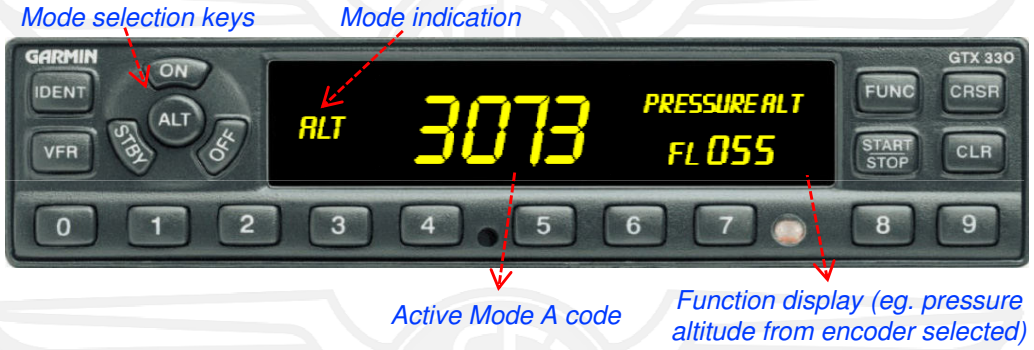
7. Radar procedures
a. The Transponder

Aim	• To learn to use the Transponder in flight	Airmanship	• Current charts, Instrument ground checks, FREDA, S-I-D	Performance	• Comply with ATC squawk instructions

The Garmin GTX330 Transponder

Operation

- "OFF" powers down the unit; pressing any of "STBY", "ON", "ALT" will turn it on, display the last previously selected code, and place the unit in that mode
- In STBY mode, the transponder does not reply to interrogations
- In ON mode, it replies with the Mode A code, but not Mode C altitude information
- In ALT mode, it replies with both the Mode A code and Mode C altitude



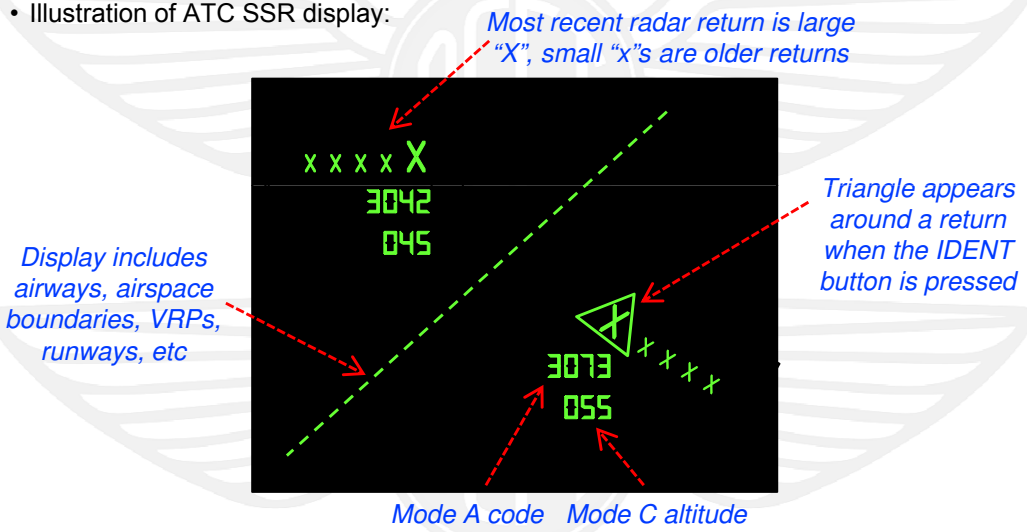
- **Code selection does not require changing to STBY mode; a new code will become active only after the fourth digit is entered**. The "CLR" button moves the cursor back to the previous digit. The "CRSR" button cancels a new code entry, reverting to the previous code
- Use the "IDENT" button only when requested by ATC; press once
- The "VFR" button selects a previously configured code (usually 7000 in Europe)
- The GTX330 is a Mode S transponder, and Item 10 of the FPL should end with "/S"
- There is no test button, the unit will display "FAIL" prominently if it malfunctions

Standard squawk codes

- **7000** Conspicuity (used VFR or IFR when not assigned a code by ATC)
- **7500** Hijacking **7600** Radio Failure **7700** Emergency
- **2000** FIR Boundary crossing when no code assigned by ATC
- Avoid selecting 7500 and any code in the range 7600-7777 (unless required, or directed by ATC); these codes trigger alerts in various automated facilities

Ground Equipment: ATC Radar

- The Transponder is part of the Secondary Surveillance Radar (SSR) system, which is totally separate from Primary radar, although SSR and Primary data is often superimposed on ATC display screens
- In its basic form, the SSR system uses computer-generated graphics to depict aircraft position, track, Mode A code and Mode C pressure altitude. Mode S equipment enables a more sophisticated display and feature set
- Illustration of ATC SSR display:



- The Mode C altitude derives from an Encoder in the aircraft which supplies altitude data to the Transponder
- This Encoder is not adjustable by the pilot, and it always operates from the standard 1013 hPa barometric reference
- Thus, the altitude information ATC receives is Pressure Altitude, irrespective of the pressure setting on the aircraft altimeters
- The Transponder also replies to interrogations from aircraft ACAS (Airborne Collision Avoidance System) equipment and other active traffic interrogating devices. There are also passive traffic alerting systems that monitor replies to SSR interrogation in areas of SSR coverage only.