5-08 (6hrs) Re-installed wing control surfaces with all new bolt, washers and nuts. Safety wired outboard aileron bolts.

Caulked new RH landing/taxi light bay, interior painted flat black.

Removed wing and stabilator tips to have repainted due to blemishes and a slight color mismatch with the correct metallic green (see receipt file for paint codes).

Chad (Tom's Aircraft) came by and performed the ACF50 treatment.

5-6-08 (8hrs) Final detail buffing, newly repainted wing/stabilator tips re-install (with flush, countersunk washers).

Re-install lower main gear shrouds, inspection covers.

Stamped and installed new Lycon data plate on engine per Lycon STC.

Greased main and nose gear fittings.

Replaced all brake lines at pedals with new, replenished, bled and tested brakes. Tested good.

Tom assisted with the brakes, lubrication and data plate install. He inspected and approved all work to-date.

5-7-08 (8hrs) Finished remaining inspection panel re-installation and lubrication of remaining grease points.

Fitted and installed new polished Lake Aero stainless steel hub caps.

Detail painted screws and edges of landing light bay lens frames.

Fully restored L/R fuel drain valves with all new O-rings and mounting gaskets (p/n 169.0000-255). Leak checked. No leaks.

5-8-08 (5hrs) Fully drained oil and replaced with 7 quarts of Phillips 66 M 20W-50 mineral oil for cylinder break-in flight.

Removed lower spark plugs, and turned engine over till oil pressure indicated. Replaced plugs. Checked for leaks. None found.

Lubricated all empennage moving points, flaps and aileron hinge and control points with LPS 2 shots.

5-9-08 (7hrs) Replaced vacuum system filter with new.

Bled and pressurized fuel system. Thoroughly inspected for leaks, under pressure, throughout system. None found.

Repainted and re-mounted fuel selector pod. Checked L/R detents. Checked good.

Test ran engine for leak check. Engine started right up, ran smooth with no leaks. HI/LOW VOLT and OIL PRES annunciator lights confirmed operational.

5-10-08 (6hrs) Final adjustment of fuel selector pod/detent stops check. Checked good.

Installed new fire extinguisher in center floor section.

Stripped, wrinkle paint sprayed and installed rudder pedal base bezels.

Completed last of several lower panel template drafts for Aircraft Engravers to scan for Burlwood Formica engraved overlays.

5-11-08 (5hrs) Installed (2) 1A inline fuses on XeVision pulser control switch (steady/wig-wag) circuit per Tom's advice. Tested and confirmed operation and correct L/R labeling.

Repaired cracks and repainted plastic trim spar cover (rear floorboard step up cover).

Installed remaining interior pieces, rear safety belts, rear panels and rear seat.

Installed the Garmin 496/XRX interface cable. Tested XRX PCAS system. Displays good on Garmin 496.

Finish dressed/wire harnessed all wiring to date.

5-12 - 5-27-08 (12hrs est.) Removed and replaced wing walk material with new. Used the full roll kit available from Lake Aero for Mooney Aircraft..

Assembled and lubricated newly engraved fuel caps (with all new o-rings) that meet the Lycon STC requirements for "100LL Only" placarding.

Installed the remaining mini inspection covers.

Buffed out overspray and condensation blemishes, cleaned up and dressed rubber wingroot seals.

Sent out final template for lower panel overlays to be scanned and engraved.
Final torque of landing light lens cover's screws (following extended paint cure time).

9-29-08 (1hr) Battery box clean, battery ground cable to hull removed, cleaned and remounted. Battery box cover wood block retainers remade and all primed with zinc chromate.

10-1-08 (6hrs) Fitted, trimmed and installed newly engraved lower panel Burlwood overlays. Cleaned, polished all toggle switches and installed new retaining nuts/washers on all.

10-4-08 (8hrs) Added fail safe headphone, mic/PTT jacks on center console. Separated, identified and labeled all avionics power wires powered from avionics master switch.

Segregated all but the Narco MK12D and AT150 from avionics switch by adding an inline fuse to all other, low current drain avionics. These include: the Garmin 496/XXR system, the Flightcom 403d intercom, JPI EDM-700, FS-450, Hi/Lo volt monitor module and the Fiberlight system LEDs. This fuse is located just above the panel lower railing to the left of the center console. The location is clearly labeled looking up from the floor to the bottom of the panel.

A permanent PTT with a new coiled cord was added to the yoke for passenger operation. The stretched coil cord on the pilot yoke was replaced with a new matching micro PTT pushbutton and Motorola coil cord.

10-5-08 (6hrs) Final installation of lower console and restored throttle/mixture bezel.

Replaced battery with new Gill-35. Re-installed interior, vacuumed interior. Installed EPC ELT. Tested good.

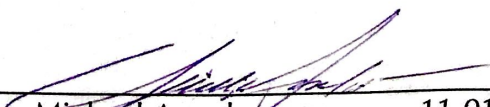
10-20 - 10-21-08 (10 hrs) Gold pin striping.

Equipment List updated 8/23/08. Aircraft re-weighed 5/23/08.

Restoration completed 10-29-08.

Tom L. Wasson

Supervised and Inspected by Tom Wasson
A&P 1378002 IA 11-01-08


Michael Amerlan, owner 11-01-08