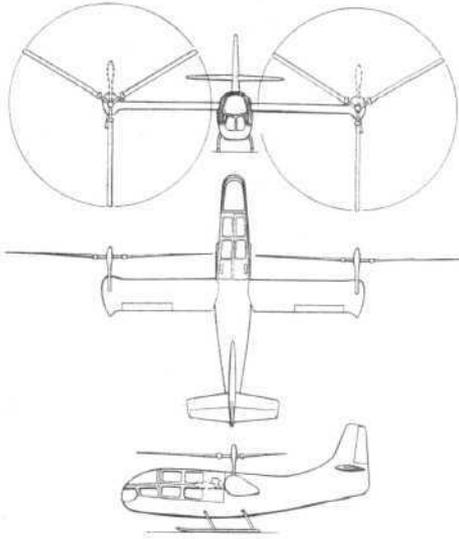


Helicopters of the World...



(Above and right) Bell Model 200 (XV-3).

(continued from page 708)

for armament totalling some 4,000 lb in weight and including dipping, sonar and "lightweight homing weapons."

One of the major problems to be faced in using A.S.W. helicopters is that of crew fatigue during long periods of ocean search in all weathers, which is far more arduous than anything done with rotary-wing aircraft so far. Bell have designed their own autopilot to fill this need, and its characteristics have been matched with the requirements of dunking sonar (sonobuoy) apparatus. The system is, in conception, simple. Pitch and roll are stabilized conventionally by a vertical gyro and a rate gyro in combination. The unique feature is that it is the helicopter control system, and not the fuselage, which is stabilized. This permits rapid variations in c.g. (as might follow the dropping of heavy weapons) without effect on flight path and without the need for any re-trimming. Pilot control of the pitch and roll channels is accomplished by simple manual movement of the cyclic-pitch stick. Directional heading is controlled by a G-2 gyro compass integrated with the autopilot. Changes in heading can be made in two ways. In hovering flight, the HSL can be yawed by the application of pedal pressure, the pedal force governing the rate of yaw. In forward flight, an automatically co-ordinated turn can be made by depressing a button on the cyclic stick and establishing the desired angle of bank with stick movement. Once on the new heading, the pilot recovers from the turn and re-engagement of the button ensures that the new course will be maintained. Collective pitch, and thus altitude,

in forward flight is maintained by a pressure-sensing servo which varies collective pitch as a function of pressure altitude related to reference altitude. At any time, the pilot can override any commands or displacements imposed by the autopilot simply by applying a moderate force to the primary controls; this is made possible by slip clutches between the servos and the system.

- Rotor diam., 51ft 6in; overall length, 70ft; max. speed at s.l., 132 m.p.h.

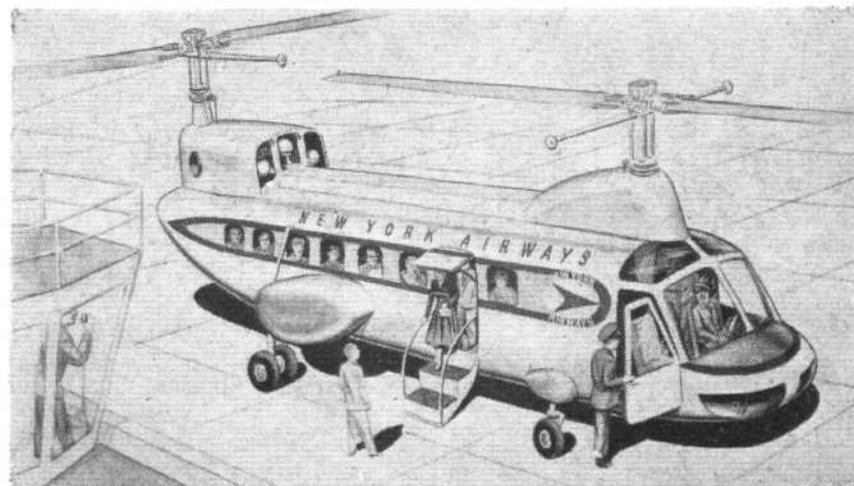
**Model 200** This convertiplane is officially known as the XV-3. Of tilting-rotor type and powered by a Pratt and Whitney R-985 engine, it has been built to an order placed in 1951. By August last it was reported to have flown with rotor shaft forward angles of up to 15 deg; power requirements at speeds up to 80 kt, it was said, were low, and autorotational descents from 500ft had shown good power-off characteristics.

The twin three-bladed rotors are mounted near the tips of the relatively small wing, with the axes of the rotor masts vertical for "helicopter" operation. After a certain speed is reached the masts are tilted forwards through about 90 deg, so that the rotors are then acting as propellers. During conversion (which requires between 10 and 15 seconds) the lift load is transferred to the wing, and after conversion a transmission gear-change, similar to a car over-drive, is used to reduce rotor speed and thereby to attain improved high-speed performance. It is claimed that there will be no abrupt changes in flight characteristics during conversion and that the pilot will retain full control at all times.

A makers' announcement states that not only is there no loss of height during conversion, but that the operation can be performed while the aircraft is maintaining a steady climb. In case of engine failure, power-off conversion back to helicopter configuration can be made so that an autorotational landing is possible.

The following remarks by the makers are worthy of record: "The tilting-rotor type convertiplane, capable of vertical take-off and landing coupled with considerable operational radius, contains the element of surprise because of its speed. Speed also enables troops to be moved safer by decreasing the time the transport is subjected to enemy fire when approaching the objective, and makes possible more round trips per vehicle in any given period. In its present configuration, the XV-3 is a four-place observation-reconnaissance aircraft, or a two-place (pilot, medical attendant) evacuation-rescue craft with litter accommodation for two patients. The XV-3 is suitable for transporting men, equipment and supplies within the combat zone in addition to its primary missions of observation and reconnaissance, with delivery to the point of tactical use.

"Commercially, the convertiplane's advantages are apparent. Economically speaking, the helicopter's future lies in passenger and cargo flights up to 150 miles radius, the convertiplane from 100 to 750 miles, leaving fixed-wing aircraft with the balance. And the market is there for the convertiplane. For instance, nearly 28 million persons annually take inter-city plane, train or bus trips of between 150 and 600 miles, which is roughly the convertiplane's optimum area of operation.



(Left) Bell D216. (Below) Bensen B-7M.

