The RV-8A is an all metal, tandem, low wing, low aspect ratio monoplane like its predecessor, the RV-4. Both are creations of Van’s Aircraft in North Plains, Oregon. However, the RV-8A is a distinct new design with substantially different features. It is intended to be a high performance sport plane with a mix of capabilities ranging from basic positive G. aerobatics with nimble handling qualities to limited cross country travel.

The prototype RV-8A presented to the CAFE Foundation for this report is serial # 1 of this design and it first flew on April 4, 1998. The RV-8 is the taildragger version of this aircraft while the RV-8A has tricycle landing gear. Thirty two RV-8’s have been completed as of this writing.

Among the innovations on the RV-8 are a new wheel pant design that is reportedly of lower drag than those used by Van’s Aircraft in the past. The Cessna Aircraft Corporation has engaged Dick VanGrunsven for help in the process of adopting a similar wheel pant design for its new 182.

The RV-8A is offered in kit form with a Quick Build kit which the manufacturer claims may be assembled in as little as 800 hours.

The testing of this N58VA encompassed 3 weeks in February 1999 during which the CAFE Board members installed, tested and refined several new performance flight testing upgrades. A new data acquisition package that allows real time display of angle of climb, glide ratio, Barograph derived rate of climb and mpg was created for these tests.

We wish to thank Ray Richter and Dick VanGrunsven for transporting the aircraft to the CAFE Foundation for testing and for the opportunity to keep the aircraft long enough for a thorough evaluation.
SUBJECTIVE EVALUATION

RV-8A, N58VA

By OTIS HOLT

I was really looking forward to Dick VanGrunsven’s arrival in January to hand over the keys to N58VA for this APR. Dicks reputation for honest, efficient designs precedes him, so it was a safe bet that the RV-8A would be predictable, free of serious bad habits and a delight to fly. During the subsequent three weeks, with more than twenty hours logged in a variety of loading and flight configurations, the RV-8A would prove to meet and generally exceed these expectations.

I was impressed by the casual ease with which Dick surrendered the only existing RV-8A before departing homeward in a waiting RV-4. I’d like to believe it was because he’d been impressed by my piloting skill during our brief checkride, but a more likely explanation is that he already possessed such confidence in the aircraft itself that he had little cause for concern. Today homebuilders can choose from a number of aircraft kits offering very high performance, but the RV-8A stands apart from the others in this group with respect to the modest demands it places upon the pilot’s skill.

FIRST IMPRESSIONS

The “8” sits quite handsomely on tricycle gear, appearing to be larger than it really is. The width of the large sliding canopy increases for several inches above the level at which it joins the fuselage, contributing to an almost military presence. The full engine cowling blends smoothly into the fuselage, and the absence of cowl cheeks sets the RV-8A apart from Van’s earlier tandem and single place designs. A walk around the aircraft reveals elegant simplicity and balanced proportion from every viewing angle. This airplane is, indeed, very easy on the eyes.

Close examination of N58VA reveals workmanship rarely seen on factory prototypes, and suggests that the staff at Van’s Aircraft includes some very talented builders. Nearly all metal seams on the airframe are flawlessly butt-joined using precisely installed flush fasteners, and display none of the distortion often seen along rows of closely-spaced rivets. The fit and finish of the canopy, cowl, and other challenging parts are also superb. Construction of N58VA employed the use of many components from the now fully matured RV-8 kit inventory, including the very clean cowling, with a Nomex honeycomb core, and lightweight wing-tip fairings. The upper surfaces of the wing-tip fairings, can be seen in the photo.

RS-156A, N58VA

By OTIS HOLT

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Randy Schlitter--RANS S-7C
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Fred Baron--Lancair 320
Mark Beduhn--Cozy Mark IV
Dick VanGrunsven--RV-8A
which form a flat-wrap conforming to the upper airfoil shape, do display some waviness, which might be remedied by the reinforcement of those areas with foam or Nomex.

True to the designer’s philosophy, N58VA is equipped and finished with simplicity and minimal weight in mind, so there are few items installed that could be described as non-essential. Instrumentation is basic VFR, and the cabin interior is painted instead of being upholstered. Builders would do well to follow Van’s lead by limiting extras; the reward being an aircraft that can be flown solo at just over seven pounds per horsepower, and that is a recipe for excitement.

THE DESIGN

There is no magic to the means by which Dick extracts such great performance from his aircraft. His choice of a thick, constant-chord, low aspect ratio wing takes maximum advantage of the high strength-to-weight potential of aluminum construction and results in one of the more structurally efficient designs available today. Dick’s forte has been to identify the ideal point of balance between the structural advantages and aerodynamic penalties associated with low aspect ratio wings to optimize performance of his aircraft for their intended missions. Coupling this wing with a lightweight, aerodynamically clean fuselage and well-faired landing gear results in an aircraft with a very impressive operating envelope.

The large body of experience and customer feedback Dick has accumulated from the RV-4 clearly provides the foundation upon which the RV-8/8A was designed. It is almost universally agreed that the RV-4 is a true “pilot’s airplane”, but also that it presents a load management challenge when carrying large passengers or gear for travel, and that the rear seat can be somewhat limited in space and creature comfort. These issues have been significantly improved with the RV-8A while retaining good flying qualities.

In my opinion, the single most profound difference between the two aircraft is load management design philosophy, and this is worthy of some discussion. The RV-8/8A is intentionally designed with a very forward empty center of gravity. The seats are located as far forward and close together as practical, and a forward luggage compartment has been added, leading to much broader loading options. The table below includes a selection of sample loadings we calculated for N58VA. Here c.g. position is given as a percent of the total range, so zero corresponds to the forward limit, and 100 to the aft limit.

The first example represents a typical loading with two adults at gross weight with full fuel. Use of luggage as forward ballast allows this flight to depart at a very comfortable mid-range c.g., and even with fuel reduced to a 30 pound reserve, the c.g. ends up just 67% aft of the forward limit. Even the extreme condition described by example B, with a heavy passenger, maximum rear baggage, nothing in the front compartment, and fuel to gross weight is within published limits. In this case, as fuel is reduced to zero, the c.g. moves very near the aft limit, as indicated by the next example.

As is always the case with aircraft design decisions, there is trade-off for the N58VA’s near immunity to aft loading.

Dick recommends that a 180 pound pilot carry about 50 pounds of ballast in the aft compartment for solo flight, putting the center of gravity about 25% aft of the forward limit. Lighter pilots would require slightly more ballast. This is also the range he recommends for solo aerobatics, and our flight test experience would confirm that it represents a good combination of positive stall recovery and comfortable stick force gradients during higher g-load maneuvers. Example D represents N58VA configured for solo flying with about two hours of fuel onboard. In addition to the 25 lb.-hp power-loading penalty the ballast represents in solo flight, the need for ballast might be an inconvenience prior to the solo continuation of a flight that had a passenger aboard previously. Perhaps a lightweight, collapsible water container could be carried to compensate for off-loading a passenger enroute.

Dick has been designing and building aircraft for over 30 years. The RV-3, his first original design kitplane, entered the market in 1973. The design objective of the RV-3, and all other RV models through the RV-8A, was that of a general purpose sport aircraft with good handling qualities and a wide performance envelope. Additional business objectives have been affordable kit pricing and kits which could be constructed with modest skills.

His designs have enjoyed great popularity, with 2158 examples of the RV designs completed. The RV-9 is another new, lower cost, 2 place design whose kit development is now in progress at Van’s Aircraft.

Mr. VanGrunsven has a Bachelor of Science Degree in General Engineering. He has conducted his own self-study training in various aspects of aircraft design. The RV-8A, along with other recent Van’s Aircraft kitplanes, is a product of their engineering team including an aeronautical engineer and two other mechanical engineers. There are currently no plans to FAA certify the RV-8A.

### ABOUT THE DESIGNER

Richard VanGrunsven learned to fly in 1955 and soloed at age 16. He rapidly advanced through private, commercial, and instructor levels, eventually acquiring a multi-engine ATP. His total flying time is around 9000 hours which includes over 5000 hours in homebuilts and over 1300 hours in sailplanes.

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It might be argued that the empty c.g. is a bit too forward, but it should be noted that the 200 hp/constant-speed installation is the most forward-c.g. configuration rec-
ommended for the RV-8/8A. Example F represents N58VA with a 180-hp Lycoming substituted. The useful load is increased by about 30 pounds, and the need for ballast is cut in half. Example G is a rough calculation for an RV-8A with a 180-hp Lycoming and a fixed-pitch metal propeller. In the prior examples, the battery is installed below the aft luggage compartment floor, but in this case it is installed at the optional firewall location. Again, ballast is reduced by half, but take-off weight is nearly 100 pounds less than

CAFE Barograph designer Steve Williams, installing the data network cable in the RV-8A.

for example D with the same pilot and fuel. As a result, the power loading is only slightly higher, while the wing loading is much less. I’m sure that this version would be a pleasure to fly, and it would certainly offer great performance at much less cost.

**ERGONOMICS AND COMFORT**

The front seat of the RV-8A begins to feel like home right away, and just climbing aboard inspires a strong desire to launch skyward. The canopy’s convex sides provide a nearly straight-down view in any direction with a slight tilt of the head, and its large size permits the pilot to sit high up, yielding an excellent view forward over the cowl. All switches and controls fall readily to hand and separation of the rudder pedals is just right, adding to a sense of stability. In flight, the pilot’s sense of “linkage” with the aircraft is immediate and complete, due in large measure to a nearly flawless control system that translates the pilot’s desires into immediate action with little conscious effort. There are a few very minor distractions. The instrument panel is just a little too close for those of us with compromised visual accommodation and I often found myself referencing it through the reading portion of my bifocals. Also, a massive roll bar and forward canopy shroud combine to trace an arc more than two inches wide located about a foot from the pilot’s eyes that occupies a bit more of the field of view than would be ideal. This was most noticeable during formation flying, causing me to alternately lean forward and back to keep the lead plane in clear view. In spite of the roll bar, the pilot’s field of view both in flight and on the ground would have to be described as excellent, contributing greatly to the joy and safety of flying the aircraft. Finally, both of these conditions as well as the pilot’s comfort level would be improved if the seat were tilted rearward a few more degrees.

The pilot’s seat is fixed, but the entire rudder/brake pedal assembly slides fore and aft on tracks, and is easily adjusted through a full six inches of travel by pulling on a release cable while pushing on the pedals with your feet. Sitting height is adjusted by adding or removing cushions. Tall pilots should have no trouble fitting in. Although the parallel rails carrying the sliding canopy limit width at the pilot’s shoulders to about 24 inches, cabin width just below them and at the pilot’s elbows measure a full 32 inches, and canopy width in the vicinity of the pilot’s head is about 26 inches. The overall feeling is of spaciousness, with plenty of room for tasks like chart folding, and there is sufficient legroom to comfortably rest your feet flat on the floor aft of the rudder pedals. Speaking of charts, a few pockets for stowage of these and other items would be nice to have to supplement the glove box stowage of these and other items would be nice to have and there is sufficient legroom to comfortably rest your feet flat on the floor aft of the rudder pedals. Speaking of charts, a few pockets for stowage of these and other items would be nice to have to supplement the glove box stowage of these and other items would be nice to have.

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The first data flight: foreground, left, Brien Seeley and Steve Williams start the Barograph while pilot Otis Holt and engineer Ed Vetter wait on board.
fixed landing gear would provide as it collapsed.

Cabin noise levels in flight are quite high, as can be seen in the measured performance section. I found it helpful to wear foam earplugs under the headset, but for many flights I use quality active noise canceling headsets if I wish.

GROUND OPERATIONS

Taxing the RV-8A is a breeze, thanks to an almost unobstructed field of view and the short wingspan. The free-swivel-

ing nose wheel permits taildragger-type turns when one main-wheel brake is locked. Steering is by rudder and differential braking, though in reality the brakes are rarely used. The rudder is effective for steering at very slow speeds, and responds instantly to a slight burst of power, if needed, to initiate turns.

It is also easy for one person to move the 1,125-pound RV-8A about on the ground manually without the use of a towbar. The nose wheel has stops at about 60 degrees to either side of neutral, but there is enough anti-shimmy friction built into the pivot to allow the aircraft to be pushed backwards slowly and steered by pushing the nose from side to side. Preflight is straightforward, with everything except tire pressure easy to access and check. The wheel fairings are very clean aerodynamically, but are not provided with ports for filling the tires. Some pilots might be tempted to launch with marginally low tires instead of removing and replacing the nine screws securing the forward portion of each wheel fairing.

TAKEOFF AND CLimb

This is where the real fun begins, especially when flying solo with a light fuel load. During one such flight on a cool morning, intended to simulate a CAFE Triathlon run, my takeoff distance was measured at 236’, and sustained climb rates in excess of 2,500 fpm were indicated. If you refer back to the table of sample cg loadings, example E represents the configuration for that flight. One might expect an aircraft capable of such performance to be quite a handful for the pilot, but this is not the case with the RV-8A. Mind you, things do happen quickly, and low-time pilots will require enough high-performance experience to insure that they can keep up with the aircraft during takeoffs, go-arounds and touch-and-go.

The brisk climb performance offered by the aircraft at relatively low speeds actually enhances safety by providing the pilot with more options should a power loss occur during the climb-out. The rudder, being sized to satisfy the needs of the RV-8 taildragger, has an abundance of authority on the RV-8A. A modest amount of pressure on the right rudder serves to keep the nose on the centerline during the brief ground roll. The aircraft levitates readily with a smooth rotation initiated at 50 mph, with no tendency to over-control. One hundred mph produces excellent climb rates with a good field of view over the nose. All speeds given here are panel indicated airspeed in mph unless otherwise noted. Even at a nose-low cruise-climb speed of 125 mph with power set at 24.5 square, the indicated climb rate remained over 1300 fpm at a takeoff weight of 1600 pounds. Aileron input to counter torque during high performance climbs is barely noticeable. The use of flaps is recommended for takeoffs at higher weight or density altitude, but generally not required when flying solo. Naturally, takeoff and climb performance is degraded significantly at higher takeoff weights, but they remain impressive. Takeoffs at maximum gross weight lead me to conclude that the published value of 1800 pounds is just about right, as distinctly lower takeoff rolls are seen and a slight sense of sluggishness begins to be felt at weights near that value.

STABILITY AND CONTROL

It could be that Dick did employ some
kind of magic in the design of the control system, because it is extraordinarily good. The feel is silky smooth and there is no detectable control slop in any axis. The aircraft embodies the rare combination of an unhesitant willingness to obey the pilot’s wishes and a low pilot workload during cruising flight. Control harmony between the three axes is excellent, in that none stands out in relation to the others in the pilot’s perception of magnitude of movement or force required. Input forces are pleasantly light within a wide range of any trim condition, yet generally increase substantially to give the pilot adequate feedback when deviating by a large amount from that trim point.

We flew N58VA to evaluate stability and control at multiple center of gravity loadings ranging between 15%-85% aft of the forward limit. Takeoff weight at the lowest forward c.g. was about 1550 pounds, and about 1700 at the most aft. With a very generous c.g. range of 8.2”, it is not surprising that we observed substantial differences in control force and authority at the extremes. It would be prudent for each pilot to consciously and deliberately explore the edges of the envelope and establish their own comfort range. The chief effects of very forward c.g. were markedly increased weight on the nose wheel, higher stick-force/G gradients and diminished power-off elevator authority at slow speeds. I would personally tend to operate within the 15%-85% region to preserve slow-speed, power-off flair power at the forward end and reasonable stick force gradients near the stall toward the aft end of the range.

**LONGITUDINAL STABILITY**

Dynamic longitudinal stability was explored by inducing elevator doublets, and found to be deadbeat at all speeds tested both stick fixed and stick free. This contributes to the aircraft’s secure, rock solid feel during maneuvers and in cruising flight.

Static longitudinal stability was measured by trimming to Va (140 mph indicated) and measuring stick force required to hold speeds in ten-mph increments from 70-190 mph, while maintaining altitude by adjusting power. Note that for the forward cg condition, the result was a very substantial positive force gradient as speed varies in either direction from the trim condition. In the aft-cg test, however, a reversal of the force gradient was encountered as speed was reduced from 140 to 70 mph indicated, with the maximum force occurring at about 110 mph. It is generally desirable that some positive force gradient exists as speed deviates more and more from the trim point, and imperative that no actual force reversals occur. I would recommend that pilots explore aft-cg stalls with some care to familiarize themselves with stick force behavior in this region. We did not conduct tests with loadings further aft, but the trend would indicate that the gradient reversal observed would become more pronounced, and stick force during stalls at the full aft limit could be near zero when trimmed for a normal approach. The forward luggage compartment makes it quite easy to ballast loading well forward of the aft limit by placing heavier items there.

**DIRECTIONAL STABILITY**

The RV-8A responded to rudder doublets with about 2 overshoots before damping rudder-free and about 1 overshoots with the rudder fixed. This is well within the acceptable range, given that it resulted in no discomfort or annoying Dutch-roll tendency. There was no detectable dead-band or excessive break-out force when actuating the rudder. It is interesting to note that the RV-8A has no rudder centering springs or devices installed, so the fixed vertical stabilizer provides nearly all directional stability. In fact, the aircraft even lacks any type of pedal-return springs. As a result, the cables go slack when there is no foot pressure on the rudder pedals. Dick’s response, when asked about this was “didn’t need ’em”, and that seems to be the case.

**ROLL DUE TO YAW**

Roll due to yaw was tested by measuring the bank angle and opposing stick.
force required to hold a constant heading with the rudder deflected. At 1.5 Vs (93 mph) in the cruise configuration, right rudder required 2.5 pounds of opposing force and a 20-degree bank angle, with 2.0 pounds and 20 degrees required to oppose left rudder. A stick force of 3.5 pounds was needed to counter a full rudder deflection in either direction, with bank angles of about 30 degrees. These results indicate modest but adequate dihedral effect. Full rudder deflection also resulted in an apparent partial stall of the rudder in both directions at this speed, as evidenced by a strong buffet in the control, but of course this would not be encountered during normal operations.

The rudder has adequate but much reduced authority to induce rolls when the flaps are down. In the landing configuration at 1.3Vs (78 mph), deflection to the left requires ten degrees of opposing bank to maintain a constant heading, and full

The graphs below use a Power-Performance data plotting technique developed by Klaus Savier. The peak CAFE score occurs at the fuel flow and cruise velocity, V, which optimize the trade-off between speed and MPG and is typically lean of peak EGT. The relative CAFE scores shown here, scaled to fit the graph’s Y axis, are based on the computation \( (V^{1.3} \times \text{MPG}) \), which is part of the CAFE Challenge formula.

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rudder requires about 18 degrees. Only three degrees of bank was sufficient to oppose right rudder and about ten degrees for full right rudder. Although the nose drops when rudder is held in either direction with the flaps down, multiple light taps on the rudder are able to alter and control bank without the use of aileron. Strong positive rudder force gradients were observed throughout the rudder’s range of travel at all speeds and configurations tested.

**MAINEVING STABILITY**

The substantial stick force per G gradients we measured for the RV-8A came as something of a surprise: The pilot’s perception when maneuvering the aircraft is generally that forces required are fairly light, and certainly that no undue effort is ever required to obtain the desired result. At the same time, the sharp gradients we measured for the RV-8A came as adequate. The substantial stick force per G gradient we measured for the RV-8A came as adequate. The substantial stick force per G gradient we measured for the RV-8A came as adequate. The substantial stick force per G gradient we measured for the RV-8A came as adequate.

**ADVERSE YAW**

It’s tempting to write “nothing to report” here, because it comes close to describing NS8VA’s adverse yaw behavior. The design features Frise ailerons, which are hinged such that the leading edge projects below the wing when the trailing por-
tion is deflected upward, thereby creating drag to counter adverse yaw. On the RV-8A these are almost perfectly "calibrated", so the ball stays centered during mild turning maneuvers with no rudder input at all. A mere touch of rudder is all that is needed to coordinate turns with more abrupt aileron inputs. Abrupt inputs without rudder result in a slight hesitation before the nose follows into the turn.

When I suggested to Dick that the RV-8A, in the hands of a good instructor, might actually be suitable for primary flight training, he correctly pointed out that its self-coordinating tendency would leave the student ill prepared for most other aircraft. Conversely, old habits do die hard, and I never did entirely overcome a tendency to use excessive rudder during turns.

**ROLL RATES**

The brisk roll rates we measured for the RV-8A can be found in the table below, but the quality of its roll behavior is really of more interest than the absolute rate. Very effective ailerons and the low inertia of the lightweight wing work in concert to produce gratifyingly crisp and immediate response to control inputs, and the roll ceases promptly when the stick is returned to the neutral position. Point rolls should be easy in this aircraft. Rapid aileron deployments are light and fluid, with stick force just sufficient to provide good feel, with no accompanying tendency for the nose to rise or drop. It should be noted that the roll rates in the table below are calculated from the time required to roll from a stabilized 60 degree bank to a 60 degree bank in the opposite direction including time for the control input and acceleration. The absolute rate once established in a sustained roll would be higher. A fairly casual full aileron roll entered at 160 mph would be easy in this aircraft. Rapid aileron inputs. Abrupt inputs without rudder result in a slight hesitation before the nose follows into the turn.

You would not necessarily expect an aircraft so ever-willing to roll as the RV-8A to display neutral spiral stability, but that is indeed the case. After being placed in a stable, coordinated turn with a 20-degree bank in either direction N58VA showed no particular tendency to deviate from that position with the stick free either at Va clean nor at 1.3 Vs in the landing configuration. Although the RV-8A does require a modicum of continuous attention during cruising flight, it wouldn’t roll over into a death spiral just because the pilot’s attention was diverted by a moment of chart reading.

**SPIRAL STABILITY**

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| RV-8A, N58VA, SPECIFICATIONS |
|-----------------------------|--------------------------|
| Empty weight/gross weight   | 1127.2 lb/1800 lb        |
| Payload, full fuel          | 421.3 lb                 |
| Useful load                 | 672.8 lb                 |
| **ENGINE:**                 |                          |
| Engine make, model          | Lycoming IO-360-A1D6     |
| Engine horsepower           | 200 BHP                  |
| Engine TBO                  | 2000 hr                  |
| Engine RPM, maximum         | 2700 RPM                 |
| Man. Pressure, maximum      | atmospheric              |
| Turbine inlet, maximum      | na                       |
| Cyl head temp., maximum     | 475 ° F                  |
| Oil pressure range          | 55 – 95 psi              |
| Oil temp., maximum          | 245 ° F                  |
| Fuel pressure range, pump inlet | 14-44 psi               |
| Weight of prop/spinner/crank| na                       |
| Induction system            | Bendix RSA-5 AD1 fuel injection |
| Induction inlet area        | 28.75 in                 |
| Exhaust system              | 4 into 2 crossover       |
| Oil capacity, type, cooler  | 8 qt., 50 wt.            |
| Ignition system             | Slick 4373               |
| Cooling system              | Downdraft, hot accessory section |
| Cooling inlet area          | 34 sq in                 |
| Cooling outlet area         | 44.6 sq in               |
| **PROPELLER:**              |                          |
| Make                       | Hartzell HC-C2YK-1BF/F7666A-4 |
| Material                   | aluminum                 |
| Diameter/Pitch             | 72 in                    |
| Prop extension, length     | 0                        |
| Prop ground clearance, full fuel | 13 in                 |
| Spinner diameter           | 13.25 in                 |
| Electrical system          | 12 V battery/35 amp mini-alternator |
| Starter                    | Skytech starter 12 v.   |
| Fuel system                | 2 wing tanks - fuel injection |
| Fuel pump                  | engine driven pump, elect. boost pump |
| Fuel type                  | 100 LL                   |
| Fuel capacity, by CAFE scales | 41.92 gal              |
| Fuel unusable              | 8 oz                     |
| Flight control system      | center stick - dual     |
| Braking System             | Cleveland                |
| Tire size, mains/nose      | 500 x 5 / 11x4.00 x 5   |
| Seats                      | 2                        |
| Cabin entry                | sliding canopy           |
| Width at hips, front/rear  | 27 / 23 in               |
| Width at elbows, front/rear| 32 / 29 in               |
| Width at shoulders, front/rear | 24 / 24 in          |
| Height, seat front to canopy | 42.5 in                |
| Baggage capacity, front/rear | 14Lx34Wx15H / 27Lx23Wx27H |
| Baggage door size, front/rear | 13 x 19 / 21.5 x 23 in  |
| Baggage lift over height, frt/rear | 51 in / 21 in (above with walk) |
| Baggage capacity, front/rear | 50 / 75 lb              |
| Step-up height to wing step/T.E. | 17.5 / 26.5 in         |
ranged from a 21-pound pull at full for-
ward trim to an 18-pound push at full aft
trim. The only time we reached the trim’s
limit of authority was during 80-mph
power-off approaches at very forward c.g.
loads.

Cruise flight data was obtained with
the wingtip CAFE Barograph (#3)
mounted on a wing cuff with a dummy
barograph and cuff mounted on the op-
posite wing. These were correlated with
the panel airspeed indicator to produce
the airspeed correction table shown here. Our
data suggest that Vy is 105 mph CAS and
Vx is 80 mph CAS.

A temporary mixture control linkage
was fabricated and installed so as to allow
mixture adjustment by the flight engineer
in the rear seat. The flight test equipment
was mounted in the forward baggage
compartment along with 2 large gel cell
batteries to power the recorders.

Cowl exit temp (C.X.T.) is a function
of the OAT & CHT and is a measure of
the efficiency with which the cooling sys-
tem removes heat from the hot engine.
This can be expressed as the temp rise rel-
ative to the hottest CHT observed during
climb:

\[(163 - 61) / 339 = 0.30\]

Compare this to 0.25 for the Cozy Mark IV.
The RV-8A, with its fixed cowl exit size, never
reached a CHT above 360°F and could proba-
bly reduce cooling drag by use of a cowl flap.

The CAFE scales were used to deter-
mine the moment/arm of the aircraft’s
fuel. This was found to be 80.11” aft of
datum rather than the 80.0” described in
Owner’s Manual.

STALLS

One-G and mildly accelerated stalls
were found to be benign in all configura-

tions and loadings tested. Stall onset was
indicated by very mild airframe buffeting
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by about 1-2 mph, depending upon the configuration. There were no stall warning or angle of attack devices installed on the aircraft. Stall behavior was generally quite benign, but low-time pilots should practice stalls at altitude in all configurations to enhance their ability to recognize stall onset. With the flaps fully extended, the aircraft displayed a tendency to fall off to the left somewhat at the stall. Recovery in all cases occurred almost instantly upon release of back pressure on the stick, and resulted in the loss of no more than 100-200 feet of altitude. Clean 1-G stalls occurred between 56-59 mph with full flaps and 60-63 mph clean, depending upon weight. CAFÉ calibrated stall speeds, which are lower due to installation/position error, can be found in the measured performance section. The slowest 1-G stall we measured, at a flying weight of about 1400 pounds and using the Triaviathon rule of 15° mp/1500 RPM, was 47.5 mph!

APPROACH AND LANDING

The excellent field of view, fixed landing gear, and benign handling all contribute to safety and a low pilot workload during approaches to land in the RV-8A. The aircraft decelerates and descends readily when power is reduced, so descents from cruising altitude do not require a lot of planning. This ability, in combination with the great climb performance, gives the pilot a sense of freedom of movement in all three dimensions.

A speed of 100 mph works well in the pattern and also corresponds to Vfe. Electric flap actuation is one of the few extras that Dick was willing to include, and I feel that it was an appropriate choice. With the flaps effortlessly activated by a toggle switch on the control column, the pilot can give full attention to flying a safe pattern. As speed is reduced to 75-80 mph with the flaps extended and the prop at fine pitch, the sink rate rises quite dramatically, so considerable power is required to maintain a standard approach angle. Everything goes to slow motion during a properly executed flair, with the resulting touchdown speed being about that of a Cessna 150.

Dead-stick landings are worthy of some practice due to the increased power-off sink rate, and are made easier by leaving the prop in coarse pitch until the runway is assured. Extra speed is in order when practicing power-off landings with very forward c.g. loadings, as elevator authority becomes quite limited at speeds normally used for landing. In normal operation, a small amount of power carried into the flair restores ample elevator authority. When doing go-arounds or touch-and-goes, the pilot should be mentally prepared to provide substantial forward pressure on the stick after power is applied and until the flaps are up and the elevator re-trimmed for the climb-out. The aircraft has ample control authority to negotiate crosswind landings, and these require no special technique or skill. The brakes are excellent and control during the deceleration to a stop is very positive.

CONCLUSIONS

As C.J. put it, the RV-8A is a dream airplane for the well-prepared low-time pilot, and I agree wholeheartedly. At the same time, its exhilarating performance and great handling qualities will never leave the veteran pilot bored. Imagine several categories of homebuilts, one being those with intrinsic safety, another those featuring great value, another those promising high performance, and finally the group of those with great handling qualities. The RV-8A would be equally at home in all of them. The group of homebuilts for which that can be said is small indeed!