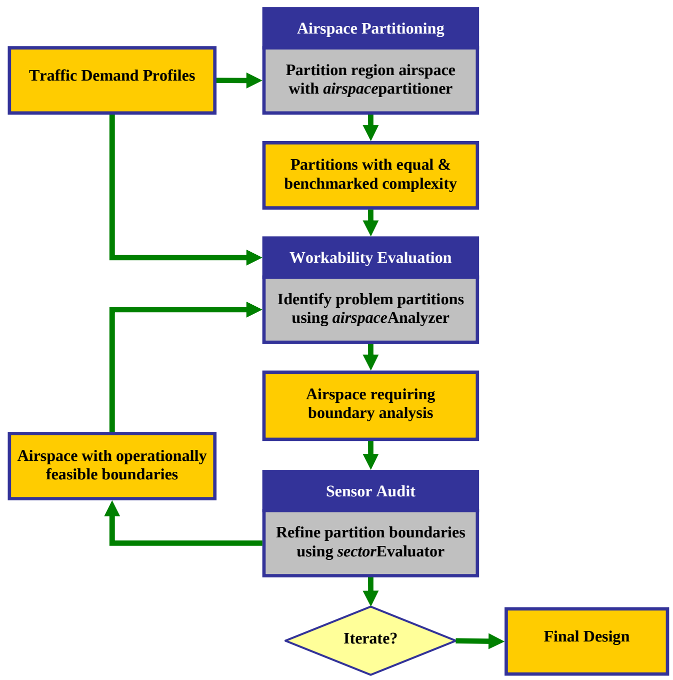
*airspace*Toolsuite

Airspace design is the process of creating sector boundaries and routes to support the safe and expeditious flow of aircraft. This job has historically been performed by air traffic controllers acting as local airspace experts who identify problems, consider options, and propose solutions multiple times to refine the design. This is a mixture of art and science that has worked well in the past, however it requires significant time and staffing resources. Also, due to the interconnectedness of the national airspace system, controller solutions to local problems may have unintended effects elsewhere in the system.

To make the task of airspace redesign more efficient and able to prevent unintended effects, the Federal Aviation Administration (FAA) and The MITRE Corporation's Center for Advanced Aviation System Development (MITRE/CAASD), has developed the *airspace*Toolsuite. This set of tools includes three core capabilities: *airspace*Partitioner, *airspace*Analyzer, and the *sector*Evaluator; and provides visualization and automated analytical support to airspace designers within an integrated three step process.

The first step in the process defines the airspace environment to be redesigned and partitions it into regions of equal complexity. The airspace environment is defined by traffic profiles; the communications, navigation, and surveillance environment; automation support; and Air Traffic Management resources available in the study region. MITRE/CAASD calls upon its extensive demand forecasting and flight trajectory modeling capabilities to develop airspace demand profiles for any number of different conditions or assumptions. Then, MITRE/CAASD's *airspace*Partitioner creates a map of geographically distributed traffic complexity (based on a specific set of metrics) for the study region and divides the airspace into areas of equal complexity. The desired amount of complexity for each partition is adjustable and can be benchmarked against one, two, or three person sectors.

In the second step, the *airspace*Analyzer, a fast-time, simulation model, identifies unmanageable airspace regions requiring further boundary analyses. The *airspace*Analyzer mimics air traffic control (ATC) by providing aircraft-to-aircraft and aircraft-to-airspace separation, and adherence to traffic flow management (TFM) and other procedural restrictions. Wherever *airspace*Analyzer is unable to perform these tasks efficiently, the airspace design must be remediated.



The final step in the design process utilizes the *sector*Evaluator. This tool uses a knowledge database of design best practices captured from human airspace designers to recommend solutions to the problems identified in step three. For example, *sector*Evaluator may suggest relocating a sector boundary to minimize point-outs or reduce excessive scanning.

Using objective, repeatable, and transparent methods, the *airspace*Toolsuite facilitates a more efficient airspace design process.

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