

# BONANZA AT-1

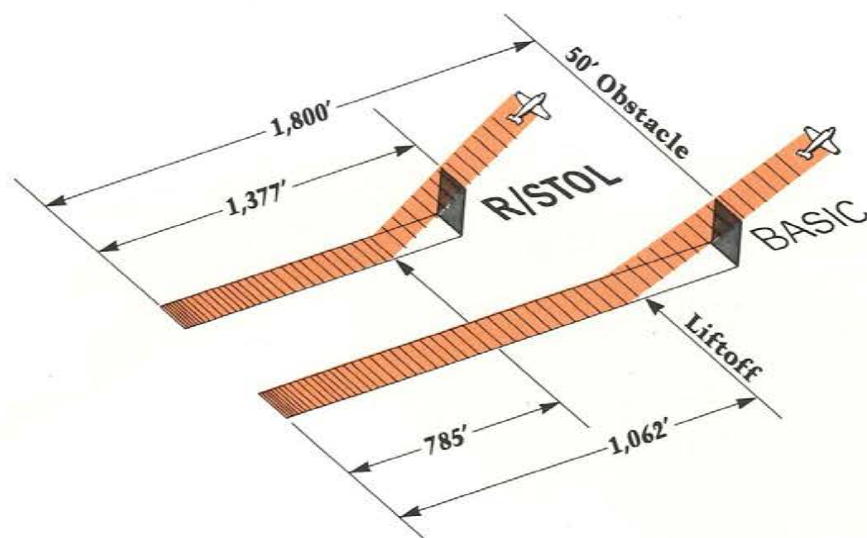
- SPOILERS: For sharp, positive roll control in all configurations.
- FULL-SPAN, SINGLE-SLOTTED FLAPS: For Hi-Lift on takeoff, climb and landing.
- BOUNDARY LAYER MODIFIERS: Reduce stall speed .



# ROBERTSON

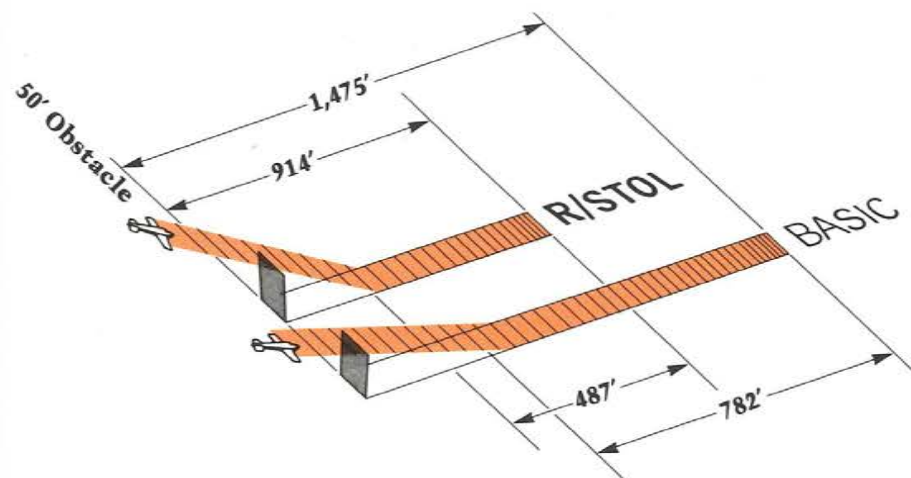


# HI-LIFT PERFORMANCE WHEN YOU NEED IT MOST



## AT TAKEOFF

Robertson's Hi-Lift BONANZA AT-1 (for Advanced Technology Model 1) will change your concept of taking off and landing. You'll lift off sooner and climb out at a steeper angle — great for clearing obstacles. The Robertson BONANZA AT-1 features full-span, single-slotted flaps, and boundary-layer modifiers to reduce gear-down stall speed by 4 knots and spoilers for roll control to assure sharp responsive handling at slow speeds. Robertson's Hi-Lift System for the BONANZA reduces takeoff roll by 277 feet with lift-off at 57 KIAS. To clear a 50-foot obstacle the Robertson BONANZA AT-1 requires only 1,377 feet compared to 1,800 feet for the standard BONANZA. The Robertson Hi-Lift System improves relative BONANZA performance even more under high-altitude and/or hot airfield conditions — when you need the added lift from the full-span flaps to avoid offloading. Robertson-equipped BONANZAS offer greater safety and more flexibility when flying into major airports as well as short, austere airfields.



## DURING APPROACH & LANDING

You'll land your Robertson-equipped BONANZA AT-1 effortlessly — at slower approach speeds that allow more reaction time for course and glide-slope correction. Events happen in slow motion, yet you enjoy the solid feel of crisp control, particularly on the roll axis, as spoilers perform with double effectiveness at slow speeds when flaps are down. You won't experience aileron fade as you slow to touchdown speed because spoilers retain their effectiveness well below stall speeds.

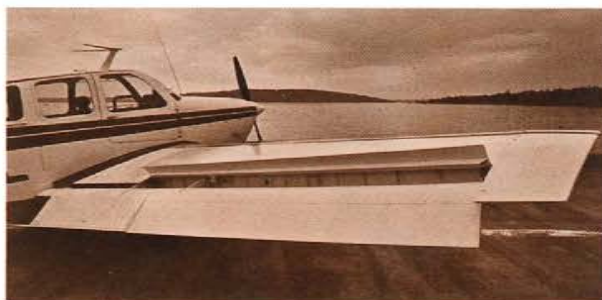
Your Robertson-equipped BONANZA AT-1 lands over a 50-foot obstacle in 914 feet compared to 1,475 feet for the standard BONANZA. Short-field landing capability stems from two new Robertson innovations — a 4-knot slower stall speed and assured sharp control that permits you to fully utilize the Robertson BONANZA'S improved performance. The Robertson wing (see following page) delivers both increased lift and sharper control.



# THE ROBERTSON WING

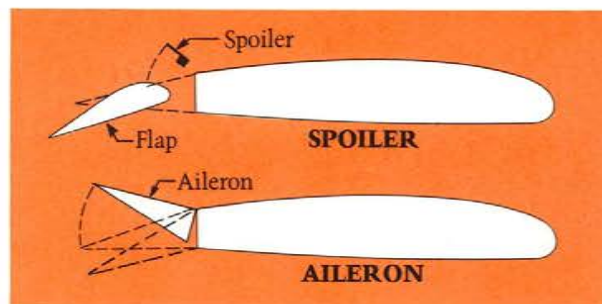
## SPOILERS

Spoilers for roll control on the Robertson-equipped BONANZA AT-1 permit flaps to be installed along the full trailing edge of the wing. Thus, spoilers and flaps work together to produce improved performance. Spoilers and full-span flaps were first certificated on the SENECA I by Robertson — the first for small U.S.-built aircraft.



## SPOILER DIFFERENCES

**Ailerons** are hinged portions of the outboard trailing edge — one on each side of the aircraft. An upward movement of the aileron decreases lift. A downward movement of the aileron increases lift. **Spoilers** are thin sections of the wing's upper surface positioned forward of the flaps. Spoilers move in only one direction — UP. When the spoiler moves up, it spoils wing lift — hence the name. As the lift on one wing is spoiled, it drops relative to the opposite wing on which the spoiler remains in its down, or faired, position.



## BENEFITS FROM SPOILERS

- **More Positive Roll Control** - particularly with flaps extended. At slow speeds less air flows over the aileron and it, thereby, produces less force for roll control. For this reason aileron-equipped aircraft tend to feel "mushy" or unresponsive at slow speeds. With flaps down at slow speeds the roll rate for the Robertson-equipped BONANZA is fast and crisp. At cruise speeds roll rates are unchanged. Thus, the BONANZA AT-1 retains comfortable roll control at cruise and a quick roll rate during those critical times when you need it most — takeoff and landing.
- **Less Chance of Spins** - At high angles of attack, a down-moving aileron may stall, causing that wing to

drop rather than rise. This effect is sometimes erroneously called "aileron reversal". Spoilers provide positive roll control. Raising a spoiler can only lower the wing. Hence, the BONANZA AT-1 retains roll control deep into a stalled condition.

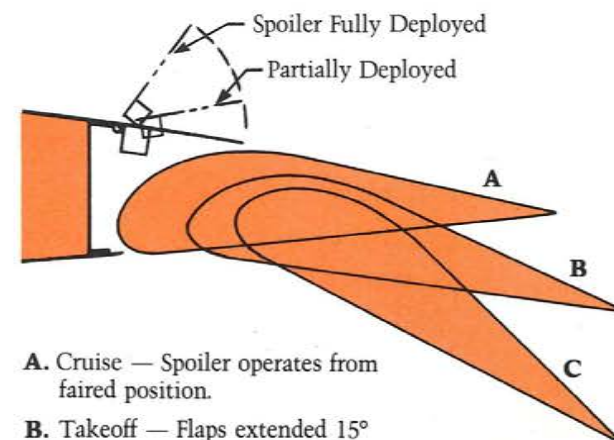
- **No Adverse Yaw** - On conventional aircraft, lowering an aileron to raise a wing increases drag on that side and pulls the nose of the aircraft opposite to the direction of the turn. With spoilers, turns initiated by raising the spoiler increase the frontal drag on the down-moving wing only. This drag pulls the nose into the turn *without* using the rudder. This action leaves more rudder power available to control gust upsets or high crosswinds.

## FULL-SPAN SINGLE SLOTTED FLAPS

Two distinct benefits are built into the Robertson-equipped BONANZA'S all-new flap system: 1.) The full wing span from fuselage to wingtip is fitted with a single flap to develop slow-speed lift over the full wing rather than only the previously flapped portion. 2.) Single flaps move on tracks aft and downward in a programmed action to open a slot between the wing and the flap leading edge. The precisely defined slot improves lift by drawing just enough high-pressure air from under the wing to the upper surface of the flap to retain airflow over its full camber and, thereby, increase lift. The high-energy air reduces the depth of the boundary layer and increases lift.

The Robertson-equipped BONANZA AT-1 climbs at its best rate while flying 78 KIAS with 15-degrees of flap as the standard BONANZA flies at 96 MPH with flaps up. As a result the climb gradient is substantially steeper than for the standard BONANZA. The Robertson-equipped BONANZA AT-1 is FAA-approved for takeoff and climb with 15 degree flaps to take full advantage of the higher lift at slower speeds. Higher climb angles obviously benefit operations into and out of short fields surrounded by trees or other obstructions. The steep angle also permits a pilot to attain a safe altitude quickly when flying from commercial airfields.

Flaps may be deployed to 30 degrees for approach and landing to achieve high lift and high drag. Small changes in power permit the pilot to maintain the desired glide slope and to simplify landing at a specific spot on the runway.



- A. Cruise — Spoiler operates from faired position.
- B. Takeoff — Flaps extended 15°
- C. Landing — Flaps extended 30°. Note slot between faired spoiler and flap L.E.

## SPOILER-FLAP RESEARCH

In 1970 Robertson built a wing designed at the University of Kansas for experimental flight testing on a Cessna CARDINAL. This wing has both spoilers and conventional ailerons for roll control. In 1972 Robertson designed the ATLIT wing (for Advanced Technology Light Twin) that incorporates a new NASA airfoil with full-span full-Fowler action flaps for a Piper SENECA. Spoilers offer the only means for roll control on the ATLIT wing. The spoiler and full-span flap systems for the Robertson SENECA and BONANZA AT-1 were developed from this technical "know-how".





## BONANZA AT-1 (V-35B) PERFORMANCE SPECIFICATIONS

	Standard	Robertson
<b>GROSS WEIGHT</b> (Pounds) .....	3,400	3,400
<b>TAKEOFF</b> —		
Distance Over 50' (Feet) .....	1,800	1,377
Ground Roll (Feet) .....	1,062	785
Lift-off Speed (KIAS) .....	80	57
<b>CLIMB</b> —		
Over 50' (KIAS) .....	77	68
Best Rate (KIAS) .....	96	78
Best Angle (KIAS) .....	83	68
<b>STALL</b> — (@ Gross Weight-Idle Power)		
Flaps UP (KIAS) .....	64	63
Flaps 15°-Takeoff (KIAS) .....	—*	56
Flaps 30°-Approach (KIAS) .....	55	51
<b>LANDING</b> —		
Distance Over 50' (Feet) .....	1,475	914
Ground Roll (Feet) .....	782	478
Approach Speed (KIAS) .....	78	65

\*Manufacturer prohibits flap takeoffs.

### FLAP SYSTEM PRESELECTED DETENTS ELIMINATES GUESSWORK

Preselected flap positions permit the pilot to select UP, INTERMEDIATE, or DOWN flap positions without looking at the indicator. The flap automatically moves to the position desired and stops. By being able to preselect an intermediate position, flaps-down limit speeds are higher than standard.

## TESTED AND APPROVED

In developing the Advanced Technology Hi-Lift Safety and Performance Systems, Robertson engineers and pilots have worked closely with the Federal Aviation Administration in exhaustive analysis, structural substantiation and flight testing to guarantee the airworthiness and safety of each installation.

### SCHEDULING YOUR BONANZA AT-1

Complete Hi-Lift System installation on your BONANZA AT-1 will be accomplished within 10 working days. A prior space reservation is required to assure on-time completion. Cost-only pickup and delivery to and from your airport can be arranged if desired.

Upon accepting delivery of your Robertson BONANZA AT-1, you are provided with complimentary dual-flight familiarization to help you gain maximum utilization from the Robertson Hi-Lift System.

### FINANCING AVAILABLE

Installations of Robertson Systems on new and used aircraft may be financed at low interest rates over extended periods. Financing is available even if the aircraft is not fully owned.

### REDUCED INSURANCE PREMIUMS

Aircraft equipped with Robertson Systems are eligible for up to 35% lower insurance premiums. Write or call for specific information.

### ROBERTSON INSTALLS HI-LIFT SYSTEMS ON THESE OTHER AIRCRAFT:

Cessna 150, 172, 180, 182, 185, 188, 206, 207, 210, 337, 310, 340, and all 400-Series models.

Piper PA23, PA24, PA28 (all models) PA32, PA30, PA34, and PA39.



DEDICATED TO THE ADVANCEMENT OF GENERAL AVIATION

## ROBERTSON AIRCRAFT CORPORATION

839 W. PERIMETER RD., RENTON MUNICIPAL AIRPORT, RENTON, WASHINGTON 98055

TELEPHONE (206) 228-5000 (WASHINGTON RESIDENTS CALL COLLECT)

**CALL TOLL FREE (800) 426-7692**

TWX 910-423-1555

"THE EXTRA MARGIN OF SAFETY"