PARAMAX
A Unisys Company

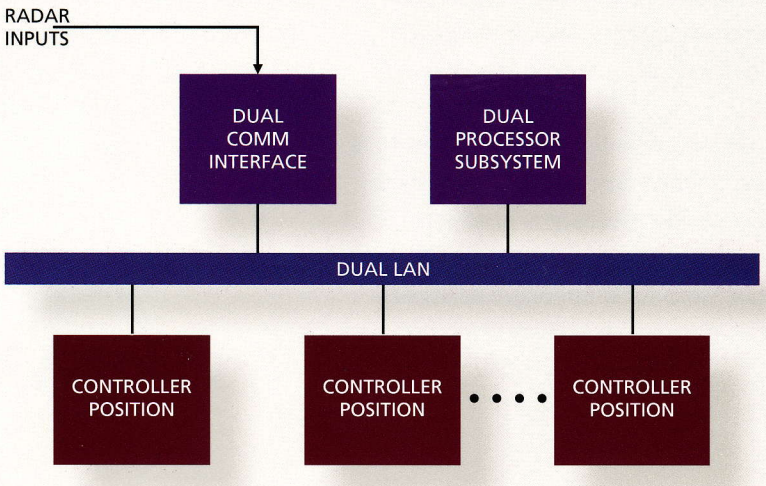
Short Term Conflict Alert

The Paramax Short Term Conflict Alert (STCA) warns air traffic controllers of aircraft under their control that either are, or could be, dangerously close.

Visual and audible alerts provide a safety net against collisions, a backup for currently established controller practices to ensure safe aircraft separation. Specifically, STCA uses radar track data and Paramax-designed and Federal Aviation Administration (FAA) proven algorithms to monitor the current and projected distances between aircraft.

STCA detects aircraft within or approaching close proximity horizontally (typically less than 3 nm) and vertically (typically 300 feet or less). Because STCA can use a very short term look-ahead time – just sufficient to issue a clearance and execute an avoidance maneuver – it achieves a low nuisance alert rate.

STCA System Block Diagram



The computer-human interface attracts the attention of the controller to the alert message. The message itself is designed so that the problem is readily comprehensible to the controller who has to rapidly issue the necessary resolution clearances. STCA provides sufficient warning time for the controller to comprehend the problem, formulate a resolution and issue a clearance, and for the aircraft to execute the maneuver.

STCA allows the air traffic controller to inhibit conflict alert for a specific aircraft pair or for a specific aircraft. Additional entries allow the supervisor to enable or disable the conflict alert function at an entire facility for a specific controller position.

The STCA recording and playback capability permits after-the-fact analyses. Analysis tools process the recorded data and present them in tabular and graphic formats to improve the site parameter settings and to evaluate operational procedures.

The STCA design allows for easy modification of parameters to accommodate changing airspace structure, traffic patterns and operational procedures.

The Paramax STCA applies proven algorithms within exact, short look-ahead times to provide controller alerts for converging aircraft. STCA is also available as a separate package that can be integrated into any existing radar data processor.

System Functions

The STCA capability consists of three basic functions: primary filtering, conflict detection and conflict monitoring.

Primary filtering quickly eliminates from further consideration aircraft pairs that have no chance of being in conflict. Most aircraft are safely separated and pose no threat to each other.

Conflict detection determines which aircraft are in a physical situation where a controller should be warned of actual, potential or probable violation of specified separation minima. The major objectives of the conflict detection function are to detect and predict conflict situations and to alert controllers in sufficient time for evasive actions.

The separation minima and detection logic employed at each ATC facility are driven by the air traffic control environment and are designed to reduce nuisance alerts. The Paramax STCA includes special parameters that are used for conflict lateral separation threshold if the aircraft are classified as "parallel" for aircraft making simultaneous departures and approaches.

Similarly, the Paramax STCA altitude conformance capability ensures that aircraft changing to newly assigned altitudes do not generate false alerts.

Conflict monitoring evaluates the results of the conflict detectors and determines if a controller warning is necessary; it also determines when a previously issued warning is no longer necessary.

And this function inhibits warnings in geographic-inhibit areas, for specified aircraft pairs, for aircraft transponding SSR codes within specific code blocks or to specific controllers.

STCA System Architecture and Features

- Dual communication interface is PC based and supports RS-232 serial data inputs from up to 15 radars
- Dual RISC based processor provides radar processing of up to 350 tracks and 25 violation alerts to provide:
  - System control
  - Data recording and playback
  - Tracking
  - Violation alerts
  - Archiving
  - Target simulation
- Dual redundant LAN
- Controller positions are PC based with a 21" high-resolution monitor (selectable to 27") and configurable up to 20 stations to provide:
  - Radar situation display of tracks and violation alerts
  - Playback control
  - Area status
  - SSR codes
  - Target simulation control.

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