Development of the Forward looking Terrain avoidance in a Terrain Awareness & Warning system (TAWS)

Ch.1 Introd:

- ADC → Air data Comp.
- ANP → Actual Navigation Performance
- CFIT → controlled Flight into Terrain
- DTM → Digital Terrain Model
- EGM → Earth Gravitational Model
- EGPWS → Enhanced Ground proximity Warning System
- FAA → Federal Aviation Administr:
- GPWS → Ground proximity Warning system
- FAF → Final Approach Fix
- FLTA → Forward looking Terrain avoidance
- VFR → Visual Flight Rules

→ CFIT (controlled Flight in Terrain) : major cause of accidents

→ Terrain Avoidance & Warning System (TAWS)

→ GPWS: warnings are based on the radio altimeter

- radio altimeter: measures height above the terrain

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Accidents in Aviation

Top 3 causes:
(i) Loss of control (ii) Controlled Flight into Terrain
(iii) Runway Excursion

CFIT: occurs when an airworthy aircraft under the the complete control of the pilot is inadvertently flown into terrain, water or an obstacle. The pilots are generally unaware of the dangers until its too late.

— effect: mostly collision with grd/obstacle.

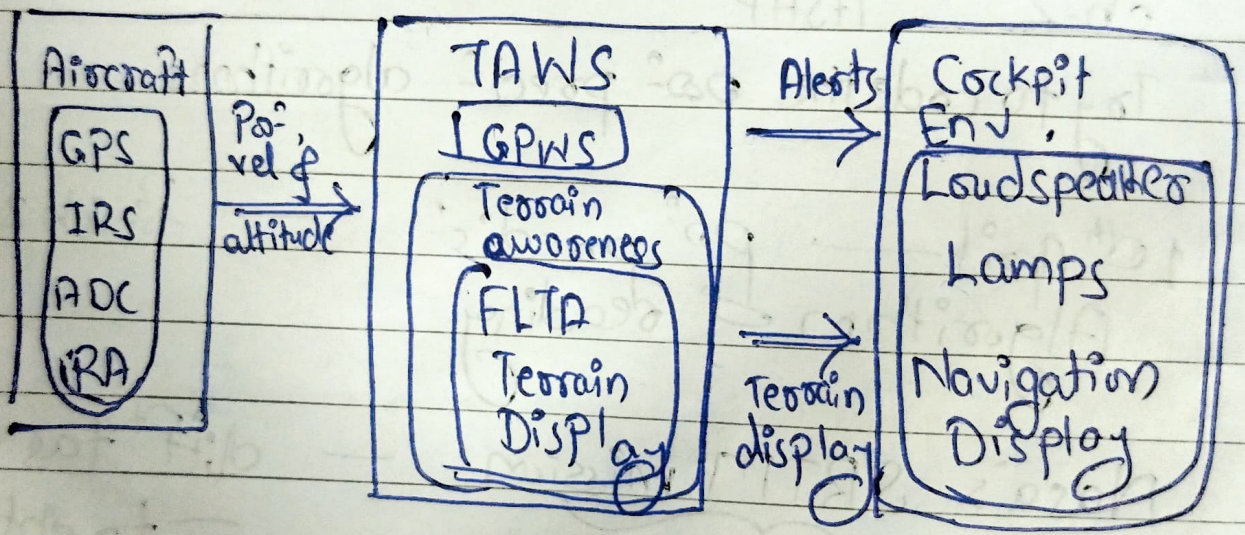
— Situational Awareness → (SA)
- safety of the flight
⇒ cont extr of environmental ~~extr~~ info, the integr of the same with previous info /knowledge to form a coherent mental pict, fusing it in directing further perception of anticipating future events.

SA → situational Awareness

* 6 modes in any Basic GPWS :-

(i) Excessive Descent Rate
(ii) Excessive Terrain closure rate
(iii) Altitude loss after take off
(iv) Excessive Deviation below glidescope
(v) Excessive Bank angle & Altitude Callouts

IRS → Inertial Reference Unit
ADC → Air data computer
RA → Resolution Advisory



* Radio Altimeter (RA) :

GPS → pos^n data ; velocity vector
IRS → pos^n ; Kinematic data (vel. vector, angular rates) & altitude data
ADC → airspeed ; barometric altitude ; & temp. data
RA → Radio Altitude.

IRS → more sensitive

FLTA is responsible for
(i) predic^n of current aircraft pos^n
(ii) constr^n of a search volume
(iii) Insertion of the search volume with a terrain Database.

predic^n is done using the current aircraft pos^n of the velo. vector to cal. future pos^n