Testimony of

Edward Kragh, Certified Professional Controller

Adjunct to FAA NY VFR Airspace Task Force

National Air Traffic Controllers Association

Before the House Transportation and Infrastructure Committee

Subcommittee on Aviation

Wednesday, September 17, 2009

Hudson River Airspace and Management of Uncontrolled Airspace Corridors

National Air Traffic Controllers Association
The National Air Traffic Controllers Association (NATCA) is the exclusive representative of more than 15,000 air traffic controllers serving the Federal Aviation Administration (FAA), the Department of Defense and the private sector. In addition, NATCA represents approximately 1,200 FAA engineers, 600 traffic management coordinators, 500 aircraft certification professionals, agency operational support staff, regional personnel from FAA logistics, budget, finance and computer specialist divisions, and agency occupational health specialists, nurses and medical program specialists. NATCA's mission is to preserve, promote and improve the safety of air travel within the United States, and to serve as an advocate for air traffic controllers and other aviation safety professionals. NATCA has a long history of working together with the NTSB, other government agencies and aviation industry experts to make the National Airspace System (NAS) the safest in the world.

August 8, 2009: Aftermath
On August 8, 2009, a Eurocopter AS350 helicopter collided with a Piper PA-32R over the Hudson River. Nine people died in the collision. This accident and loss of life has caused many aviation safety experts, including NATCA, to examine the circumstances surrounding the incident and search for ways to prevent the situation from repeating itself in the future. To this end, NATCA was an active participant in the New York Airspace Task Force which was chartered by the FAA in response to this incident in order to recommend safety enhancements for the affected airspace.

The incident occurred under a particular set of aviation rules and procedures; both aircraft were operating under Visual Flight Rules (VFR) in the Class B Exclusion Corridor, and the incident occurred in the midst of a handoff between air traffic control facilities. Although we believe that procedures were properly adhered to, the incident forces us to examine the procedures themselves so that we may prevent future incidents of this type. As an organization that prides itself on its air traffic control expertise, NATCA has examined and will testify about several aspects of aviation operations and procedures in effect at the time of the incident.

Visual Flight Rules: See and Avoid
Both the aircraft involved in the August 8 incident were operating under Visual Flight Rules (VFR).

VFR rules are a set of specifications governing the operation of aircraft under clear meteorological conditions. The basic premise of VFR is that pilots maintain a safe distance from terrain and other aircraft using a simple "see-and-avoid" standard.

> Conduct of VFR Flight: In the conduct of VFR flight, the prevention of collisions (safe separation from other aircraft) is solely the responsibility of the pilot-in-command (PIC) to see and avoid.[1]

[1] FAA Order 8900.1 Flight Standards Information Management System Volume IV: Aircraft Equipment on Operational Authorization, Chapter 1 Air Navigation Communication and Surveillance

A pilot choosing to operate under VFR has a variety of tools at his disposal to assist him in maintaining situational awareness. Perhaps the most important of those tools is the Common Traffic Advisory Frequency (CTAF). Using CTAF, pilots communicate via two-way radio to announce their position and intentions to other pilots in order avoid conflict.

Air Traffic Control flight following can be another tool for VFR pilots. While the onus of separation remains on the pilot, an Air Traffic Controller can help the pilot to see and avoid (See section on flight following for more information). In congested VFR airspace like the Hudson River corridor, communication over CTAF is considered preferable to communication with air traffic control. The high volume of VFR traffic combined with the unreliability of Radar coverage in the area makes CTAF the more effective option.

Seeing and Avoiding: August 8, 2009

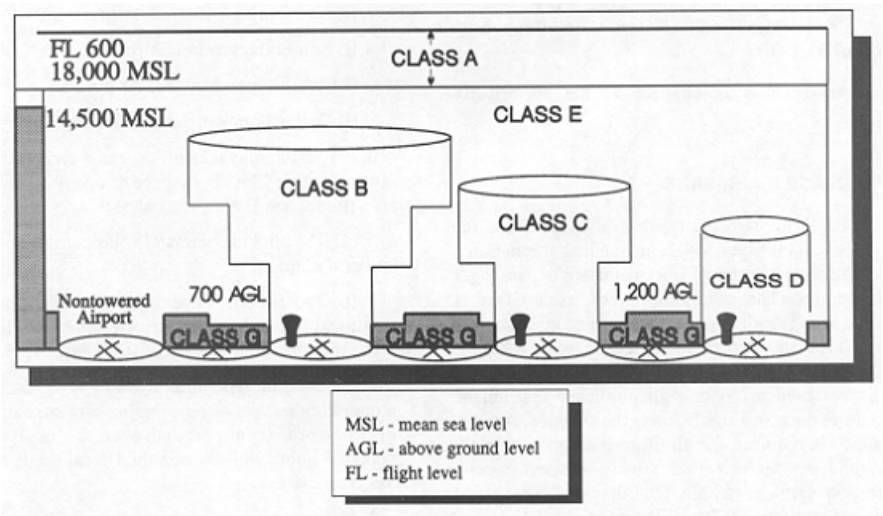
The incident on August 8 was an example of one of the most common types of VFR incidents: a high-wing, low-wing collision. A Piper 32A has a low-wing design; the wings are positioned low relative to the fuselage, making it difficult for the pilot to see aircraft flying at a lower altitude. Conversely, helicopter rotors are positioned above the fuselage, making it more difficult for the pilot to see aircraft flying above. Therefore, if a helicopter flies below a Piper and ascends; each aircraft may be in the other's blind spot.

This situation was a tragic illustration of the limitations of see-and-avoid separation. Simply put, if pilots are unable to see approaching aircraft it is extremely difficult to avoid them. Tools like CTAF can save lives in these cases; they can make a pilot aware of hazards outside of his immediate ability to see. In congested corridors like the one in which the incident occurred pilots should be particularly cognizant of the availability of CTAF and be required to monitor that frequency and broadcast their position and intentions.

Airspace Classes

As previously stated, both of the aircraft involved were operating under VFR, but the specific procedures governing proper utilization of VFR are not fixed. They vary depending on the class of airspace in which the aircraft is operating. The FAA breaks the National Airspace System (NAS) into different classes of airspace; Classes A, B, C, D, and E are all designations of controlled airspace, and Class G is uncontrolled (Class F does not exist in domestic airspace). These classes of airspace differ in the rules that govern them, the obligations of air traffic controllers, the responsibility of pilots, and the flexibility of aircraft operation.

Figure I[2]



The most stringent rules apply to class A, the airspace typically designated from 18,000 ft above Mean Sea Level (MSL) to Flight Level 600. All aircraft operating in Class A airspace must utilize Instrument Flight Rules (IFR); pilots must be equipped and trained to rely on their instruments for navigational purposes. It is the responsibility of air traffic controllers to maintain separation between aircraft in Class A airspace.

The next most stringent class is Class B, which typically surrounds the nation's largest airports. The main purpose of class B airspace is to protect the area around a major airport so that larger passenger aircraft can operate safely. As such, aircraft in Class B airspace are permitted to use VFR in clear meteorological conditions, but it remains the controller's responsibility to ensure separation according to FAA regulations. No aircraft is permitted to enter Class B airspace without first receiving a clearance from air traffic control. Once inside, pilots are required to closely follow air traffic control instructions.

In airspace classes C, D and E, air traffic controllers are responsible for maintaining separation between IFR aircraft, but VFR aircraft are allowed to freely travel through the airspace without receiving clearances from air traffic control. In these cases, it is the VFR pilots' responsibility to maintain separation by utilizing the see-and-avoid method that is standard for VFR.

Class G, or uncontrolled airspace, operates entirely according to VFR standards. Air traffic controllers do not have jurisdiction over aircraft operating in class G airspace, and the burden of separation is entirely on the pilots. Pilots flying in Class G airspace are urged to monitor and broadcast their position over CTAF in order to effectively coordinate use of airspace and uncontrolled runways.

Class B Exclusion Areas:
Class B airspace is designed to protect large passenger aircraft in the areas surrounding major airports by providing positive air traffic control separation. However, many of these areas also

[2] Federal Aviation Administration *Aeronautical Information Manual: Official Guide to Basic Flight Information and ATC Procedures* 2008 (with changes for 2009). Figure 3-2-1

have a high volume of VFR traffic. As a result, VFR aircraft would have had to fly all the way around this class B airspace, as it would be difficult for an air traffic controller to safely handle such a high volume of VFR traffic in addition to the IFR traffic that is their first duty priority without imposing restrictions on the flow of traffic.

Rather than require these VFR users to travel all the way around the Class B airspace, The FAA implemented an alternative in several metropolitan areas including New York, Los Angeles and San Diego. In these areas there is a small corridor carved out of the Class B airspace where VFR aircraft are permitted to fly without communicating with Air Traffic Control. These corridors are considered Class G or uncontrolled airspace. VFR pilots who wish to coordinate with air traffic control may still request permission to enter Class B airspace.

The Aeronautical Information Manual (AIM) advises pilots in these corridors as follows: "Pilots operating in VFR corridors are urged to use [the CTAF frequency] for the exchange of aircraft position information." Pilots are therefore expected to communicate and coordinate with other pilots in order to maintain self-separation. Pilots monitoring that frequency are not in contact with air traffic control and therefore do not receive flight following services.

Flight Following

VFR pilots who are operating in controlled airspace may request flight following service. According to the Air Traffic Control Order JO 7110.65S, the manual for all air traffic control operations and procedures, Radar Flight Following is defined as follows:

> RADAR FLIGHT FOLLOWING- The observation of the progress of radar identified aircraft, whose primary navigation is being provided by the pilot, wherein the controller retains and correlates the aircraft identity with the appropriate target or target symbol displayed on the radar scope.

An aircraft operating under Visual Flight Rules (VFR) appears on a controller's radar scope with minimal information. Essentially, the controller knows only that there is a VFR aircraft present and its altitude (if the aircraft is properly equipped). He does not know aircraft type, call sign, or flight plan. When a pilot requests flight following, the pilot provides that additional information to the controller, who then enters the flight data. The controller has his computer automatically generate an identifier, which he instructs the pilot to enter into his transponder – enabling a data block to appear on the scope with all of the relevant information. This simple tracking assists in the event that search and rescue services are needed.

If a pilot operating in Airspace Classes C, D or E requests flight following the controller will provide basic radar service to the VFR pilot, workload permitting. According to the JO7110.65S

> Basic radar services for VFR aircraft shall include:
> 1. Safety Alerts
> 2. Traffic Advisories
> 3. Limited radar vectoring when requested by the pilot.

4. Sequencing at locations where procedures have been established for this purpose and/or when covered by a LOA [letter of agreement].

These services can only be performed if the pilot continues to monitor the appropriate air traffic control frequency. Under these circumstances, the controller does not assume responsibility for ensuring separation, nor does he give instructions to the pilot. He simply acts as an "eye in the sky" providing surveillance and advisories, workload permitting. It remains the pilot's responsibility to maintain separation under VFR. A controller's first duty priority is to the aircraft receiving full radar service. A controller must only provide flight following service to VFR pilots if his workload permits

Flight following in Class B is markedly different from that in other airspace classes. An air traffic control clearance is required to enter and operate within Class B airspace. Therefore, when a pilot requests flight following from a controller responsible for Class B airspace, it is understood that they are requesting permission to enter the airspace, and that, if granted, they will be provided with full radar service until they leave that airspace. The controller will only grant the clearance to enter the Class B airspace if his workload permits.

ATC Service for VFR Aircraft: Teterboro (TEB)

An aircraft departing TEB flies through Class D airspace. The AIM describes the procedural requirements for aircraft departing an airport with an operating control tower in Class D airspace as follows:

> Two-way radio communications must be established and maintained with the control tower, and thereafter as instructed by ATC while operating in the Class D airspace.

The AIM goes on to say that "No separation services are provided to VFR aircraft," although a pilot may request flight following services.

Because TEB is located in such close proximity to the larger New York Area Airports that service passenger airlines, the Class D airspace is located immediately adjacent to Class B airspace controlled by Newark (EWR) and the Class B Exclusion Corridor along the Hudson River. An aircraft departing from TEB and heading in the direction of the Hudson River therefore has the option of entering uncontrolled airspace, or requesting to enter Class B. Controllers at TEB do not have the authority to climb VFR aircraft into the EWR Class B airspace, only EWR controllers can give them such permission. Therefore, the transition into Class B airspace requires a handoff of control from TEB to EWR.

ATC Service for VFR Aircraft: Newark (EWR)

If a pilot leaving TEB airspace wishes to remain in communication with air traffic control as he continues southwest along the Hudson River, control must be transferred to EWR. If the EWR controller accepts the handoff, he will climb the VFR aircraft into Class B; if he does not accept the handoff, the aircraft must remain outside class B airspace and utilize the Exclusion Corridor.

In EWR there are several different air traffic control positions responsible for different aspects of the aviation operation around the airport. These positions include a ground controller

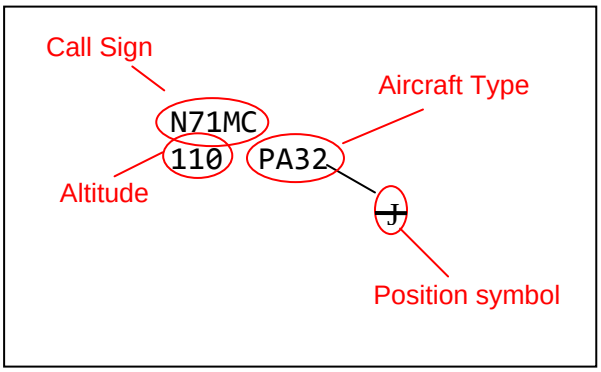
responsible for taxiing to the runways, a local controller responsible for take-off and landing, and a Class B Airspace (also known as Terminal Control Area) Controller.

The Class B Airspace controller is responsible for the VFR aircraft traversing Newark's Airspace, including those flying in the Class B airspace above the exclusion zone. Unlike the local controller who works mostly with large passenger aircraft, the Class B Airspace controller is responsible mainly for helicopters, small fixed-wing planes, and occasional military aircraft. Part of his job is to coordinate airspace usage with the local controller in order to maintain safe separation as he guides VFR aircraft through designated VFR routes in the Class B airspace.

Handoff Procedure:
A handoff occurs prior to an aircraft crossing an airspace boundary when control of that aircraft must be transferred from one air traffic controller to another. It consists of a radar transfer and a communications transfer. In most cases, the radar transfer occurs via Automated Information Transfer (AIT). For the purpose of this description, Controller 1 will refer to the controller in control at the beginning of the handoff and Controller 2 will refer to the controller responsible at the end of the handoff.

Each air traffic control position has a position symbol, a letter that appears superimposed on the radar target to indicate which controller is responsible. The TEB position symbol is J and the EWR position symbol is B (See Figure ii).

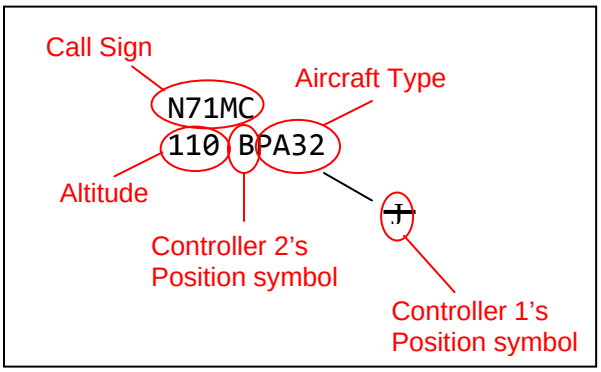
Figure ii



When an aircraft is approaching an airspace boundary, Controller 1 initiates a radar handoff by pressing a button on his console. By pressing that button, Controller 1 causes a data block to flash on the scope of Controller 2. Because of this, initiating a radar handoff is colloquially referred to as "flashing" by controllers.

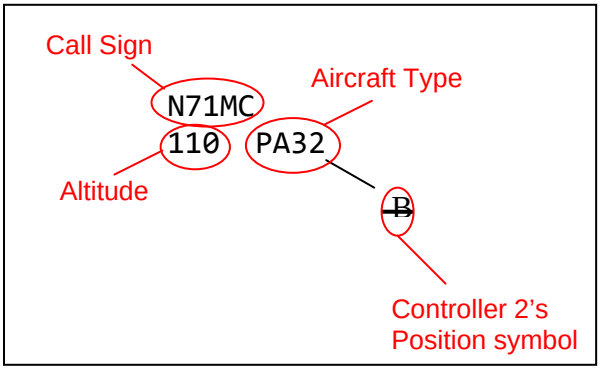
As Controller 1 "flashes" the aircraft to Controller 2, Controller 2's position symbol appears in the second line of the data block. Controller 1 remains responsible for the aircraft, but the presence of this symbol means that the handoff has been initiated.

Figure iii



Controller 2 sees the flashing data block and hits "Enter" on his keypad to accept the transfer, effectively completing the radar handoff. Controller 2 has acknowledged that he sees the aircraft, its identifier, altitude, and other relevant data and accepts responsibility. By hitting enter, Controller 2 causes the corresponding data block to flash on Controller 1's console, attracting Controller 1's attention. At this point, Controller 2's position symbol appears above the target, confirming completion of the handoff.

Figure iv



Controller 1 than contacts the pilot and instructs him to contract Controller 2 and provides him with the appropriate frequency. Once the pilot has accurately read back the new frequency, the handoff is fully complete, and controller 2 assumes primary responsibility for the aircraft.

Handoff: TEB to EWR

The Current air traffic control procedure *does not* require TEB controllers to pre-coordinate a transition for VFR aircraft wishing to travel through the EWR Class B airspace. The TEB controller simply flashes the aircraft to EWR, where the controller can choose either to accept him or request that the TEB controller instruct him to enter the exclusion corridor.

In some instances, a pilot would have to change his plans if controller workload did not permit him to enter Class B Airspace. The pilot must therefore be ready to enter the exclusion zone, and should be prepared to switch to CTAF and announce himself, should it be necessary.

However, we do not believe that this occurred on August 8. It is our understanding that the TEB controller initiated a timely handoff, which the EWR controller accepted. The EWR controller was expecting radio contact from the N71MC, which never came. Although controllers at both TEB and EWR attempted to re-establish radio communication with the pilot, they were unable to contact him. At the time of the collision, the pilot was not in communication with air traffic control at TEB or EWR, nor was he transmitting over CTAF.

Had the pilot contacted EWR as instructed, the EWR controller would have issued climb instructions that would have taken N71MC above the exclusion zone and into the Class B airspace. Because N71MC did not successfully establish radio communication with EWR he was unable to receive that clearance; instead N71MC continued eastbound, where it collided with the helicopter in the exclusion area.

This incident caused us to examine the procedures governing this airspace including handoff procedure. NATCA believes that coordination between TEB and EWR prior to take-off would reduce confusion at the airspace boundaries and make it less likely that a pilot would unknowingly enter the exclusion zone and therefore fail to switch to CTAF frequency. This will also allow EWR to notify TEB in advance that the workload is too great to allow Class B entry so the TEB controller may provide alternate routing options to the aircraft prior to the departure.

Is Controlled Airspace A Viable Option?

In recent weeks there has been some discussion about eliminating the Hudson River exclusion area and converting the airspace entirely into Class B. Current infrastructure is unable to support the conversion of this type. Before any such change can be implemented the following infrastructure improvements would need to be made.

1. **Comprehensive Surveillance** – with the current radar infrastructure, radar coverage over the Hudson River is unreliable. In much of that corridor, the height and density of the New York City skyline prevents radar from reaching the low altitude airspace, and information on aircraft flying in this area often does not appear on a controller's scope. For example, when flight 1549 lost the use of its engines, the aircraft disappeared off controller Patrick Harten's scope after it lost enough altitude to be obscured by the buildings. If the airspace were to be converted into Class B airspace, this spotty radar coverage would not be sufficient enough to ensure the safety of the users. Additional radar sites would need to be placed in such a way so as to ensure continuous comprehensive coverage of the area.

2. **Comprehensive Radio Coverage** – Just as the radar coverage is obscured by the terrain of New York City, radio coverage is similarly unreliable. The skyline often blocks radio signals, and communication between controller and pilot might be compromised. This

3. **Air Traffic Control** – The Air Traffic Control facilities that would have jurisdiction over this airspace would need to be restructured to accommodate control of new airspace. A new control position would have to be added to each of the affected facilities: EWR, John F. Kennedy International Airport Tower (JFK), LaGuardia Airport Tower (LGA), and New York Terminal Approach Control (N90).

4. **Air Traffic Controller Staffing** – Additional controllers would need to be hired at each of the effected facilities so as to ensure proper staffing for each of the new positions.

5. **Effect on General Aviation** – The elimination of the exclusion corridor would severely restrict access to this area by general aviation. An air traffic controller is naturally constrained in the number of aircraft he can safely monitor and communicate with, and even a properly staffed position would restrict the number of aircraft that could utilize the Class B space. General Aviation pilots who do not wish to coordinate with air traffic control would be required to go around the Class B airspace, without an option to cut through.

Is the Hudson River Class B Exclusion Zone Safe?

Following an incident of this severity, it is natural to question the safety of the airspace. The fact that such an incident occurred appears to be proof that the airspace is unsafe and needs to be fixed. But one must also retain the appropriate perspective and regard this incident in context.

According to the NTSB, the incident on August 8, 2009 was the first midair collision in the Hudson River Class B Exclusion Area. The NTSB further noted that "a review of the FAA's Near Midair Collision (NMAC) database and the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) database revealed 11 reports of NMACs between aircraft in the area since 1990. Only one report was filed in the past 10 years." This safety record is considered very good; there are far fewer NMAC reports than one would predict given that over 200 aircraft utilize this airspace per day.

Yet this incident did occur, and it has served to highlight the week points in the system. The incident has caused the aviation safety community to scrutinize the procedures in place at that time and devise ways of improving safety.

The New York Airspace Task Force

On August 14, the FAA charted a task force and charged it with the duty of making recommendations to enhance the safety of the Hudson River airspace area. NATCA was very pleased to be included as active participants in this taskforce as we believe that our subject matter expertise on air traffic control contributed substantially to the task force.

The Task Force is recommending several changes to operations, procedures, training and airspace structure. In general, NATCA supports these recommendations, but we believe that the FAA must fully consider the impact that these changes will have on other aspects of operation.

For example we agree with the task force that encouraging VFR use of Class B positively-controlled airspace would improve safety, but the large influx of VFR aircraft into Class B airspace would significantly increase controller workload and generate a need for increased staffing to meet the increased demands on the Class B Area position.
The task force made the following recommendations:

1. **Modify Class B airspace to allow aircraft stratification in the exclusion by mission profile for overflight versus local operations –** This recommends the creation of a uniform floor to the class B airspace at 1,300 ft to allow aircraft operating in the exclusion to stratify by altitude. Transient traffic would operate above 1,000 ft and local operators would remain below 1,000 ft. Under the current airspace structure the floor of the Class B airspace is 1,100 in some places. NATCA is concerned that raising the floor in these areas will cause VFR aircraft receiving Class B services above the exclusion zone to interfere with passenger jets landing at LaGuardia (LGA). In some runway configurations, aircraft landing at LGA Runway 13 pass through this airspace at 1,500 ft. NATCA recommends that the FAA examine this and other unintended consequences of this recommendation carefully prior to implementation.

2. **Review airspace delegated by New York TRACON (N90) to local air traffic control towers adjacent to the Hudson River –** In its current state, there is some confusion about which tower has jurisdiction over which airspace. The FAA has admitted that there are overlapping airspace boundaries and airspace that, though controlled by a tower, has not been officially delegated. This recommendation would rectify this problem and clarify the roles and delegated responsibility of air traffic controllers in each facility. NATCA fully supports this recommendation.

3. **Revise procedures at TEB for VFR fixed-wing departures –** This recommendation would require air traffic controllers at TEB to coordinate with controllers at EWR for aircraft wishing to utilize Class B services. If workload at EWR is such that he can extend Class B services to the aircraft, TEB would be authorized to climb the aircraft to 1,500 ft and into Class B airspace. This recommendation also would establish a standardized route for aircraft departing from TEB and intending to enter the exclusion that would limit the mergers at the current point of entry. NATCA supports this recommendation.

4. **Develop a Class B VFR transition route over the Hudson River –** This would publicize and promote the use of Class B services among VFR pilots traveling in the area. While NATCA agrees that positively controlled airspace is safer than uncontrolled airspace, we have concerns about the effects of this change. If this measure is successful in increasing the use of Class B services among VFR pilots it will represent a significant increase in controller workload. At present, the Class B Airspace controller position described earlier is often combined with the local control position, particularly during weekends. If this change is to be implemented, NATCA requires a commitment from the FAA to provide the additional air traffic control staffing necessary to fully staff this position at all times, as this position should not be combined with other positions while we determine the effects of the changes on VFR traffic patterns.

5. **Mandate pilot operating practices while operating in the Exclusion –** this would codify the voluntary procedures currently recommended for pilots in the exclusion. This includes maximum airspeed restrictions, announcing altitude and intensions on CTAF, and flying along the west shoreline of the Hudson River when southbound along the eastern shoreline when heading northbound. NATCA fully supports this recommendation.

6. **Enhance pilot communication and capability and reduce frequency congestion on Hudson River CTAF –** This would create defined areas which would utilize different frequencies and decrease frequency congestion. It would also standardize phraseology to reduce confusion. NATCA fully supports this recommendation.

7. **Standardize and enhance multiple NY Area Aeronautical Charts to assist pilot navigation –** Currently there are several charts covering the area, each of which contain different information on the airspace. This would create a single chart with standardized information. This recommendation also supports recommendation four in that it would publicize the Class B services available to VFR pilots. As previously stated, NATCA requires full staffing of the Class B position, as changing or clarifying the charts is intended to increase the usage of Class B air traffic control services for VFR pilots.

8. **Develop FAA and industry standardized training and education plans for pilots, fixed-base operators, and air traffic controllers –** NATCA believes that comprehensive and effective training of pilots, controllers and other aviation safety professionals is integral to maintaining the safety of the airspace. In the case of air traffic controllers giving clearances to pilots in this airspace, we believe that training can be improved. It is important for controllers to fully understand the intentions of the pilot so that they can issue clearances that do not need to be altered later. Again, training requires proper staffing levels at the facilities. We must be able to fully cover operations during the training itself.

Air Traffic Controller Staffing at NY Area Facilities

Several of the recommendations offered by the taskforce and other changes that have been considered will represent an increase in controller workload at the facilities in the New York Area. Currently the controller workforces at the facilities in this area are understaffed, inexperienced, and operating with a potentially dangerous ratio of trainees to fully certified controllers. TEB is operating with a number of certified controllers 42 percent below the staffing rate jointly agreed to by NATCA and the FAA in 1998 and N90, JFK, LGA and EWR are 42 percent, 35 percent, 36 percent, and 32 percent below respectively. Additionally N90, JFK and TEB have a trainee ratio of over 35 percent, which had been considered the safe upper-limit by the FAA. LGA is not far behind, with a trainee ratio of 34 percent[3]. If the safety of this area is to improve, and particularly if more VFR pilots are to be encouraged to utilize Class B services,

[3] Staffing statistics are based on payroll data provided to NATCA by the FAA. They are current as of March 31, 2009.

it will require that the Class B Airspace control position be opened at all times. In order to do so, the facilities must be properly staffed.

NATCA Recommendations

1. **The FAA Must Thoroughly Examine** the recommendations offered by the task force to determine their effect on the broader operation and air traffic controller workload. This must be done in full collaboration with NATCA. Only after this examination is completed and any risks mitigated should these recommendations be implemented.

2. **The FAA Must Collaborate With NATCA** to continue investigating ways to improve operations, airspace and procedures. The FAA must formally and thoroughly include NATCA in all stages of reforming the New York area airspace, from development through implementation. NATCA's members are subject matter experts who deal with the realities of this airspace on the front line and in real time each day. As such our union should be regarded as a subject matter expert and be fully engaged in developing and implementing any and all changes.

3. **Proper Staffing to Cover Additional ATC Duties –**Any change operations, procedure or airspace structure must be evaluated as to its effect on air traffic controller workload. Even small changes may have a significant effect and must be evaluated cumulatively and multiplied by the large volume of aircraft controllers handle at a given time. It is imperative that all affected air traffic control facilities and positions be properly staffed, including the radar associate position when appropriate.