

Bearhawks!

Overview of the Bearhawk Family of Airplane Designs with Some Discussion on Scratch-Building Two Bearhawk Patrols from Plans

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EAA Chapter 524

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<https://pilotspost.com>



Photo: Todd Stock

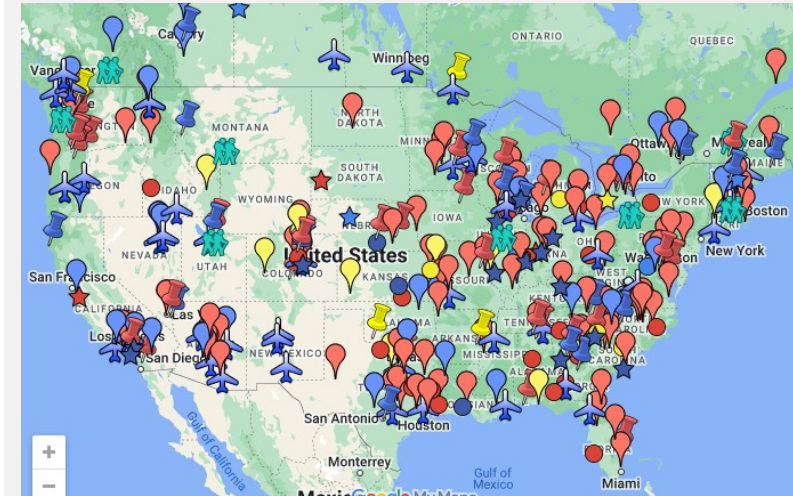


Agenda



- Quick takes and some numbers on the five different models in the Bearhawk airplane family
- Design (Bob Barrows on his airplane designs)
- Build
 - Core materials and construction
 - Builder options
- The Good and the ...
- Patrol/Super Cub comparison
- What have we done so far? (Show and Tell with Carlo!)
- Wrap-up questions

Where Are the Bearhawks?



<https://bearhawkforums.com/map>

Quick Takes:

The Bearhawk family of 2, 4, and 6-place Utility/STOL and LSA aircraft (in a nutshell)

<https://bearhawkaircraft.com>

Bearhawk Model 5



A STOL-ier Cessna 185 (5-6 place with wider cabin/ greater volume than C-185)

Bearhawk 4-Place (Bravo)



A STOL-ier Cessna 180 (True 4-place with wider cabin/greater baggage volume than the C-180)

Bearhawk Patrol/ Patrol SP



A faster Super Cub (with better low-speed handling)

Bearhawk Companion








A faster Super Cub (with SBS seating, huge baggage volume, and monster useful load)

Bearhawk LSA



A modernized Cub with benefits (the LSA kind!)

Bearhawks by the Numbers

Model					
Specs	Model 5	4 Place (4B)	Patrol/Patrol SP	Companion	LSA
Speed (Max)	180 mph	175 mph	165 mph	160 mph	140 mph
Speed (Cruise)	(75%) 165 mph	(62%) 150 mph	150 mph	140 mph	115-125 mph
Speed (Landing)	40 mph	40 mph	35 mph	35 mph	40 mph
Take-Off Roll (Min)	250-600 ft	200-500 ft	250 ft min	250 ft min	200-600 ft
Range (w/Res)	500-700 NM (Std/LR)	650 NM (65%)	900 NM (35%)	900 NM (35%)	650 NM
Empty Weight	1450-1650 lbs	1150-1300 lbs	950-1100	950-1100	750+ lbs
Gross Weight	3000 lbs	2500/2700 (SP) lbs	2000/2200(SP) lbs	2200 lbs	1320-1500 (EAB) lbs
Useful Load	1350-1550 lbs	1200-1350 lbs	900-1050 lbs	1100-1250 lbs	570-750 lbs
Wing Span/Area	34 ft	34 ft	33 ft	34 ft	34 ft/171 ft ²
Cabin Length	125"	125"	113"	113"	97"
Cabin Width/Seats	44.5 (5-6)	44.5 (4)	32" (2-Tandem)	43" (2-Side by Side)	31" (2-Tandem)
Load Rating (@MGW)	Utility	Utility	Utility	Utility	Utility

Designing the Bearhawks

Bob Barrows On Design



<https://youtu.be/k4wid84CGZk>

- STOL/utility aircraft should meet utility category loads max gross weight
- Robust does not mean heavy – weight only where necessary
- Design for home shop fabrication processes
- Leverage 90+ years of aerodynamic progress since USA/NACA airfoil development
 - 5 mph higher cruise speed (NACA 4412 on A Model vs Riblett GA on B Model 4-Place)
 - 1-2 mph slower landing speed and better stall characteristics
- Design for intended use
 - STOL operations = austere location operations
 - Conventional gear works better for operations away from pavement with more ground operations flexibility
 - Oil-damped spring shock V-style landing gear dampens/spreads landing loads more efficiently than other options
 - Large baggage compartment /access door
 - Large useful loads (big wing/efficient airfoil/efficient structure)

Building the Bearhawk Family of Aircraft:

Overview of Airframe Construction and Build Options

- **Core Construction:**
 - Wing – All-aluminum flush-riveted, single strut
 - Fuselage/Empennage – Cromoly steel tube and fabric covering
 - Fuel System – Gravity-feed from welded aluminum wing-root tanks
- **Build Options:**
 - Plans build from scratch
 - Plans-build from components/sub-assemblies
 - Plans-build from basic fuselage or wing component kits
 - Quick-Build kits (Aircraft Kit, Wing Kit, Fuselage Kit)
 - Other options: Floatplane, extended range tankage

Patrol Plans: \$320

Plans \$300

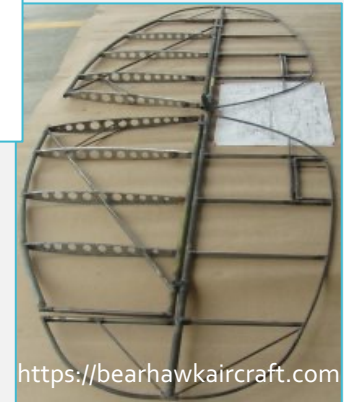
Patrol Plans: \$320

Companion Plans: \$330

4- Place Model B Plans: \$355

5-Place Plans: \$375

Hor Stab and Elevator: \$1550



Patrol QB Kit: \$62K

\$62,000

(red)

Kit - \$26,000

Quick Build Fuselage - \$37,750

Basic Fuselage - \$19,750

Wing Component Kit - \$13,000

When purchasing the Quick Build Kit subtract \$280 if you already have plans.

CRATING CHARGE (if delivered by Bearhawk Aircraft): \$925
(if delivered by common carrier): \$950 wings/ \$950 fuselage

The Good and...

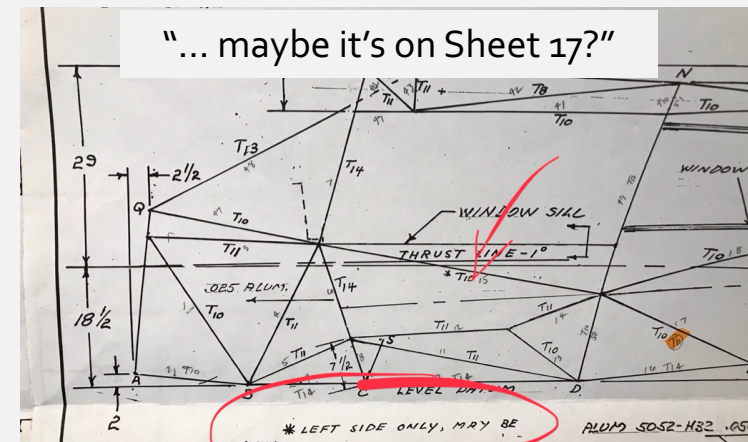
- **The Good Stuff:**
 - Bob Barrows understands how these airplanes get used
 - Bearhawks fit Americans
 - Bearhawks fly like sport planes
 - Kits and parts prices are reasonable
 - Robust, crashworthy construction
- **The Not-Quite-So-Good/Challenging Stuff:**
 - It takes a village/airport to plans-build
 - Plans are 1950's standard... think Poberezny homebuilt
 - Bearhawks are conventional-gear, STOL airplanes... pilot proficiency is assumed



<https://www.kitplanes.com>



<https://www.kitplanes.com>



<https://bearhawkaircraft.com>

Patrol/Super Cub: A Comparison

Design Features	Patrol (180 HP/CS Prop)	Super Cub (Stock PA-18 Configuration)
Cabin Width	32"	26" (some clones are wider)
Wing Structure	Full flush riveted, all aluminum skins, single strut	Fabric covered wings, V-strut
Airfoil	Riblett GA30-4135	1930's USA 35B
Baggage Door	21" x 27" unobstructed	Many now modified with small, high-set door
Landing Gear	Oil-dampened spring shocks	Rubber bungee/some improved bungee
Tail Surfaces	Airfoil-shaped ribs on hor/vert stab	Flat tail ribs
Visibility	Excellent visibility from both seats	
Cruise (180 hp, 75%)	130-143 fixed pitch props/ 150-162 C/S props	90-95 mph/ 110-120 for fastest clones w/ C/S Props
Stall Speed	~35 mph	~35 mph (stock wings)
Empty Weights	950-1150 lbs	960-1300 lbs
Gross Weight	2000 lbs	<1500 Utility Cat, 1500-1750 (Normal Category)/ 2000 lb gross weight mod available

So What have
We Done So
Far?

'Show and Tell'
Time with Carlo!

- Rib forming
- Wing weldments
- Spar & trailing edges – bending & prep
- Aileron and flap assembly
- Plan modifications
 - Weldments
 - Wet wing
 - Composite cowling and plenum

Wrap-Up Questions on the Patrol

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Photo: Todd Stock