**Research:**

Main goal of air traffic control: Ensure the safe, orderly, and efficient flow of air traffic within controlled airspace and at airports. This includes the prevention of collisions, the optimization of traffic flow and the provision of assistance.

Here is a list of responsibilities of air traffic controllers:

* Providing clearances and instructions to pilots
* Monitoring aircraft movements
* Managing traffic flow
* Providing emergency services
* Communicating with other air traffic control centres
* Maintaining records

Summary of NAV CANADA and what they do:

NAV CANADA is a private, not-for-profit corporation responsible for managing 18 million square kilometers of Canadian civil airspace and the North Atlantic oceanic airspace under Canada's control. Established in 1996, it oversees air traffic through a network of area control centers, air traffic control towers, flight service stations, maintenance centers, flight information centers, and navigation aids across the country.

The organization provides essential services including air traffic control, airport advisory services, weather briefings, flight information, and the development of aeronautical publications and charts. NAV CANADA is recognized internationally for its safety record, service excellence, and technological innovation, investing directly in operations, personnel, and infrastructure to maintain a safe and efficient air navigation system.

With approximately 5,000 employees across the country, NAV CANADA serves around 50,000 customers, including airlines, business aviation, air cargo operators, air charters, air taxis, helicopter operators, and general aviation pilots and owners.

Automation in ATM can be used for various purposes:

* Collection and distribution of flight plan data. [Flight plans](https://skybrary.aero/articles/flight-plan) (as well as any changes or cancellations) are sent to a centralised unit and then distributed to anyone concerned. This is probably the most widespread use.
* Collection and distribution of other aeronautical data (e.g. [NOTAMs](https://skybrary.aero/articles/notice-airmen-notam), [METARs](https://skybrary.aero/index.php/METAR), [SNOWTAMs](https://skybrary.aero/index.php/SNOWTAM), etc.)
* Provision of meteorological data (e.g. [ATIS](https://skybrary.aero/index.php/Automatic_Terminal_Information_Service_(ATIS)))
* Integration of various data on the [situational display](https://skybrary.aero/articles/situation-display) (e.g. [special use areas](https://skybrary.aero/articles/special-use-airspace-sua), weather information) or on [Integrated Tower Working Position (ITWP)](https://skybrary.aero/index.php/Integrated_Tower_Working_Position_(ITWP)) displays
* Imposition of restrictions (e.g. [CTOTs](https://skybrary.aero/index.php/CTOT))
* [Sector configuration](https://skybrary.aero/articles/atm-sector-management) tools (software that helps the [supervisor](https://skybrary.aero/articles/atc-shift-supervisor) choose the most appropriate sector configuration)
* Exchange of current flight plan data (e.g. via [Online Data Interchange (OLDI)](https://skybrary.aero/index.php/Online_Data_Interchange_(OLDI)))
* Automatic [Correlation](https://skybrary.aero/index.php/Correlation) between [tracks](https://skybrary.aero/articles/plots-tracks-and-labels) and flight plan data and warning in case a [correlated track is no longer seen](https://skybrary.aero/articles/lost-track-tool) by [surveillance](https://skybrary.aero/articles/surveillance) systems.
* Communication and [coordination](https://skybrary.aero/articles/coordination-atc) (e.g. [CPDLC](https://skybrary.aero/index.php/Introduction_to_CPDLC_Operations), electronic [inter-sector](https://skybrary.aero/articles/atc-team-coordination) and [inter-unit coordination](https://skybrary.aero/articles/atc-unit-coordination), etc.)
* [Safety nets](https://skybrary.aero/articles/safety-nets) (e.g. [Short Term Conflict Alert (STCA)](https://skybrary.aero/index.php/Short_Term_Conflict_Alert_(STCA)), [Minimum Safe Altitude Warning (MSAW)](https://skybrary.aero/index.php/Minimum_Safe_Altitude_Warning_(MSAW)), [APW](https://skybrary.aero/index.php/Area_Proximity_Warning)) that activate autonomously and warn the controllers of imminent safety hazards.
* Clearance verification tools (e.g. [Tactical Controller Tool (TCT)](https://skybrary.aero/index.php/Tactical_Controller_Tool_(TCT)))
* [Conflict detection](https://skybrary.aero/articles/conflict-detection) tools (e.g. [Medium Term Conflict Detection (MTCD)](https://skybrary.aero/index.php/Medium_Term_Conflict_Detection_(MTCD)))
* Various reminder and verification tools, e.g.:
  + automated checks whether the planned exit level meets the restrictions, stated in a [letter of agreement](https://skybrary.aero/articles/letters-agreement-between-ats-units) or a local procedure;
  + highlighting "special" flights (squawking 7X00, non-RVSM flights in [RVSM](https://skybrary.aero/index.php/Reduced_Vertical_Separation_Minima_(RVSM)) airspace, [formations](https://skybrary.aero/articles/formation-flights), VIP flights, etc.);
  + pointing out [double SSR codes](https://skybrary.aero/articles/duplicated-ssr-code).

**Design Choices based on the analogy of air traffic control**

1. For our AI Tetris model, we decided that it would suggest a move, and the player would have to decide on whether they will accept the AI's move or refuse it and make their own. In the context of air traffic control, it would be the equivalent of the responsibilities of an air traffic controller. Automated solutions are deployed and help air traffic controllers with their decision making, but the air traffic controller still has the final say. We based our design on this key detail to make our Tetris AI model as realistic to the air traffic control analogy as possible.
2. Our Tetris AI takes a safety-first approach when suggesting moves to the player. Instead of aiming for the riskiest, highest-scoring plays, it prioritizes consistent and secure decisions that ensure the survival of the player in the game. This design choice mirrors one of the core objectives of air traffic control: balancing safety with efficiency. In air traffic control, safety is paramount, but efficiency also plays a critical role in managing airspace. For our AI, we deliberately chose to prioritize safety—just as air traffic control would in critical situations—over efficiency, even if it means forgoing higher scores in favor of keeping the game under control.
3. We made the design choice to have the AI be programmed to only start searching for the best move when a piece enters the field of play. This means that there will be moments in the game when the Tetris AI simply won’t have enough time to suggest a move. This is when the human’s awareness and decision-making skills take center stage. It is similar to the way air traffic controllers must rely on their expertise to make critical decisions during emergencies, system failures, or when bad weather disrupts flight patterns.