

# Dornier SeaStar: 180 KTAS, FL150, 430 nm, up to 12 seats



Tractor-pusher engine configuration for pair of PT6A-135As follows longstanding Dornier tradition.

SeaStar becomes airborne over Biscayne Bay in Miami with hopes to resurrect the flying boat heritage.

Photo's courtesy Dornier SeaStar

By David Bjellos  
ATP/Helo. Gulfstream IVSP, Bell 407

Aviation has evolved inevitably through technological advances and it is rare that early designs get a chance for rebirth. A few, such as the flying wing and tiltrotor, have succeeded for special applications, but one in particular is gaining traction for a wide audience—the flying boat. Soon to hit the market is the twin-turbine SeaStar, built to modern standards with many design features pioneered by the founder, Claudius Dornier. His company was founded in 1914 and built many successful flying boats (and later land aircraft), the most famous being the Do X—a 12-engined monster that could carry 164 passengers in 1929.

The golden age of seaplanes existed between 1929 until just after WWII. By necessity, they flourished because of a lack of land runways. Global expansion reached a frenzied pace the moment Lindbergh crossed the Atlantic nonstop in 1927, fueled by the public's fascina-

tion with all things aeronautical. The Europeans were well ahead of their American counterparts in most aviation pursuits during this time. Daimler, de Havilland, Dornier, Fokker and Marchetti had all produced land and seaplanes, and regular passenger service throughout Western Europe was common in the 1920s. But commerce required connecting Europe with the Americas, both North and South, and the seaplane was deemed essential to cross the Atlantic.

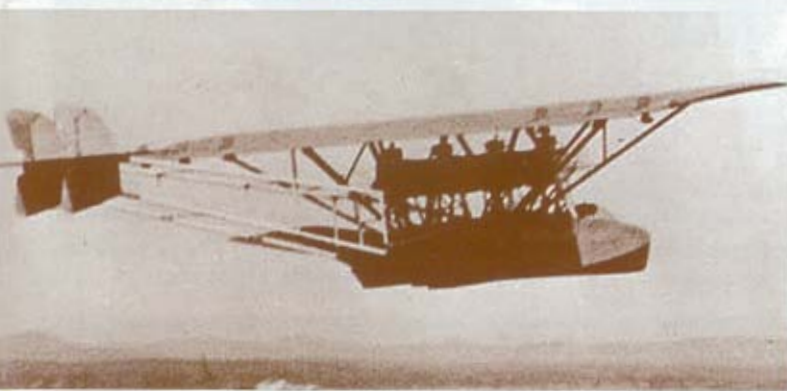
In America, aeronautical pioneers William Boeing, Glenn Martin and Igor Sikorsky contracted to build unique flying boats for Pan American to demanding specifications by the visionary Juan Trippe and Chief Engineer Andre Priester. In Europe, Dornier pioneered seaplanes with his extensive knowledge of hydrodynamics and aerodynamics. Prior to 1930 he produced 9 flying boats with features—such as sponsons on the fuselage—which would continue to be the standard for flying boats until today. The company produced over 100 aircraft types with various alliances well into the 1980s.

## Resurrecting the flying boat heritage

Fast forward to 1991 and Conrado Dornier, grandson of Claudius. The Dornier Seaplane Company which bears his family name has just received EASA and FAA certification for its newly developed SeaStar CD2 flying boat. Featuring 2 Pratt & Whitney Canada PT6A-135As mounted in tandem atop the fuselage, the SeaStar is composed nearly entirely of composite, all but eliminating the bane of all saltwater vessels—corrosion. Unlike earlier Dorniers, the CD2 is an amphibian.

In Oct 2008 the company announced that it was reviving the project. Dornier Seaplane Company has more than 25 firm orders from global customers and construction will take place in a newly established factory at YJN (Saint-Jean-sur-Richelieu QC, Canada), near Montreal. CEO Joe Walker expects the first deliveries in 2012 with water testing in nearby Lake Champlain.

With the advent of glass cockpit technology, Dornier has begun soliciting bids from avionics OEMs



Early in its history Dornier was successful with tandem-mounted engines. (Upper L) Designed in the 1920s, the Do J Wal flying boat was powered by 2 piston engines in a single nacelle. One engine drove a tractor propeller, the other a pusher. Note general similarity to current CD2 SeaStar. (Upper R) The Do 335 Pfeil (Arrow) fighter was powered by 2 separate engines within the fuselage. Production had barely begun when WWII ended. (Lower L) The 4-engine Dornier RS-II B seaplane prototype flew in 1916 but did not enter production. (Lower R) At the time of its first flight in 1929, the Do X was the largest flying boat in the world. It was powered by 12 engines housed in tandem within 6 nacelles. Only 3 were built.

for incorporation into the production line about 2014. Transport Canada will issue both a production and type certificate.

### Sea legs for the land-based pilot

Before flying the SeaStar, I reflected on the history of these extraordinary machines and considered how a modern-day pilot, with little or no seaplane experience, could handle takeoffs and landings from marine runways. Professional seaplane flying is severely limited by geography and relatively few aircraft. Alaska, the Caribbean, North America and Southeast Asia remain the prime areas of relevance, and few modern aviators fly regularly from the water. So what special skills are required to fly and maintain this breed of flying machine?

This author has neither a seaplane rating nor significant experience in floatplane or flying boat operations. During a pleasant January afternoon on Biscayne Bay in Miami, I was pleasantly surprised both by how straightforward the transition was to water flying and by the robustness of the SeaStar.

Dir of Flight Ops Grady Washatka and VP Tech Ops Marv Ruthenberg provided a thorough and detailed briefing of the SeaStar's capabilities and limitations at X44 (Miami Seaplane Base, Miami FL) on Watson Island. Walking around the aircraft, Ruthenberg showed me the composite airframe and sponsons, detailing the design benefits of each. Ruthenberg has the credentials, having worked for Hughes Aircraft (directly with Howard Hughes) on the Spruce Goose and served as CEO of Seaborne Airlines seaplane service in the US Virgin Islands.

Washatka then briefed our flight and performed a safety review of exits, life vests and flotation. I found I was paying a bit more attention to these knowing I'd be on the water in just moments.

### Getting wet

Washatka followed a checklist carefully and performed engine start and preflight items. Those completed, he pushed the prop controls to the full-forward position before taxiing down the seaplane ramp into Government Cut.

One is instantly comfortable in the SeaStar on the water. The fuselage sponsons carry all the fuel and help lower the center of gravity for stability during displacement (off-the-step) operations. If you are comfortable in a 25-ft boat, the SeaStar will feel right at home.

Taxiing out, Washatka raised the landing gear and lowered the flaps to 30° while demonstrating the maneuverability at low speeds. There was quite a bit of chop from several boats in the cut and the flying boat reacted to them much as a regular boat—it bobbed and splashed both laterally and longitudinally with the low speed making control inputs sluggish in spite of the water rudder. But the instant Washatka pushed up the power levers for takeoff, an entirely new character emerged. The effects of the sponsons became apparent immediately—they got the aircraft onto the step very quickly through hydrodynamic lift and increased longitudinal stability greatly during transition. Due to this feature—a Dornier trademark since inception—there was very little pitch change from fully displaced until

## Dornier SeaStar specifications

### Price

Basic equipped (US\$) N/A

### Powerplants

(2) P&WC PT6A-135A

Takeoff power (shp) 650

### Dimensions

Wingspan 58 ft 2 in

Wing area (sq ft) 329.4

Horizontal tailspan 18 ft 3 in

Tail area (sq ft) 68.0

External height 15 ft 9 in

External length 41 ft 7 in

Internal cabin length 18 ft 0 in

Internal cabin width 5 ft 4 in

Internal cabin height 4 ft 6 in

Cabin volume (cu ft) 348

Landing gear track 8 ft 3 in

Normal seating, crew/pax 2/6-12

### Performance

Takeoff distance on land  
(MTOW, 2 eng, flap 20)  
over 35 ft (ft) 1,850

Landing distance on land  
(9,920 lb, flap 40) over 50 ft 2,250

MTOW (lbs) 10,141

Basic operating weight 7,450

Rate of climb  
(MTOW, 2 eng) (fpm) 1,300

(MTOW, 1 eng) 490

Useful load (lbs) 2,691

Max fuel load (US gal) 418

Max altitude (ft) 15,000

Range (NBAA, IFR,) (nm)  
430 w/200-nm alt

Cruise speed (KTAS) 165

Max cruise speed 180

VLE/VLO (KIAS) 148

Vmo 180

### Water operation

Takeoff distance  
(MTOW, 2 eng, flap 30, wave  
height 6-12 in) over 35 ft (ft) 2,500

Landing distance  
(MTOW, 2 eng, flap 40)  
over 35 ft 2,480

Figures supplied by Dornier Seaplane



Production aircraft will feature integrated flat panel EFIS/EICAS displays from a yet-to-be-named supplier. Note traditional throttle quadrant as opposed to overhead mounting.



Interior can be outfitted for high-density seating (up to 12) or an executive configuration with a 6-club seat arrangement.



Additional side door for pilot allows easy egress for approaching dockage, beach head and access to engine areas for preflight.

actual liftoff. Unlike land aircraft, no real rotation through the elevators is necessary—rather, a pitch attitude is established early in the takeoff run once on the step and the flying boat leaves the water gracefully on its own accord. Washatka accelerated quickly to 120 KIAS and we flew south to an area known as Stiltsville in Biscayne Bay.

Flying boats literally began life in Biscayne Bay in the 1930s with Pan Am serving the Caribbean and South America from its Dinner Key seaplane base. It became Miami City Hall in 1954 after Pan Am made a permanent change to landplanes. Ironically, Biscayne Bay saw tragedy in 2005 when Chalk's Intl Airlines suffered the

fatal crash of a Grumman Mallard. The airline was grounded, ending the longest continuously running airline operating certificate (AOC), first issued in 1919. (KLM is now the world's longest running airline.) As an aviator and flying boat history buff, I was profoundly touched by the nostalgia and history that seaplanes created on



Author Bjellos prepares for demonstration flight. Main entry door is large enough to accommodate large objects for use in remote areas.



Bjellos and Dir of Flight Ops Grady Washatka water taxi back to Watson Island after a 2-hr flightcheck.

these same waters some 70 years earlier.

### Water ops—learning the basics

Washatka turned the controls over to me and I acquainted myself with the handling of the aircraft. It is very stable in flight and flies like a much larger aircraft. Power changes had little effect on pitch, making it a stable IFR platform and both ailerons and elevator were light yet solid. Approach and landing were very straightforward and I lined up on a channel without boat-

#### Composite construction, failsafe landing gear design

**D**esign of the SeaStar evolved from a 1930s design designated Do 18. Dornier was the first to use an all-metal construction for the larger Do X in 1929. Today, the SeaStar employs a fiberglass/carbon fiber cold layup process for the fuselage and flight surfaces. It is smooth and reduces friction and parasite drag, both in the water and airborne. The fuel cells are located in the sponsons to provide a low, centralized CG and promote longitudinal stability.

Landing on water with the landing gear down would be disastrous and destroy the aircraft. As a result, Dornier engineers designed a unique switch which is activated once airborne. It is labeled "Sea" and "Land." Once placed in the Sea position, the landing gear handle is rendered inoperative. Should the switch itself fail, it is failsafed to the Land position, allowing the gear handle to be operative and giving the pilot an option for landing. □

ing traffic for several touch-and-gos. Full flaps (40°) can be selected at 117 KIAS and, as instructed, I slowed to 90 KIAS for the final approach (and reconfirmed gear up). The most conservative technique is to maintain some power until touchdown, and the SeaStar was very controllable.

After touchdown, I kept the hull on a plane while Washatka raised the flaps to normal water takeoff setting (30°) and advanced the power levers. Again, a slightly positive pitch attitude allowed a smooth takeoff. Allowing me the pleasure to repeat this several more times, I was convinced that the transition to flying seaplanes was very possible by an average aviator with sufficient experience in multiengine turbine aircraft.

We did not demonstrate single-engine work, but Washatka assured me that handling qualities remain identical with either engine inop and about a 30-kt loss of airspeed in cruise flight.

### Summary

Dornier expects to sell the SeaStar to a mixed-use group in Asia, the South Pacific and North America focusing on charter, maritime patrol and private applications. The biggest attraction is the reduced maintenance requirements for saltwater exposure. Traditionally, seaplanes have a useful life of 3–4 years in commercial service before requiring a major overhaul on aluminum structures. Downtime can exceed 3 months. The SeaStar's composite structure, coupled with the power and reliability of the PT6 engines will likely give the SeaStar performance and reliability unknown in earlier flying boats. Because of the reduced downtime,

this aircraft could find a niche in the charter market where reasonable operating costs could provide a profit, such as Alaska or Caribbean inter-island service.

With proper training—and a dose of humility—any competent landplane pilot could easily transition to this aircraft. Ground staff and maintenance technicians will appreciate the straightforward and well designed layout as well as easy access for inspections and repair. It was clear to this writer that once some experience is gained maneuvering on the water, a high degree of accuracy can be obtained for landing in confined areas or narrow rivers. The aircraft is extremely agile and requires no more water for a takeoff run than a small to midsize turbojet aircraft off a land runway. Using reverse, a pilot can stop very quickly with little effort and under complete control.

Flying the SeaStar gave a sense of refinement to the sometimes repetitive world of landplane flying. It will satisfy the CFO through reduced costs and reward the pilot and passengers with a safe, easy-to-fly modern aircraft that brings to bear nearly 100 years of aeronautical experience in flying boats. Perhaps elegance is returning to aviation, as it is for Dornier and the SeaStar. ✈



David Bjellos is the aviation manager for a private corporation whose flight department was the first in south Florida to achieve IS-BAO certification. The company operates a Gulfstream IVSP, a Dassault Falcon 2000, 2 Bell 407s and a Eurocopter EC120.