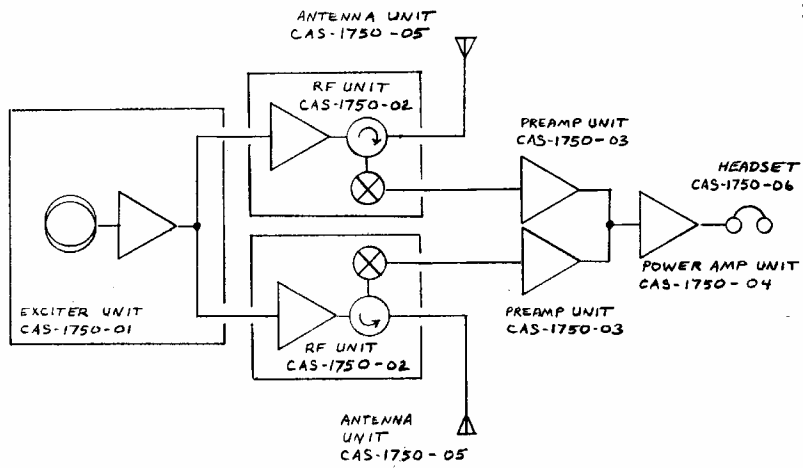
Binaural Doppler Collision Alert System

Project: BiDCAS **PI: Dr. H. Paul Shuch, Chief Engineer, Microcomm (paul@microcomm.net)**

Key Features:

- Self-contained active Radar system tracks non-transponder equipped targets
- Binaural audio user interface through existing pilot's headset
- Audio amplitude indicates pseudo-range
- Audio pitch indicates closing velocity
- Apparent direction of binaural presentation indicates relative bearing to target
- Compatible with Military, Air Carrier, and General Aviation aircraft and spacecraft
- Supplements both see-and-avoid and TCAS



Development History:

- Selected illumination frequency as a function of audio range, closing velocity, and spectrum allocations
- Designed antennas for overlapping 90° beamwidths
- Performed radar cross-section study of GA fleet
- Used RCS and receiver sensitivity data to determine required transmitter power
- Fabricated and flight-tested dual Doppler transceivers
- Presented analog binaural audio to pilot's headset
- Demonstrated threat identification through analog binaural presentation

Partners:

- Experimental Aircraft Association
- AVCO Lycoming
- Eventide Inc.

Schedule Milestone and Deliverables:

1984 (TRL 2)
- Binaural concept discussed at Central States VHF Conference

1985 (TRL 3)
- First breadboard and testing of analog binaural Doppler radar

1986 (TRL 4)
- Circuitry disclosed in Master's Thesis (San Jose State University)
- Breadboard demonstrated to FAA Chief Scientist Dr. Robert Machol

1987 (TRL 5)
- Flight Prototype demonstrated at EAA Oshkosh Fly-in
- Received EAA/Avco Lycoming Safety Achievement Award
- US Patent #4713669 issued

1990 (TRL 6)
- Doctoral Dissertation published (Univ. of California, Berkeley)
- Production evaluation by Eventide Inc.

TRL = 6

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Keywords: General Aviation, Collision Aviodance, TCAS, Radar, Doppler, Binaural, Audio Interface, BiDCAS