

**Exhibit A**  
**FCC Form 442**  
**FCC File Number 0031-EX-PN-2021**

(v1.3)

**Exhibit Title: Experimental Flight Plan**

Commercial airliners and high-end business jets have access to multiple sources of navigational information to enable their flight crews to cross-check their locations should doubt arise as to the accuracy of the Global Positioning System (GPS) because of interference, spoofing or equipment malfunctions. However, a large (and growing) fraction of the general aviation (GA) aircraft fleet has become increasingly dependent on GPS for navigation and many no longer even carry the equipment necessary to determine their locations using legacy navigation systems like the VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME) system or the Automatic Direction Finder (ADF).

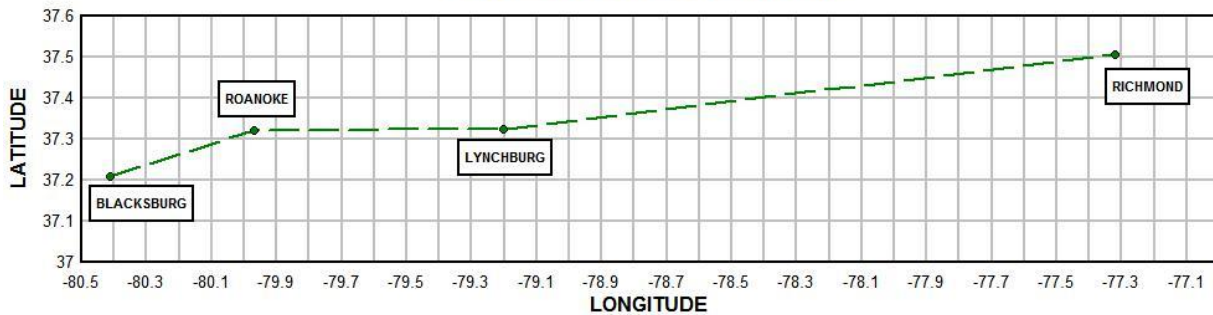
The Federal Aviation Administration (FAA) has expressed concern that deliberate “spoofing” of the GPS position (that is, interfering with the GPS signal in a way that appears to place the airplane at a location different from the actual location) is potentially a hazardous situation for GA operations, and the likelihood of that threat is increasing in the current world environment. Accordingly, the FAA has tasked The MITRE Corporation (MITRE) to evaluate the potential use of the location-determination capabilities of the fourth- and fifth-generation (4G/5G) terrestrial cellular network to provide evidence that GPS spoofing is occurring and warn the pilot accordingly. *Note that the intent is not to navigate the airplane in a spoofing environment using cellular location data, but rather just to warn pilots so that they can act appropriately to ensure the safety of their flights.*

To accomplish this task, MITRE has proposed to perform up to six flight tests in Central Virginia, between Richmond and Blacksburg, and in the local Blacksburg area. Current plans call for completion of the tests within the current fiscal year (FY), but follow-on activities that are currently unforeseen may well extend into FY 22. Plans call for the first flight to be around mid-June 2021 (or whenever all approvals are obtained, whichever is later), with completion of the flights by the end of July.

The airplane will be carrying three cellphones (one phone for each major carrier in the region – AT&T, T-Mobile and Verizon) and data collection equipment in order to assess the capabilities and limitations of such a technique. These flights will be conducted by a very experienced MITRE pilot who has received all necessary MITRE legal approvals for such flights and has, in fact, recently conducted similar flights for other projects. He will be accompanied by a “Safety Pilot”, also a licensed pilot, who will enhance situational awareness and also attend to any tasks associated with the test equipment on board.

The aircraft test flights will be flown in two formats: “Linear” and “Circular.” The **Linear** paths will be flown along routes within the region shown in the administrative section of this application, the centerline of which is also shown in Figure A-1. Deviations from the centerline path, but within the shaded area, will be executed, as required, to both overfly cellular towers and fly at various distances adjacent to them to collect data. Altitudes will range between 1,000 feet (ft) above ground level (AGL) and 9,000 ft AGL, but the flights will operate mostly between 1,000 ft AGL and 6,000 ft AGL. The pilots will coordinate their activities, as required, with the Air Traffic Control Facility in whose airspace they are flying at any given time. Written approval for the test flights has been received from the FAA **and they are also the Sponsor of MITRE's project.**

**FIGURE A-1**  
PROPOSED FLIGHT PATH CENTERLINE



TABLE\_A-1.grf

The **Circular** flights will occur in the Blacksburg, VA area. Virginia Tech operates a Center of Excellence for Drone Research at two locations in the Blacksburg area. These locations include three cellular base stations at each site. Flights in this area will be used to facilitate the examination of various factors such as aircraft attitude and base station antenna pattern effects and to determine the distance from the base station at which a usable airborne signal is present in a more controlled environment.

MITRE is fully aware that Federal Communications Commission (FCC) Rules, specifically 47 CFR 22.925, prohibits the operation of cellular telephones from aircraft because of potential interference to the cellular network from phones that are airborne and can “see” more base stations than the network was designed to handle. **That is, in fact, the reason for which this Application is being made: a Temporary Waiver of 47 CFR 22.925 is needed to perform these flight tests.**

In light of potential, *though transient*, interference with the cellular network, MITRE is coordinating this project with the Cellular Telecommunications Industry Association (CTIA). CTIA is not only assisting in the acquisition of tower technical data for the project but is also coordinating with the three cellular vendors in the area. MITRE and CTIA are still working on this, but the process is proceeding smoothly and both parties anticipate full agreement prior to the first test flight.

----- **End of Exhibit A** -----