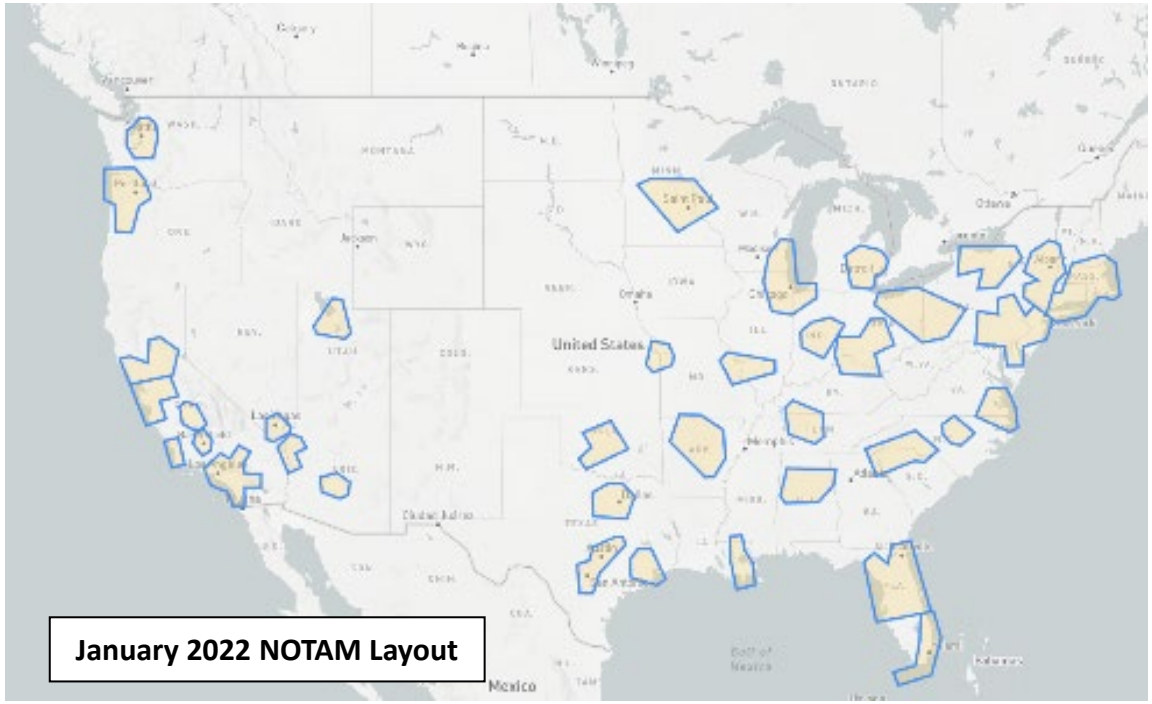
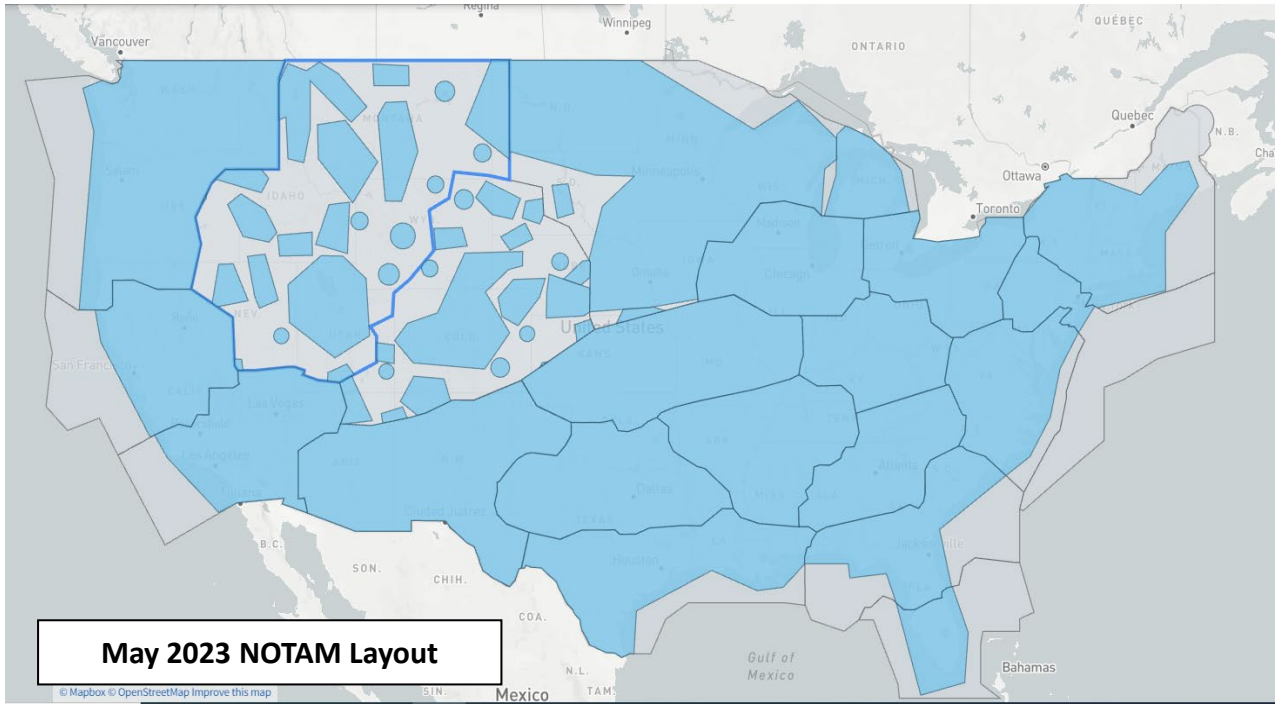
Radio Altimeters and 5G C-Band Deployment

April, 2023

Airspace NOTAMs January 2022 vice May 2023





As of Jan 19, 2022 NOTAM totals

- **Airspace: 55**
- **Aerodrome: 1289**
- **Instrument Approach Procedures (IAP):**
  - **114 Public**
  - **12 Special**
  - **131 DoD**

As of 1, 2023 *NOTAM totals (subject to change)*

- **Airspace: 63**
- **Aerodrome: 2865 (includes 5 Heliport + 94 VFR)**
- **Instrument Approach Procedures (IAP):**
  - **150 Public**
  - **124 Special**
  - **270 DoD**

Post July 1, 2023 Considerations

- Original voluntary Telco Mitigations end July 1, 2023
  - Continued power limits at 5G C-Band Mitigated Airports (CMAs)
  - Future agreements are in the works
- 5G C-Band emitters are anticipated in all 406 PEAs in Contiguous U.S.
- Current NOTAM/AMOC process is untenable
- Current transport AD prohibits certain low vis landing ops (plus airplane specific ADs)
- 19 new telecom entrants (in addition to VZ and ATT)
- Updated transport AD
  - Aircraft proven to be hardened against catastrophic/hazardous effects of 5G, will be permitted to perform certain operations (e.g., low visibility landing operations)
  - Aircraft not proven to be hardened against catastrophic/hazardous effects of 5G, will not be permitted to perform certain operations (e.g., low visibility landing operations) anywhere
  - All cumulative major/minor effects of radio altimeter interference would continue to be realized without any mitigation

Link to Transport NPRM:

https://www.regulations.gov/document/FAA-2022-1647-0001

Link to Rotorcraft NPRM:

https://www.regulations.gov/docket/FAA-2023-0668

Post July 1, 2023 plan for NOTAMs and Domestic Notice

- **Domestic Aircraft (Transport/Rotorcraft)**
  - Follow restrictions in respective ADs
  - Reference Transport Domestic Notice for 5G CMAs
- **Foreign Operators (Transport/Rotorcraft)**
  - Follow guidance in Aeronautical Information Publication (AIP)
  - Comply with respective 5G C-Band Domestic Notice
- **As additional safety measures:**
  - **20 CONUS ARTCC NOTAMs**
  - **~150 IAP NOTAMs against all public and special SA CAT I / II, CAT II, III approaches**

Discussion

Backup Slides

Draft AIP language for Apr 2023

1.3. In the United States, some telecommunications companies launched 5G services on January 19, 2022, using frequencies in a portion of the radio spectrum called the C-band. These frequencies can be close to those used by radio altimeters, an important piece of safety equipment in aircraft. The 5G deployment involves a new combination of power levels, frequencies, proximity to flight operations, and other factors. The FAA requires that radio altimeters are accurate and reliable, and therefore imposes restrictions on flight operations using certain types of radio altimeter equipment. These safety restrictions are posted in a 5G C-Band Domestic Notice, and could affect flight schedules and operations. All operators (domestic and international) must comply with the guidance and restrictions provided in this Domestic Notice.

5G C-Band Domestic Notice Transport

Fixed Wing

- Background (focus on pertinent info for foreign operators to know to safely fly in the contiguous USA. This synopsis will be based on the AD text.)
- Introduce the fundamental and spurious curves with a pointer to the AIR Policy Statement
- Include the radio altimeter tolerant airplane figure for Radio Altimeter Flight Restrictions (these airplanes meet the fundamental and spurious curves) plus the non-radio altimeter tolerant airplane figure for Radio Altimeter Flight Restrictions (these airplanes DO NOT meet the fundamental and spurious curves)
- Include the list of CMAs (dissolve the standalone CMA domestic notice)
- Extra information with links (e.g. 5G C-Band wireless broadband interference exists from surface to 5000 feet AGL. U.S. 5G C-Band restrictions do not cross the U.S. border into Canada or Mexico (refer to Canadian or Mexican publications for any applicable 5G C-Band restrictions). 5G C-Band wireless broadband is not currently deployed in Alaska, Hawaii, Puerto Rico, or any other U.S. territories, therefore does not impact these locations.)

5G C-Band Domestic Notice Draft Outline
Rotorcraft

Rotorcraft

- Background (focus on pertinent info for foreign operators to know to safely fly in the contiguous USA. This synopsis will be based on the AD text.)
- Introduce the fundamental and spurious curves with a pointer to the AIR Policy Statement
- Include the rotorcraft figure of Radio Altimeter Flight Restrictions
- Extra information with links (e.g. 5G C-Band wireless broadband interference exists from surface to 5000 feet AGL. U.S. 5G C-Band restrictions do not cross the U.S. border into Canada or Mexico (refer to Canadian or Mexican publications for any applicable 5G C-Band restrictions). 5G C-Band wireless broadband is not currently deployed in Alaska, Hawaii, Puerto Rico, or any other U.S. territories, therefore does not impact these locations.)

November Airspace NOTAMs Domestic Notice

- ZTL AIRSPACE RDO ALTIMETER UNREL WI AN AREA DEFINED AS 313113N0874951W (MVC275024.8) TO 313103N0881718W (GCV017027.2) TO 314422N0881921W (GCV007039.4) TO 324348N0875115W (OKW225043.1) TO 330319N0875702W (OKW253036.9) TO 331905N0873812W (OKW284020.0) TO 340111N0873208W (VUZ302038.0) TO 340543N0871241W (VUZ327029.9) TO 340420N0864529W (VUZ014025.2) TO 342139N0861018W (GAD347023.5) TO 343111N0860824W (RQZ122029.5) TO 344823N0855501W (RQZ087035.3) TO 345027N0852839W (GQO245017.5) TO 352347N0851410W (HCH211026.3) TO 361138N0852244W (LVT206025.6) TO 365921N0820350W (GZG006009.9) TO 361219N0811002W (BZM016020.5) TO 364019N0802211W (PSK152029.9) TO 371609N0805438W (BLF102013.7) TO 372004N0803808W (PSK020015.3) TO 363708N0801250W (GSO345036.3) TO 360817N0795641W (GSO019005.8) TO 360453N0794444W (GSO082011.4) TO 352332N0794815W (SDZ318015.0) TO 345121N0800858W (CTF030013.8) TO 341731N0813502W (GRD086028.4) TO 335415N0815051W (IRQ057019.6) TO 325402N0815157W (IRQ167050.7) TO 323540N0815511W (SAV313045.4) TO 321730N0821044W (DBN121036.8) TO 322756N0823838W (DBN127011.1) TO 320723N0833116W (VNA192005.6) TO 315916N0842354W (PZD347020.7) TO 313046N0865424W (MVC078023.1) TO 311810N0872442W (MVC194009.9) TO POINT OF ORIGIN SFC-5000FT AGL. HEL OPS REQUIRING RDO ALTIMETER DATA TO INCLUDE OFFSHORE INSTRUMENT OPS, HOVER AUTOPILOT MODES, SAR AUTOPILOT MODES, AND CAT A/B/PERFORMANCE CLASS TKOF AND LDG NOT AUTHORIZED EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVE 2021-23-13
- ZTL AIRSPACE RDO ALTIMETER UNREL WI ATLANTA ARTCC AIRSPACE SFC-5000FT AGL. HEL OPS REQUIRING RDO ALTIMETER DATA TO INCLUDE OFFSHORE INSTRUMENT OPS, HOVER AUTOPILOT MODES, SAR AUTOPILOT MODES, AND CAT A/B/PERFORMANCE CLASS TKOF AND LDG NOT AUTHORIZED EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVE 2021-23-13 AND DOMESTIC NOTICE

5G C-BAND AIRSPACE NOTAMS

CONTINENTAL UNITED STATES (CONUS)

NOVEMBER 1, 2022 UNTIL FURTHER NOTICE

Since January 2022, multiple areas of the CONUS have been impacted by the presence of 5G C-Band wireless broadband interference. This Domestic Notice outlines the airspace restrictions impacting helicopter operations as stated in Airworthiness Directive 2021-23-13, unless approved through an alternative method of compliance (AMOC):

- Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Barometric minimums must be used for these operations instead.
- Engaging hover autopilot modes that require radio altimeter data.
- Engaging Search and Rescue (SAR) autopilot modes that require radio altimeter data.
- Performing takeoffs and landings in accordance with any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data.

INFORMATION ON AIR ROUTE TRAFFIC CONTROL CENTERS (ARTCCs)

1. 5G C-Band wireless broadband interference exists in every ARTCC in the CONUS and its effect on radio altimeters can potentially extend up to 17 NM from the U.S. coastline.
2. 5G C-Band wireless broadband interference exists from surface to 5000 feet AGL.
3. U.S. 5G C-Band restrictions do not cross the U.S. border into Canada or Mexico (refer to Canadian or Mexican publications for any applicable 5G C-Band restrictions).
4. 5G C-Band wireless broadband is not currently deployed in Alaska, Hawaii, Puerto Rico, or any other U.S. territories, therefore does not impact these locations.
5. ARTCC boundary latitudes and longitudes are located at the following website for download as a CSV file: https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/Center_Surface_Boundaries/.
6. National Geodetic Survey (NGS) shoreline mapping and data can be downloaded at: https://shoreline.noaa.gov/data/datasheets/index.html or https://nsde.ngs.noaa.gov/.