

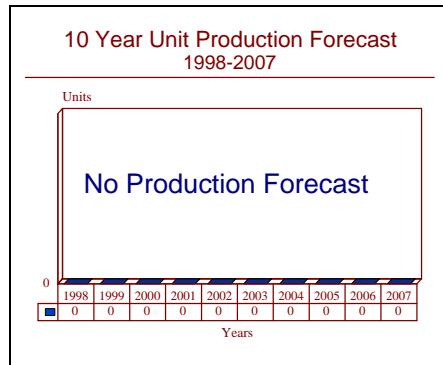
# ARCHIVED REPORT

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## Beech Series 2000 Starship 1 - Archived 8/99

### Outlook

- Production completed in 1995
- Program a technical success, but commercial failure



### Orientation

**Description.** Nine-passenger, pressurized, all-composite, twin-pusher, turboprop-powered, corporate/executive transport aircraft.

**Sponsor.** Beech Aircraft.

**Contractors.** Raytheon Aircraft Co, Beech Aircraft Corp, Wichita, KS, USA.

**Status.** Production completed in 1995.

**Total Produced.** Beech produced 53 Starships through 1995. Several operated under lease.

**Application.** Corporate/executive passenger transportation.

**Price Range.** Approximately \$4.3 million typically equipped, in 1995 US constant dollars.

### Technical Data

(2000/2000A)

**Design Features.** Cantilever low-wing monoplane with moveable foreplanes (canards). Wings are slightly swept with wing fences and tip-sails for lateral control. No tail. Pusher-configured engines are mounted above

the wing, slightly aft of wing center chord. Aircraft is constructed almost entirely of carbon-fiber composite materials and is the first all-composite aircraft to be certificated by the US Federal Aviation Administration.

#### Dimensions

|                   | <u>Metric</u> | <u>US</u> |
|-------------------|---------------|-----------|
| Length overall    | 14.05 m       | 46.1 ft   |
| Height to tipsail | 3.68 m        | 12.9 ft   |
| Wing span         |               |           |
| Aft               | 16.61 m       | 54.40 ft  |

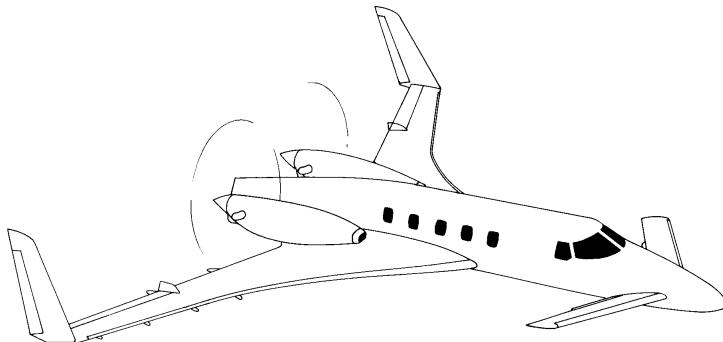


|                               | <u>Metric</u>   | <u>US</u>        |
|-------------------------------|---|------------------|
| <b>Weight</b>                 |   |                  |
| Max T-O                       | 6,591/6,773 kg  | 14,500/14,900 lb |
| Max landing weight            | 6,140 kg  | 13,538 lb        |
| Zero fuel weight              | 5,466 kg  | 12,050 lb        |
| Basic weight, empty           | 4,314 kg  | 9,511 lb         |
| Useful load                   | 2,199 kg  | 4,849 lb         |
| Max payload                   | 812.3/1,035 kg  | 1,787/2,277 lb   |
| <b>Capacities</b>             |   |                  |
| Max fuel                      | 1,922 liters  | 508 gal          |
| Baggage volume <sup>(a)</sup> | 1.34 cu m   | 49 cu ft         |
| Baggage capacity              | 351 kg  | 775 lb           |
| <b>Performance</b>            |   |                  |
| Max cruise speed              | 641 km/h  | 336 kt           |
| Certificated ceiling          | 12,496 m  | 41,000 ft        |
| Ceiling, single engine        | 5,791 m   | 19,000 ft        |
| Rate of climb, at S/L         | 990.6 m/min   | 3,250 ft/min     |
| VFR Range                     | 3,095 km  | 1,670 nm         |
| IFR Range                     | 2,817 km  | 1,520 nm         |
| <b>Propulsion</b>             |   |                  |
| Starship 1 (2)                | UTC Pratt & Whitney Canada PT6A-67 axial-centrifugal turboprop engines flat rated to 895 kW (1,200 shp), each driving a Hartzell five-bladed, fully feathering, reversible pitch, metal pusher propeller. |                  |

**Seating**

Standard cabin seating for eight passengers. A ninth passenger can be accommodated in lieu of the co-pilot. Starship 2000A is configured for six passengers.

<sup>(a)</sup>Includes aft and forward compartments of 35 and 14 cubic feet, respectively.



BEECH SERIES 2000 STARSHIP

Source: Forecast International

## Variants/Upgrades

**Starship 2000.** Initial production model, seating eight-nine passengers.

**Starship 2000A.** Certificated in May 1992, features a reduction in stall speed, a 202-pound increase in max

fuel capacity, an increase in max range to 1,552 nmi, and a new, roomier six-passenger interior. 2000A improvements available to 2000 owners as retrofit.

## Program Review

**Background.** This unconventional design was a virtual show-stopper upon its introduction at the 1983 NBAA convention. The twin-turboprop Starship aircraft was a novel design, with the majority of its structure composed of graphite, with several major sections of DuPont Kevlar, glass and titanium. Burt Rutan of Scaled Composites, Inc (SCI), until December 1988 a subsidiary of Beech, aided in the configuration design. SCI built an 85 percent-scale flying prototype, essentially a flying wind-tunnel model which was intended to validate the design.

**Standard Equipment.** The long list of Starship features includes computer-aided design of a tandem-wing arrangement, one tapered wing aft-located with tipsails (with rudders) at each end, and a patented variable-geometry forward wing. The twin engines are located inboard, above and to the rear of the aft wing. The functional benefits of a pusher-engine configuration satisfied the objectives of Beech to offer lower interior

noise levels, more thrust per horsepower, and the elimination of induced airflow over the aircraft.

The fuselage and wing structure consist of epoxy graphite and honeycomb sandwich panels. The fuselage panels were built up of an epoxy outer skin, an adhesive layer and a honeycomb core, and are 3/4 inches thick.

At the time of its market entry, the Starship 1 offered the most modern, state-of-the-art cockpit ever designed for a business aircraft, featuring an "all glass" panel, with CRT displays for all flight, navigation and aircraft-performance monitoring systems. Since the Starship was announced, nearly all new corporate turboprops and jets entering the development phase offer similar advanced avionics.

The first full-scale prototype flew in February 1986. The second flew in June of that year, and the third in 1987.

## Funding

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Beech invested approximately \$310 million (in 1991 US dollars) in its effort to become a major player in the aircraft composite material business. Most of the investment was in the Starship, but a great deal was to establish a total engineering and manufacturing capability.

## Timetable

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| <b>Month</b> | <b>Year</b> | <b>Major Development</b>                            |
|--------------|-------------|---|
| Aug          | 1983        | First flight of the 85% scale version of Starship 1 |
| Oct          | 1983        | Full-scale mock-up introduced and displayed at NBAA |
| Feb          | 1986        | First prototype flew                                |
| Jun          | 1986        | Second prototype flew                               |
| Early        | 1987        | Third prototype flew                                |
| Jun          | 1988        | Starship granted conditional FAA Type Certification |
| Jun          | 1989        | Delivery of first Starship                          |
| Dec          | 1989        | Full certification received                         |
| May          | 1990        | Single pilot operations approved                    |
| Late         | 1991        | Starship 2000A announced                            |
| Mid          | 1992        | Starship 2000A certificated                         |
| Mid          | 1995        | Production ended                                    |



## Worldwide Distribution

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Not available.

## Forecast Rationale

The Starship program was not a commercial success, but viewed from a technological standpoint the project did pave the way for much of the advanced composites work now being carried out by the restructured Raytheon Aircraft Co. This is most evident in the new Premier series of corporate jets.

In any event, Starship production has ended and will not be re-started, as the Raytheon/Beech team has moved on to other programs.

## Ten-Year Outlook

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No further production.

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