Federal Aviation Regulation (FAR) Part 71.12: "The terminal control areas listed in Subpart K of this part consist of controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in Part 91 of this chapter. Each such location is designated as a Group I or Group II terminal control area [TCA], and includes at least one primary airport around which the terminal control area is located."

New terminal control areas rapidly being established around the country. Pilots puzzled by some intricate navigation problems involved. FAA publishes 'questions and answers' on new system

Complexities Of TCA

AN AOPA PILOT SPECIAL REPORT

With those slightly more than 70 words, FAA officials have embarked on a course that will drastically alter future movements of the overwhelming majority of all aircraft in the United States. Those most directly affected are general aviation flights. Thousands of daily flights already are being affected, and have been since June 25, when the first TCA was established and went into operation at Atlanta [April PILOT, page 32; June PILOT, page 9].

TCAs also have been established for Chicago and Washington, D.C. New flight rules and restrictions associated with terminal control areas originally were scheduled to go into effect at these locations on July 23. After strong protests by AOPA over the inadequate time allowed pilots to become familiar with what is entailed in operating in the new TCAs, FAA officials delayed implementation of the Chicago and Washington, D.C., terminal control areas until August 20.

As of press time, a formal Notice of Proposed Rule Making (NPRM) also had been published by FAA, outlining a proposed TCA for Dallas. Following normal administrative practices, the FAA did not include any word in the NPRM as to when that TCA would go into effect and start governing flights in the Dallas area.

Current and planned new terminal control areas will have a continually increasing impact, not only on flights at the primary airports located within the TCAs, but also on all flights at the several dozen satellite fields near them.

In the immediate future, TCAs similar to those now governing flights at Atlanta, and to go into effect at Chicago and Washington, D.C., August 20, will be established at a total of 24 major public airports in 23 of the country's largest cities. Conspicuously missing from the most recent FAA pronouncements on the TCA program has been any mention of an initial FAA plan to establish TCAs at an additional 97 medium-sized cities.

The bulk of general aviation's 135,000-plus fleet is, of necessity, based in or near, and operates into and out of, the major urban areas. Ultimate effect of the new TCAs on air transportation, both general aviation and airline travel, is unknown, of course. Advance assessments by AOPA officials and members, as well as by other pilots and pilot groups, are that the TCA program is ill-advised, to put it mildly, and should be either modified extensively or abandoned altogether.

These critics have contended that the TCA program, as devised by FAA officials, is basically unsafe in some respects and is geared toward providing increased Federal regulatory and economic protection for airline corporations, at the expense of growing demands for the private air transportation that is offered by general aviation.

Some have charged, privately if not publicly, that the TCA program is little more than an extension of continuing attempts by certain segments within FAA to give the airline corporations and their big jets near-exclusive use of most major public airports.

Opponents have contended that more workable, more safe, and less-damaging-to-general-aviation proposals have been offered to, but arbitrarily rejected by, FAA. Most frequently mentioned alternate proposal has been the "safety climb and descent corridors" concept, which was jointly developed and proposed by AOPA and the Air Line Pilots Association (ALPA) [November 1969 PILOT, page 33]. The AOPA-ALPA proposal received strong backing and endorsement from numerous nongovernment groups as well as from the Professional Air Traffic Controllers Organization (PATCO).

On the other hand, FAA officials, whose support for the TCA to date significantly has been almost totally limited to airline officials and their trade group, the Air Transport Association (ATA), have claimed the TCAs will "enhance safety" and help provide "an efficient flow of air traffic."

Though far from being swayed by FAA arguments that the TCA program in its present form is either safe, necessary, or workable, AOPA officials are urging all members and other pilots to become thoroughly familiar with the restrictions and flight requirements associated with the new terminal control areas.

In line with this urging, AOPA called attention to a new FAA Advisory Circular (AC 91-30) that outlines general flight requirements for operating within the new TCAs and presents FAA responses to a list of questions reportedly most asked by pilots about the new program.

Ironically, AC 91-30 requires almost nine full pages of tightly packed words to "explain" the TCA concept and answer pilot questions. One of the major gripes to date by pilots is that the varying airspace configurations for each TCA, as well as the multitude of new operating instructions, are so complex and involved that most pilots will have difficulty in understanding them.

Of interest to pilots and aircraft owners is a statement in AC 91-30 that says: "The TCA program will be closely monitored at each location. Further refinements and changes will be made as operational experience reveals the need for such changes. *Pilot comments and suggestions in this regard are solicited.*" [Emphasis added.—Ed.]

This statement added still another

note of irony to implementation of the TCA program, inasmuch as FAA initially received more than 1,800 written comments from pilots and other users, plus hundreds of additional verbal recommendations during a series of 22 hearings around the country. Practically all the comments asked the FAA not to do what it now has gone ahead and done.

A chart accompanies this article, showing the first Group I and Group II TCAs and general flight requirements. ATC procedures also are included. The chart is based on information and wording in AC 91-30.

Of possible passing interest is the fact that FAA currently is placing a "tentative location" label on each of those TCAs designated as Group II terminal control areas. A recent FAA press release on the list of Group II TCAs ambiguously stated, "This list is tentative, however, and could be changed in the light of future developments."

AC 91-30 includes 21 questions that the FAA said were among those most frequently asked about the TCA program. Some of the questions, along with appropriate excerpts from FAA's answers follow:

Why are TCAs being established? "To reduce the risk of midair collisions between aircraft operating in accordance with an ATC clearance and other aircraft operating within the same airspace without the knowledge of the air traffic controller. In addition to this safety factor, the requirement for all aircraft to be in communication with ATC prior to entering the TCA will provide for a more effective and orderly flow of traffic to and from those airports which serve the greatest number of people."

What impact will TCA have on the airspace user? "Any program designed to bring a higher order of regulation and control within the random flying VFR environment will result in some impact, not only on the airspace users but on the air traffic control system. . . . *If the requirements of the system should pre-*

Terminal Control Areas

(Source: FAA Advisory Circular)

Group I TCAs

Atlanta (effective 6/25/70)
Washington, D.C. (effective 8/20/70)
Chicago (effective 8/20/70)
Boston
Dallas
New York City (JFK and LaGuardia)
Los Angeles
Miami
San Francisco

Group II TCAs

Cincinnati
Cleveland
Denver
Detroit
Houston
Kansas City
Las Vegas
Minneapolis
Newark
New Orleans
Philadelphia
Pittsburgh
Seattle
St. Louis

Operating Rules and Pilot/Equipment Requirements

Regardless of weather conditions, an ATC authorization is required prior to operating within all TCAs. Pilots cannot request such clearances unless the requirements of FAR 91 are met. Included among these requirements are:

a. Two-way radio capable of communicating with ATC on appropriate frequencies.

b. A VOR or TACAN receiver. This is not required for helicopters.

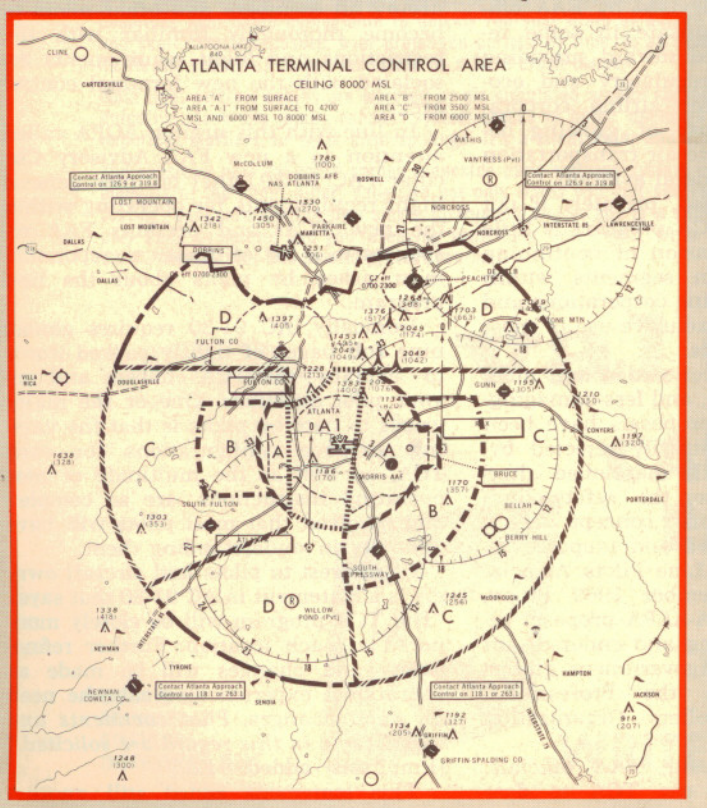
c. An appropriate transponder beacon. This is not required for helicopters, or for IFR flights at airports other than the primary airport. Additionally, this is not required for VFR flights at Group II locations.

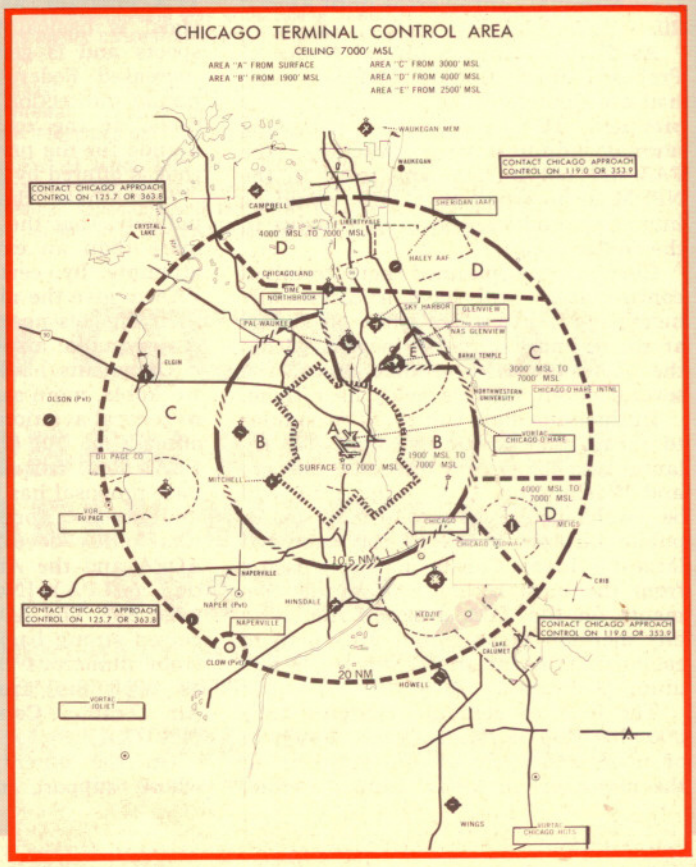
d. Private pilot certificate or better in order to operate at the primary airport. This is not required at Group II airports.

e. Unless otherwise authorized by ATC, large turbine-powered aircraft must operate at or above the floor of the TCA, while operating to or from the primary airport.

Additionally, there is a 200-knot speed limit for aircraft operating beneath the floors of the TCA and within any VFR corridors.

Atlanta's TCA configuration, considered by FAA to be the least complicated of all such TCAs now being established, has a "VFR corridor" that runs through Area A-1 between 4,200 and 6,000 feet m.s.l.





Chicago's TCA, which goes into effect August 20, does not have a "VFR corridor" for aircraft desiring to transit the area without landing at or departing from Chicago O'Hare International, the primary airport.

vent the present controller force from handling as much traffic as it did before TCA becomes operational, then the [a?] *reduction in capacity must be made for reasons of safety."* [Emphasis added.—Ed.]

Will IFR operations be afforded priority over VFR traffic within the TCA environment? "No. Air traffic control service will continue to be provided on a 'first-come-first-served' basis as circumstances permit."

Will TCA rules and airspace apply during instrument conditions? "The TCA rules and airspace are effective at all times, regardless of weather. It is true that TCA is not needed when VFR operations are suspended due to weather; however, it would not be operationally feasible to turn TCA 'on and off' during varying weather conditions."

Why isn't the size and shape of the TCA a standard design? "The TCA was purposely designed to provide as much free airspace as possible for satellite airport operations and for VFR transiting traffic. This individual 'tailoring' has necessarily resulted in a more complex configuration than a standard or uniform design."

Why didn't the FAA adopt the climb and descent corridor concept proposed by numerous people and organizations as an alternate to TCA? "The revised TCA concept incorporates many features of the corridor concept and provides additional vectoring airspace for maneuvering aircraft. Thus, the TCA configuration is essentially a 'corridor-cake' representing a reasonable compromise between a pure corridor design and the so-called wedding cake design."

[AOPA, which, along with the Air Line Pilots Association (ALPA), proposed the climb and descent corridor concept, said it does not agree with the preceding FAA evaluation of the final TCA product. "The TCA concept," AOPA said, "does not recognize an important and fundamental requirement that was clearly expressed in the 'Beacon Report' [earlier government-industry report]. This is the principle of segregation of aircraft by capability, which 'is the best means of attaining and maintaining adequate safety separation and efficient sequencing, thus permitting the maximum airspace.'

"The report," continued AOPA, "goes on to say, 'It is evident, therefore, that the establishment of an off-airway structure of approach and departure corridors to cruise altitudes is necessary in order to provide aircraft segregation, according to capability.' It is notable that this principle is *endorsed* by *all* airspace users but is *not* recognized by the FAA in the TCA concept."—Ed.]

Do the rules governing operation within control zones and transition areas apply within a TCA environment? "Yes. It is important to understand that designation of TCA does not negate the need for other controlled airspace. There is a common misconception that airspace beneath the floors of a TCA and within VFR corridors is uncontrolled airspace, wherein VFR operations can be conducted clear of clouds and with one-mile flight visibility. This is not the case, since portions of these excluded areas are within control zones and transition areas."

What is the purpose of the VFR corridors which are provided at some locations, and how are they to be used? "VFR corridors are free airspace, which has been excluded from the TCA so that VFR aircraft may overfly the airport . . . without contacting ATC or having to meet the transponder requirement. Except for large turbine-powered aircraft, the corridor airspace can be used by any aircraft (IFR or VFR) provided the 200-knot speed limit is not exceeded.

"While in the corridor, VFR aircraft operating more than 3,000 feet above the surface must fly at the appropriate VFR altitude for direction of flight being flown. Where possible, the VFR corridor will be defined by VOR radials overlying prominent visual landmarks. It will be up to each pilot to determine whether he can navigate through the corridor and remain clear of the TCA."

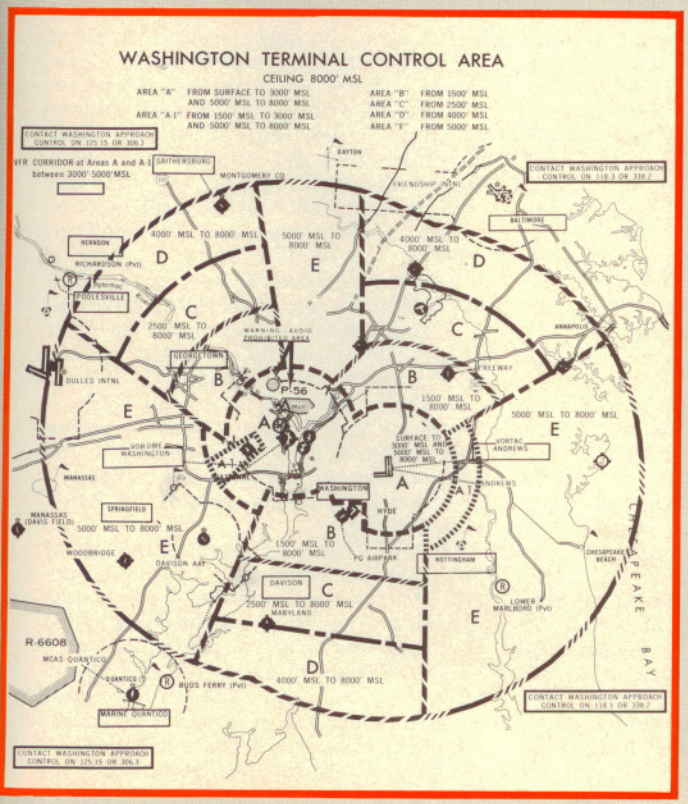
What will be the vertical limits of the VFR corridor? "This will vary depending upon individual requirements. Normally, the corridor vertical limits will be described as being between 3,000 and 5,000 feet. This will permit VFR transit at 3,500 and 4,500, depending on direction

Flight Procedures

a. IFR flights—Aircraft operating within the TCA will be operated in accordance with current IFR procedures, except that pilots of large (over 12,500 pounds) turbine-powered aircraft should operate at or above the designated TCA floors while arriving/departing the primary airport. Such aircraft will also avoid the VFR corridor, where established [Washington, D.C., and Atlanta] for uncontrolled operations to transit the TCA.

b. VFR flights—(1) Arriving aircraft should contact ATC on specified frequencies and at geographical fixes shown on local charts [VFR Terminal Area Charts—Ed.] for sequencing and spacing purposes. (2) Departing aircraft are requested to advise the ground controller of the intended altitude and route of flight to be used in departing the TCA. (3) Aircraft not landing/departing the primary airport (i.e., the airport for which TCA is designated) may obtain an ATC clearance to transit the TCA, when traffic conditions permit, provided the requirements of FAR 91 are met [transponder and private pilot certificate or better for Group I TCAs—Ed.].

Washington, D.C.'s TCA has two primary airports, Washington National and Andrews AFB. States FAA: "The VFR corridor has been established so that VFR aircraft operating at 3,500 or 4,500 feet m.s.l. may proceed below an 'E' area through the 'A' area and below another 'E' area, without contacting approach control or having to meet the transponder requirement."



ATC Procedures

All aircraft will be controlled and separated by ATC, while operating within Group I TCAs. Large turbine-powered aircraft will be separated from all other aircraft within Group II TCAs. (Other aircraft operating within Group II TCAs will be provided normal IFR or VFR radar service.) Although radar separation will be the primary separation standard used, approved visual separation and other non-radar procedures will be applied as required or deemed appropriate.

Traffic information on observed, but unidentified, radar targets will be provided on a workload-permitting basis to aircraft operating outside of the TCAs.

Initially, this additional service will be provided within TCAs on a traffic-permitting basis, because of the likelihood of unintentional violations.

Assignment of radar headings and/or altitudes by ATC is based on the provision that a pilot operating VFR is expected to advise ATC if compliance with an assigned route, radar heading, or altitude will cause him to violate standard visual flight rules, such as avoidance of clouds. □

of flight. The important thing to understand here is that large turbine-powered aircraft may cross the corridor, in the above example, at 3,000 or below and at 5,000 or above. VFR corridor traffic must be above 3,000 and below 5,000." [Horizontal width of the only VFR corridor now in existence—the one at Atlanta—measures roughly four miles at the narrowest point and about five miles at the widest point.—Ed.]

Will VFR corridors be provided at all locations? "No. Although every effort will be made to provide these corridors, there are some locations, such as Chicago O'Hare, where this is not operationally feasible because of the many instrument approach procedures. A corridor through the busy O'Hare control zone would not only result in an unacceptable loss in system capacity but would require extensive changes to approved parallel approach procedures." [AOPA and some others have disagreed with FAA's assertion that it is not feasible to have a VFR corridor within the Chicago TCA.—Ed.]

If the TCA is avoided, is the pilot assured of protection from aircraft operating to and from the primary airport in the TCA? "No. Primary airport traffic may also be operating outside of the TCA. Large turbine-powered aircraft will be required to operate above the floors of the TCA, but such aircraft may be above the ceiling prior to entering or departing the lateral limits. In short, you will be protected from large turbine-powered aircraft, operating to or from the primary airport, if you are above the established floors, or within the designated VFR corridors. If you are above the TCA, or outside the lateral limits, the situation will be the same as it is today."

What happens if a VFR pilot receives a clearance to transit the TCA, then finds he cannot comply with the clearance due to a cloud condition? "It is the pilot's responsibility to remain VFR in these circumstances and notify ATC immediately, so an alternate clearance can be issued."

Will clearances through the TCA be issued pilots if they are not landing at the primary airport? "Yes, such clearances will be issued *on a traffic-permitting basis,* if your aircraft meets the equipment requirements of FAR 91. It would be misleading, however, to imply that such clearances will always be issued, particularly during peak traffic conditions." [Emphasis added.—Ed.]

Despite the preceding assurances from FAA headquarters that clearances to transit the TCAs will be issued "on a traffic-permitting basis," AOPA officials have been told by some controllers in authority at various local ATC facilities that such clearances will not be issued.

Based on information given AOPA officials, some local ATC facilities, using the "on a traffic-permitting basis," plan to institute an arbitrary local policy of not issuing such clearances, if the aircraft are not using the primary airport. Such arbitrary local policies would have the practical effect of saying, "If you're not using the primary airport, use the VFR corridor (if one is available) or stay outside of the TCA." □

The Lead Content Of Avgas

AOPA survey determines that metal additive in grade 100/130 varies widely in different parts of the country. Shell announces a 50% reduction in lead for this grade of aviation fuel

■■ Colloquially, "get the lead out" means "get going." To general aviation, however, it has a more important *literal* message: Get the lead content out of grade 100/130 aviation gasoline, or at least reduce it to manageable levels where it does not speed up the fouled-plug process and attendant engine problems.

A firm response has now been made by at least one major oil company to the literal message. It is being forecast that similar responses by other companies will soon follow.

Accelerated action to reduce lead content in aviation gasolines is traceable to a June 1967 PILOT article entitled "How Good Is Aviation Gasoline?" The article precipitated calls for AOPA to obtain and publish, by brand names, test information on the lead content of today's aviation gasolines.

Accordingly, a survey of the quality of aviation gasoline in different parts of the United States was recently undertaken for The PILOT. That survey, along with laboratory tests to analyze lead contents in various grade 100/130 gasolines, has now been completed, and the findings are contained in this article.

Before relating these test results, it should be noted that Shell Oil Company is the oil producer referred to above as the firm that is now responding to the literal essence of "get the lead out." A few days ago, in late July, the company officially announced it had achieved an almost 50% reduction in the lead content added to the grade 100/130 avgas—now called "The Avgas"—it will be supplying through its hundreds of outlets.

The company's action conceivably could signal a reversal in past trends, where low-lead avgas has not received a very prominent position on some oil companies' things-to-do list. Shell officials announced their new low-lead avgas would be available at all the company's outlets in August.

Coincidentally, Shell's announcement closely followed completion of AOPA's unpublicized nationwide sampling and testing program to gauge the levels of lead content in avgas supplied by major producers. Shell's project, designed to lower the lead content of 100/130, was initiated in 1965.

AOPA's survey involved physically collecting and testing grade 100/130 samples from every major avgas supplier at 20 different locations across the country. The surveyed areas crisscrossed the nation from Miami to Seattle, Wash., and from New York to El Paso, Tex.

To properly appreciate any specific figures, however, it is first necessary to understand what bearing the lead content in avgas has on aircraft operations and the degree of seriousness of lead deposit buildups caused by that lead content. Understandable explanations on both these factors were provided in the June 1967 PILOT article, which spotlighted the lead-content problem.

Lead content in avgas is an extremely important element in engine performance and maintenance, the June 1967 article pointed out.

"Lead is the main contributor to combustion chamber deposits and spark plug fouling. It is added to the fuel in the form of tetraethyl lead (TEL) to give antiknock quality because it is the lowest-cost means for obtaining 'octane numbers.'

TEL consists of 64% lead and 36% carbon and hydrogen and has a boiling point of 388°F, at which temperature it decomposes.

"If one removed the metallic lead from four gallons of grade 100/130 fuel of maximum lead content, it would be sufficient to make a one-ounce lead sinker."

The 1967 PILOT article brought suggestions that AOPA publish test information on the quality of aviation gasolines, giving the specific company brand names so that gasoline suppliers might have an incentive to produce gasolines of the highest quality. It was revealed at that time that the lead content added to grade 100/130 avgas varied threefold—from 1.4 milliliters (ml) TEL to 4.4 ml TEL—among the different producers, and that, overall, the amount of lead content was steadily being increased.

The current overall average, according to AOPA's recent sampling program, is 3.26 milliliters of tetraethyl lead per gallon. Maximum being added by any of the major oil companies is 3.9 ml and the minimum is 2.0 ml. Significantly, the minimum 2.0 ml sampling was obtained from a Shell outlet in the Los Angeles area, where the company's new low-lead avgas already is being supplied.

One year ago, based on a Bureau of Mines survey sponsored by the American Petroleum Institute (API), the overall average lead content being added to avgas was 3.39 ml per gallon, with a high of 3.95 ml and a low of 1.40 ml. In 1964, less than 15% of all grade 100/130 fuels being provided by major suppliers had a lead content below 3.0 ml TEL, a level established earlier as an