Mapping Ever Larger Data with PostGIS, DuckDB, GeoArrow and deck.gl

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OCCIDENTALIS OCEANVS
HESPERIVS SINVS ET MAGNVS SINVS
HERCVLIS FRETVM
Britannia insula
Germanicus oceanus
Gallia Belgica
Pelagus Balearicum
Africanum pelagus
Meotis palus
EVXINVS PONTVS
HIRCANVS SEV CASPIVS MARE
LIBIA INTERIOR
Libya pelag.
Egyptus pelag.
PERSICVS SINVS
ARABICVS SINVS
RVBRVM MARE
ETHIOPIA INTERIOR
BARBARICVS SINVS
TERRA INCOGNITA
SCYTHIA EXTRA IMAVM MONTEM
SERICA
SCYTHIA INTRA IMAVM MONTEM
SOGDIANI
SACÆ
IMAVS MONS
PARTHI
ARIA
INDIA EXTRA GANGEM FLVVIVM
INDIA INTRA GANGEM FLVVIVM
MAGNVS SINVS
GANGETICVS SINVS
BARAGON SINVS
TAPROBANES INSVLA
INDICVM PELAGVS
HIPPADVM PELAGVS
PRASODIS MARE
Auster vel Notus

Lander - Mapping Big Data

RSTATS.AI

RSTATSGOV

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R Gov Conference Speaker

Jared P. Lander

Lander Analytics

Mapping Big Data

R CONFERENCE

GOVERNMENT & PUBLIC SECTOR

PERSON & VIRTUAL | WORKSHOPS: OCTOBER 18 | CONFERENCE: OCTOBER 19

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RSTATS.AI
#RSTATSNY



New York R Conference Speaker

Jared Lander

Lander Analytics

Using R for GIS and Mapping

R CONFERENCE

NEW YORK

-PERSON & VIRTUAL | WORKSHOPS: JUNE 8TH | CONFERENCE: JUNE 9-10

The Plan

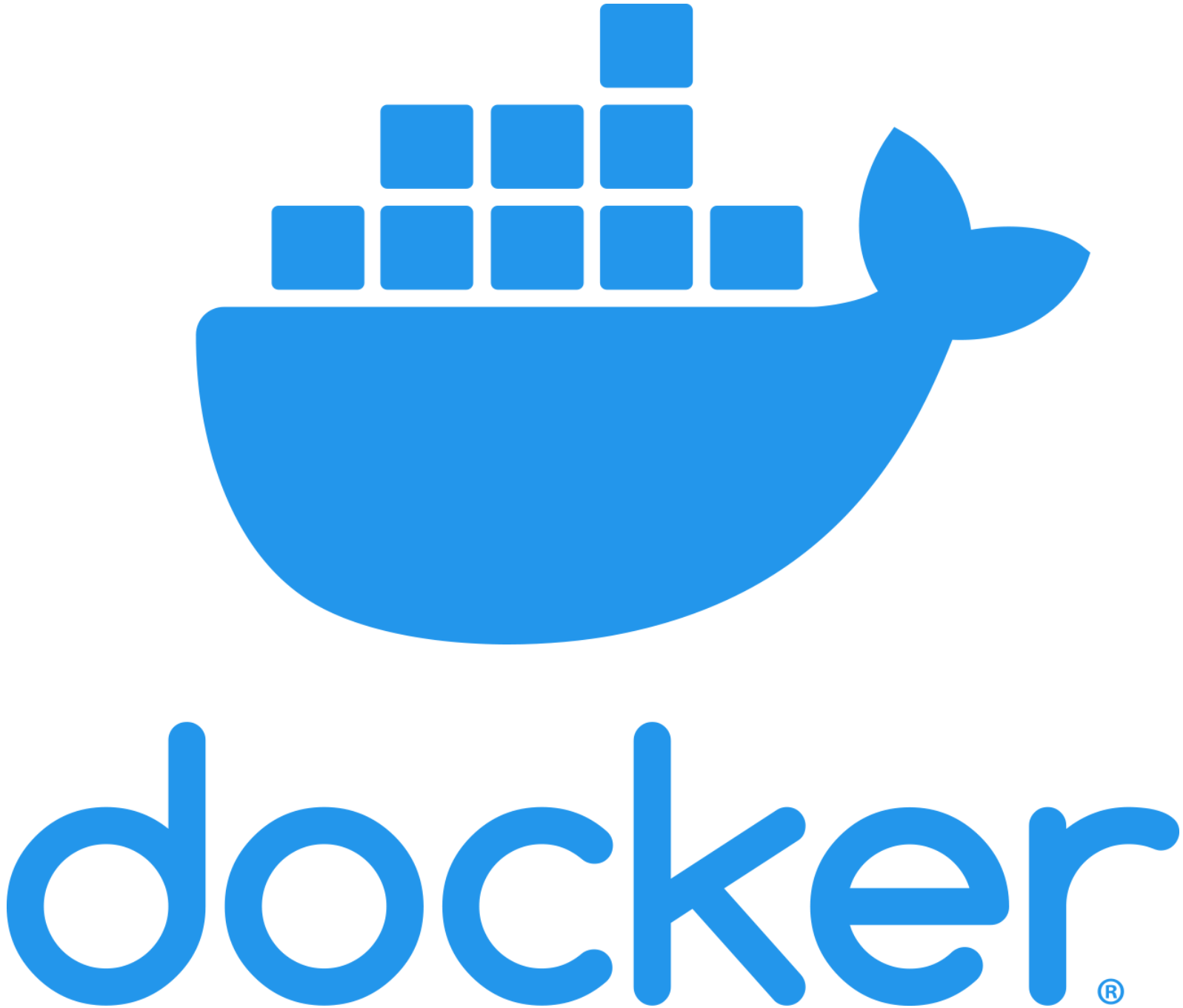
- [ ] Store All of this Data in PostGIS/Timescale
- [ ] Execute Spatial Queries with DuckDB
- [ ] Extract Data to GeoArrow for Interactive Consumption
- [ ] Visualize with deck.gl

Store the Data


PostgreSQL


PostGIS


Timescale


docker

The Data

```sql
SELECT tablename FROM pg_catalog.pg_tables WHERE schemaname = 'public';
```

5 records

tablename
spatial_ref_sys
world
airports
locations
routes

```
1  SELECT * FROM world limit 5;
```

iso3	name	geometry
ABW	Aruba	0103000020E6100000010000001000000000000C09A
AFG	Afghanistan	0103000020E610000001000000D040000040000C0FD
AGO	Angola	0106000020E6100000040000000103000000010000000(
AIA	Anguilla	0103000020E610000001000000E000000F8FFFFBFC3
ALA	Åland	0106000020E61000000D0000000103000000010000000(

```sql
SELECT country, osm_id, name, geometry FROM airports limit 5;
```

country	osm_id	name	geometry
England	4279100	Stapleford Aerodrome	0106000020E6100000010000000103000
England	4734432	Blackpool Airport	0106000020E6100000010000000103000
England	19115400	Yorkshire Gliding Club Airfield	0106000020E6100000010000000103000
England	20909615	Royal Marines Base Chivenor	0106000020E6100000010000000103000

country	osm_id	name	geometry
England	21890655	RAF Odiham	0106000020E6100000010000000103000(

```
1  SELECT longitude, latitude, timestamp, id, geometry FROM locations limit 5;
```

5 records

longitude	latitude	timestamp	id	geometry
-0.0557722	51.26073	2022-09-16 23:57:43	0a65x6	0101000020E6100000551F6(
1.9085600	51.99198	2022-09-16 06:51:06	a7s6k5	0101000020E6100000CC0D7
-0.3022392	51.80304	2022-09-18 14:54:50	j9ge45	0101000020E61000005D2AA
0.4320739	50.68635	2022-09-17 07:47:33	cnb96e	0101000020E610000098100I
-0.8738629	52.43047	2022-09-16	ug8u5y	0101000020E6100000454D2

longitude	latitude	timestamp	id	geometry
		13:31:48		

Hypertables

```sql
CREATE TABLE IF NOT EXISTS locations (
    id TEXT
    , longitude double precision
    , latitude double precision
    , timestamp timestamp with time zone
    , value1 double precision
    , value2 double precision
    , size TEXT
    , count double precision
    , geometry geometry
    , CONSTRAINT enforce_dims_geom CHECK (st_ndims(geometry) = 2)
    , CONSTRAINT enforce_geotype_geom CHECK (geometrytype (geometry) = 'POINT'::text)
    , CONSTRAINT enforce_srid_geom CHECK (st_srid(geometry) = 4326)
)

-- geometry index
CREATE INDEX locations_geom_gist ON locations USING gist (geometry);
```

```
1  CREATE UNIQUE INDEX idx_id_timestamp ON locations(id, timestamp);
```

```
SELECT create_hypertable('locations', by_range('timestamp'), migrate_data => true);
SELECT add_dimension('locations', by_hash('id', 4));
```

- [x] Store All of this Data in PostGIS/Timescale
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Spatial Queries

Locations Near Airports

1. Create 5km Buffer Around Each Airport
2. Compute Intersection Between the Points and Buffers
3. Collect the Points in that Intersection

{sf}

```
con <- DBI::dbConnect(
    RPostgres::Postgres(),
    host=Sys.getenv("DATABASE_HOST", "localhost"),
    port=Sys.getenv("DATABASE_PORT", "5432"),
    user=Sys.getenv("DATABASE_USER", "secretuser"),
    password=Sys.getenv("DATABASE_PASSWORD", "secrectpassword"),
    dbname=Sys.getenv("DATABASE_NAME", "db")
)
```

```
airports <- sf::read_sf(con, 'airports')
```

```r
air_5k_sf <- airports |>
  dplyr::select(country, name, geometry) |>
  sf::st_buffer(5000)
```

PostGIS

```sql
SELECT
  country, name, geometry,
  ST_Buffer(geometry::geography, 5000)::geometry AS buffer
FROM airports;
```

country	name	geometry
England	Stapleford Aerodrome	0106000020E6100000010000000103000000010000(
England	Blackpool Airport	0106000020E6100000010000000103000000010000(
England	Yorkshire Gliding Club Airfield	0106000020E6100000010000000103000000010000(

DuckDB

```
INSTALL postgres; INSTALL spatial;
LOAD postgres; LOAD spatial;
```

```
ATTACH 'dbname=db user=secretuser password=secretpassword host=127.0.0.1 port=5432' AS db (TYPE POSTG
```

```
1  CREATE VIEW airports AS SELECT country, name, ST_GeomFromHEXWKB(geometry) AS geometry FROM db.airport
```

```sql
SELECT
  country, name, ST_AsText(geometry) AS geometry,
  ST_AsText(ST_Transform(
          ST_Buffer(ST_Transform(geometry, 'EPSG:4326', 'EPSG:3857', always_xy := true), 5000),
          'EPSG:3857', 'EPSG:4326', always_xy := true
      )) AS buffer
FROM airports;
```

Displaying records 1 - 10

country	name	geometry	buffer
England	Stapleford Aerodrome	MULTIPOLYGON (((0.1606512 51.6543247, 0.1615611 51.6550594, 0.1624436 51.6550687, 0.1629988 51.6563639, 0.1629819 51.6568643, 0.1606311 51.6569244, 0.1604577 51.6569288, 0.158 51.6570877, 0.1569648 51.657125, 0.1557846 51.6570719, 0.1536082	POLYGON ((0.104612302153681 51.6565276225532 9, 0.104979368823971 51.65793083697215, 0.104937839940538 51.658508837918305, 0.106373710907177 51.66408361128415, 0.109591748255493 51.669363763775856, 0.114459828913035

country	name	geometry	buffer
		51.6572882, 0.151484 51.6574348, 0.1514767 51.6573947, 0.1513902 51.6570162, 0.150864 51.6569857, 0.1505358 51.6569667, 0.1497808 51.656923, 0.1501027 51.6555652, 0.1500083 51.6552492, 0.1498277 51.6546443, 0.1494152 51.6536142, 0.1486887 51.6519156, 0.1505738 51.6516118, 0.1511274 51.6511368, 0.1498151 51.651238, 0.1494623 51.6511777, 0.1489736 51.6504441, 0.1480113 51.6492335, 0.1479678	51.67413264676895, 0.12077808392124 51.678194653677636, 0.128287104462291 51.68138322016224, 0.130099477648112 51.68185501233475, 0.131222161653016 51.68229577566806, 0.139284103140494 51.684243355839705, 0.147798755409749 51.6851963731482, 0.156450158831795 51.68511952638958, 0.158574358831795 51.68497301596315, 0.159067267664014

country	name	geometry	buffer
		51.6491927, 0.1475064 51.6487599, 0.1499277 51.6482563, 0.1500392 51.6482331, 0.1508286 51.6481003, 0.1519079 51.647996, 0.1525077 51.6482335, 0.1552204 51.6481192, 0.1562396 51.648203, 0.1586429 51.6488022, 0.159308 51.6490818, 0.1598874 51.6495078, 0.160102 51.6499605, 0.1602898 51.650962, 0.1602945 51.651019, 0.1605623 51.654253, 0.1606512 51.6543247)))	51.68493156316121, 0.15956917678559 1 51.68493380096146, 0.16060437678559 1 51.6848965238539 3, 0.16247131999381 3 51.6848050493290 5, 0.16379418492590 3 51.6847229562374 4, 0.16483133398833 5 51.6846964963920 5, 0.17321161665129 4 51.6839882493863, 0.18122917298151 4 51.6823184902365 54, 0.18859971565175 8 51.6797463235485 9, 0.19506189921090 2

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country	name	geometry	buffer
			51.67636280919208, 0.200386586897512 51.67228775376801, 0.204384975394408 51.667665485881294, 0.206915289435885 51.66265976173291, 0.207887808889485 51.657447978407234, 0.207904708889485 51.65694758485197, 0.206405886169678 51.649202061970065, 0.205850686169678 51.64790665730 56, 0.204167334596078 51.64506577890845, 0.203192500158595

country	name	geometry	buffer
			51.64209594726639, 0.202977900158595 51.64164316873082, 0.199443771788078 51.63630400394557 5, 0.194213565334527 51.63153050178023, 0.193634165334527 51.631104332861234, 0.184501552886438 51.62600363259611, 0.183836452886438 51.625723890277555, 0.17538961800449 51.62293506989606, 0.17298631800449 51.62233552805095 4, 0.162139839338949

country	name	geometry	buffer
			51.62056638412204, 0.161120639338949 51.620482533045056, 0.156791644768084 51.62039657580963, 0.153081143640525 51.62012711729045, 0.144995932486597 51.6204497791214, 0.143916632486597 51.62055414248504, 0.139075208043508 51.62119365558049, 0.138285808043508 51.62132653438572, 0.1357588621351 51.62180181094818, 0.135649925479579

country	name	geometry	buffer
			51.62182449080188, 0.133231188968582 51.62232785089278, 0.124917856439081 51.62466491428421, 0.117537014420915 51.627996738190625, 0.111393355650426 51.632185578469155, 0.106740499998808 51.63705830263778, 0.103770524645982 51.6424135714737, 0.102606034833316 51.648030180931464, 0.103295102526934 51.6536762150585 5,

country	name	geometry	buffer
			0.104612302153681 51.6565276225532 9))
England	Blackpool Airport	MULTIPOLYGON (((-3.0358463 53.7675069, -3.0352865 53.7674469, -3.034454 53.7674895, -3.033291 53.7677383, -3.033 53.766853, -3.0317233 53.7670421, -3.0313471 53.766191, -3.0274004 53.7667098, -3.0260322 53.7669868, -3.0279222 53.7698445, -3.0277744 53.7698751, -3.0173494 53.7694628, -3.0154817 53.769389, -3.0148397 53.7695265, -3.0139938	POLYGON ((-3.086629340780426 53.78772769780721, -3.086384201748382 53.788152030671625, -3.082213392973745 53.79248504122159, -3.081555961330136 53.79294130109877, -3.08140835270319 53.7930944678062, -3.07885485676334 53.79486393804286, -3.07807283145025 53.795557438664844, -3.076540000657778

country	name	geometry	buffer
		53.7697077, -3.0130088 53.7699187, -3.012095 53.7701145, -3.0123635 53.7703427, -3.0133463 53.771178, -3.0134988 53.7716055, -3.0135617 53.771782, -3.0136626 53.7719497, -3.0138945 53.7723352, -3.0145327 53.772457, -3.0154479 53.7726316, -3.015956 53.7727286, -3.0164944 53.7728052, -3.0166137 53.7725206, -3.0180604 53.7727404, -3.0181431 53.772587, -3.0261147 53.7729761, -3.0266825 53.7734816, -3.0294065	53.79646616559568, -3.075918169466801 53.79689681066736, -3.075397562809218 53.79714343827012, -3.07184481439503 53.79924954809137, -3.064514868077858 53.80215100205754, -3.056365894493179 53.80414999130359, -3.054583994493179 53.80447009753237, -3.054161320521056 53.80452467161886, -3.050201605880943 53.80525629784725, -3.041568774417889

country	name	geometry	buffer
		53.7741765, -3.0297813 53.77486, -3.0300233 53.7753015, -3.0307549 53.7766356, -3.0307624 53.7766353, -3.0313612 53.7766078, -3.0315604 53.7766485, -3.0316756 53.7766721, -3.0319989 53.77682, -3.0348668 53.7762753, -3.0357911 53.77803439999999, -3.0361107 53.7786427, -3.0361311 53.7786816, -3.0363593 53.7791158, -3.0363725 53.7791409, -3.0365229 53.7794272, -3.0367895 53.7799346, -3.0413898 53.7790841,	53.80631582710109, -3.032751765342206 53.806359016387624, -3.02409035736089 53.80538420443611 6, -3.01591833282342 53.803428888508016, -3.008550614841143 53.80056828987535, -3.004887480138297 53.79843571016357, -3.002149361859718 53.79798055705159, -3.001645517085294 53.79788442728, -3.000729947373844 53.797709861682236, -3.000091747373845

country	name	geometry	buffer
		-3.0415121 53.7790859, -3.043294 53.7787656, -3.043252 53.778685, -3.0430442 53.7782865, -3.0429781 53.7781597, -3.0444459 53.7779002, -3.0446406 53.7778525, -3.0445708 53.7775655, -3.0449426 53.7775371, -3.0450142 53.7774764, -3.0449947 53.7773551, -3.0449814 53.7772914, -3.0450245 53.7772883, -3.0454266 53.7772589, -3.0453493 53.7769381, -3.0452417 53.77650339999999, -3.0451162 53.7760162,	53.79758813496833, -2.992529435254606 53.79567832811345, -2.985683483505256 53.79298592518198, -2.979783433603241 53.78960106073690 6, -2.975027111390913 53.7856370755224 4, -2.972303566496464 53.78215858868918 5, -2.970799175542934 53.7805541620279 7, -2.968081943255057 53.7754096021658 94, -2.967179384982177 53.7700460791430 4, -2.968128713523537

country	name	geometry	buffer
		-3.0450395 53.7757993, -3.0449849 53.7755771, -3.0449901 53.7754617, -3.0464819 53.7751744, -3.0462417 53.7746955, -3.0469522 53.7744874, -3.0474864 53.7742637, -3.0483284 53.7739111, -3.0477138 53.7727021, -3.047586 53.7727292, -3.046565 53.7708863, -3.0464153 53.7708951, -3.0447924 53.7706224, -3.0435263 53.7705201, -3.0433975 53.7703448, -3.0423783 53.7702665, -3.0415093 53.7706279, -3.0399541	53.76468692150766, -2.970890787725055 53.75954653587314, -2.975351726283054 53.75484357769792, -2.981327603110994 53.75076989874592, -2.988572030677573 53.74749366303244, -2.996786318652447 53.74515015057604, -2.9977037763072 53.74495345007034, -2.998689059299975 53.74474226395491, -2.999537237611221 53.74456046792819 6, -3.000179237611221

country	name	geometry	buffer
		53.77076839999999, -3.0397819 53.7707063, -3.039392 53.7699738, -3.0388458 53.7698239, -3.0378266 53.7681381, -3.0363887 53.7676154, -3.0358463 53.7675069)))	53.74442288617028, -3.004287604265124 53.74381786610306, -3.011477639653266 53.74186337480092, -3.012845839653267 53.74158620907324, -3.017649670029598 53.74078637782112, -3.021596370029598 53.74026725754731, -3.030131279456916 53.73964345205371, -3.038710759808264 53.73999315804458, -3.04702029479327 53.741303531755534, -3.05475526408398

country	name	geometry	buffer
			53.74352644948099, -3.054971498087443 53.74362247695389, -3.059918993379646 53.74499587990816, -3.061356893379646 53.74551886148312, -3.063049614765023 53.74630234987619 6, -3.06569677974432 53.74686207132954 5, -3.073144796966529 53.74948199623928, -3.07960333098006 53.75289871927127, -3.084831950642151 53.75698486973455, -3.088636010697732

country	name	geometry	buffer
			53.76158816185761, -3.089784810697732 53.76340436402995, -3.090730230843031 53.76506384334912, -3.091344830843031 53.766273063337906, -3.093085211155166 53.77167987446899, -3.092901845115373 53.77718188235817, -3.090802614200036 53.78254260728739, -3.086877747978935 53.78753173014426, -3.086629340780426 53.78772769780721))

country	name	geometry	buffer
England	Yorkshire Gliding Club Airfield	MULTIPOLYGON (((-1.2095554 54.2311954, -1.2105525 54.2305866, -1.2109756 54.2300363, -1.2109971 54.2297736, -1.2116894 54.2292241, -1.2129024 54.2285707, -1.214287 54.2280583999999, -1.2143314 54.2275646, -1.2168465 54.226952, -1.216974 54.2267414, -1.2170116 54.2264211, -1.217164 54.2261797, -1.2169862 54.2260646, -1.21644 54.2260906, -1.2162558 54.2258233, -1.2152841 54.2258604,	POLYGON ((-1.261759684618784 54.22821619521256, -1.261821976512502 54.22821869403337, -1.261784376512502 54.22853898008624, -1.26166909695196 54.228864162399326, -1.261415381075119 54.23067892002196, -1.259720897001417 54.23435928658955, -1.259316228789046 54.235500608511956, -1.259188728789046 54.235711163824774, -1.255158975012386

country	name	geometry	buffer
		-1.2147127 54.2252405, -1.2143434 54.2252542, -1.2137567 54.2252759, -1.2124441 54.22540929999999, -1.2110456 54.2256553, -1.2101103 54.2257945, -1.2094734 54.2258878, -1.2093936 54.2259517, -1.2089883 54.226834, -1.2088958 54.2268828, -1.2088119 54.227815, -1.2087212 54.2288019, -1.2086991 54.2289276, -1.2086005 54.2290619, -1.2067266 54.2303358, -1.206999 54.230644, -1.2062176 54.2314525,	54.24065401594989, -1.250263714596916 54.24438892948805, -1.249401744116684 54.24604827517965, -1.245134746413622 54.25066459143446, -1.239380302710927 54.25469579714941, -1.232368550551664 54.257975337294006, -1.224379911032619 54.26037411275441, -1.215733873919672 54.26179634916637 4, -1.214458473919672 54.261927566924655, -1.207605166571585

country	name	geometry	buffer
		-1.2063882 54.2319197, -1.2058493 54.2328647, -1.2057415 54.2335, -1.2051218 54.2346706, -1.2051847 54.2359673, -1.2066667 54.2360828, -1.2079421 54.2359515, -1.2075502 54.2354193, -1.2074908 54.2345454, -1.2075874 54.2341237, -1.2078341 54.2337271, -1.208698 54.2325541, -1.2095554 54.2311954)))	54.262319598519454, -1.200729801156394 54.26209514429112, -1.199247801156394 54.261979717105426, -1.190461105421729 54.260760314095926, -1.182269684571781 54.25853875294673, -1.175004717726986 54.255404698731, -1.16859927475128 54.25148467027509, -1.164379704667992 54.24693695567925, -1.161449227699956 54.24194524399055, -1.160286975746064

country	name	geometry	buffer
			54.236711227723426, -1.160224075746064 54.235414551098415, -1.160619946654991 54.23111474945799, -1.161750936095456 54.22812987647847, -1.161819532936924 54.22747773141958, -1.16375567927889 9 54.22290282533714, -1.164013943529059 54.222213322272225, -1.165373903171053 54.220400933942656, -1.165616659729929 54.220007943381646, -1.166014705432506

country	name	geometry	buffer
			54.21914129219998, -1.16880824707568 54.214612393662094, -1.173116624048363 54.210466457384925, -1.173196424048363 54.21040253341872, -1.178318324384783 54.206969552217224, -1.18437471657318 54.20410558245188, -1.191191586827818 54.20189690779647, -1.19855678945698 54.200410081765476, -1.199034963007046 54.200339827749694, -1.19950229212631 7

country	name	geometry	buffer
			54.2002575730343, -1.204751046992666 54.19953154452053, -1.206063646992666 54.19939806091688, -1.210917370307119 54.19906235122621, -1.211873370307119 54.19902692875279 4, -1.220388788987581 54.19918502231826, -1.228699986453198 54.20028085232905, -1.236507932359846 54.20227491952677, -1.238670651149365 54.20314339238913, -1.238871035167729

country	name	geometry	buffer
			54.203217045124624, -1.240164220988277 54.20358887329591, -1.241291690359536 54.20410676576964, -1.244268422812567 54.205200848374005, -1.250321415023371 54.20846298944793, -1.250499215023371 54.20857813851662, -1.255381631344308 54.212382645972596, -1.259010724757486 54.21663930007099, -1.26126748145307 54.221208389528805, -1.262077892530866

country	name	geometry	buffer
			54.225939995861374, -1.261759684618784 54.22821619521256))
England	Royal Marines Base Chivenor	MULTIPOLYGON (((-4.1585038 51.0951409, -4.1593453 51.0943263, -4.1601262 51.093753, -4.1613693 51.0932694, -4.1613585 51.0931781, -4.1614234 51.0925279, -4.1614623 51.0912807, -4.1630295 51.0915872, -4.1641327 51.0916485, -4.1653573 51.0912554, -4.1665176 51.09057639999999, -4.1671088 51.0896683, -4.167362 51.0890697,	POLYGON ((-4.208134047007433 51.07756161929848 6, -4.209708256476508 51.07966340689534, -4.211838121347331 51.08513189414214, -4.212197407536163 51.09075648551035, -4.210771811986729 51.09631325190351, -4.21051861198673 51.09691175814701 6, -4.208683085642274 51.10034491074503,

lander analytics

country	name	geometry	buffer
		-4.1670752 51.088769, -4.166106 51.0886555, -4.1663135 51.0879187, -4.1662009 51.0873934, -4.1653191 51.08604, -4.1640816 51.0857071, -4.1626701 51.0853985, -4.1615409 51.085479, -4.1593978 51.0857957, -4.1577745 51.0856205, -4.1572312 51.0855619, -4.1544942 51.0855878, -4.1525909 51.0856064, -4.1512107 51.085169, -4.1483361 51.0843199, -4.1465637 51.0841639, -4.1447501 51.0842596, -4.1387963 51.0850271,	-4.208091885642274 51.101252801092116, -4.203474955440754 51.10660631104319, -4.197135897262744 51.111212453867836, -4.19597597262744 51.11189115084594, -4.194788394154736 51.11241348040391, -4.193290868082739 51.11391029048477, -4.186753592852206 51.118140501219436, -4.186370592852205 51.118341307162126, -4.180847087230916 51.12081771509991,

country	name	geometry	buffer
		-4.1338455 51.0859056, -4.1305289 51.0873558, -4.1298259 51.08777, -4.1294478 51.0882882, -4.1295145 51.0895858, -4.1292869 51.09039139999999, -4.1289435 51.0910383, -4.1285379 51.0914059, -4.1302663 51.0926485, -4.1312119 51.0926673, -4.1343712 51.0926697, -4.1343945 51.0933536, -4.1369149 51.0934012, -4.1380071 51.093396, -4.1435113 51.0935004, -4.1459559 51.0937571, -4.1477188 51.094062,	-4.17479214661817 51.12274329637705, -4.17442644661817 2 51.12283854268341, -4.16602164385996 1 51.12444368831173 6, -4.15727979325061 1 51.12499126146795, -4.15675539325061 51.12499176116295, -4.14844978024527 1 51.12451365502321, -4.14042820431001 5 51.12307996616809, -4.13608578807743 9 51.12171810013498, -4.13564981339249 3 51.12158924307415,

country	name	geometry	buffer
		-4.1498088 51.0944795, -4.1528301 51.0953959, -4.1546064 51.0960244, -4.1555671 51.096307, -4.1561381 51.0965663, -4.1564967 51.0967186, -4.1566872 51.096793, -4.1572116 51.0967925, -4.1575773 51.0966972, -4.1579603 51.0964963, -4.1585038 51.0951409)))	-4.135564869091791 51.121589324972845, -4.133044469091791 51.121541753994045, -4.124593467806633 51.12087510941513, -4.12125201469681 8 51.1201918244816, -4.119724091181987 51.12006225922767, -4.111045668257416 51.118137988413075, -4.103174329628602 51.11514355875628, -4.096440596887087 51.1112045148252, -4.094712196887087 51.10996241349557,

country	name	geometry	buffer
			-4.089759190480368 51.105638241698095, -4.08618949929858 51.100805996697495, -4.084130461466721 51.09563792385831, -4.083655527040678 51.090318298239566, -4.084781637894758 51.085036862528106, -4.085216861730744 51.084218149773385, -4.085416083305142 51.08271794764974, -4.088616040125647 51.07653237352991, -4.088994140125647 51.07601404182863,

country	name	geometry	buffer
			-4.093363036364324 51.07129276409606, -4.099097406141032 51.067188218446034, -4.099800406141033 51.06677383415775, -4.104867838423074 51.064194602090204, -4.108184438423074 51.062743676024255, -4.11464465512564 51.06039245192624, -4.121635284020234 51.05874611904249, -4.126586084020235 51.057867103318415, -4.129767140881502 51.05738023288465,

country	name	geometry	buffer
			-4.135720940881502 51.05661227425335, -4.140990341188064 51.056135035171245, -4.142803941188063 51.056039276997666, -4.152796136579576 51.056213304450516, -4.154568536579576 51.05636939869231, -4.161152985844225 51.05727010625636, -4.161499185420265 51.05735312175989, -4.167644035316578 51.05734918450704, -4.177434437825562 51.05874433911655,

country	name	geometry	buffer
			-4.178845937825562 51.05905311690865, -4.181763726788792 51.05976394741526, -4.183001226788791 51.0600970340941, -4.19064523529697 51.06273303046566, -4.197334886125367 51.066247310020906, -4.202818094220996 51.07050726242124, -4.206888237519156 51.0753521795024, -4.207770037519157 51.07670589220309, -4.208134047007433 51.07756161929486))

country	name	geometry	buffer
England	RAF Odiham	MULTIPOLYGON (((-0.9533634 51.2393903, -0.9531161 51.2393484, -0.9529052 51.2389477, -0.9523579 51.238006, -0.9513529 51.2367431, -0.951494 51.2366248, -0.9518497 51.23649, -0.9529299 51.2363285, -0.9534835 51.2362458, -0.9535825 51.2362829, -0.9538101 51.2362187, -0.9538675 51.2362627, -0.9542244 51.2361631, -0.9546904 51.2361848, -0.9571606 51.2362997, -0.957201 51.2363016, -0.9573347	POLYGON ((-1.001955345629355 51.239872437608966, -1.001918459994461 51.240033729879066, -1.001181859994461 51.2420443551101, -1.001070970905149 51.24233712077447, -1.00100664331424 51.242514875338266, -1.000992509879437 51.24254118353951 5, -1.000961158353422 51.24262132306186, -1.00095034730 9875 51.242619665530434, -0.998101079749832

lander analytics

country	name	geometry	buffer
		51.2359321, -0.9572392 51.235867, -0.9570667 51.2358462, -0.9570689 51.2358246, -0.9570713 51.2358016, -0.9572596 51.2358178, -0.9574028 51.235758, -0.9581394 51.2337471, -0.9580661 51.2336353, -0.9578876 51.2335603, -0.9578966 51.2335285, -0.9579056 51.2334974, -0.9580904 51.2334629, -0.9582867 51.2333403, -0.9584055 51.2330227, -0.9563125 51.232938, -0.9562277 51.2329346, -0.9560605 51.2328913, -0.9556952	51.24792302133893, -0.993511182019276 51.25285205595821, -0.991712099181468 51.25410775112945, -0.990444199689805 51.25563277587217, -0.990303771247395 51.25576244222926, -0.98968920315037 1 51.256379823315335, -0.98895090639563 51.25714933084815, -0.98802690639563 51.25795865562146, -0.982772230135432 51.26200520991 8705, -0.97641064197 1516

country	name	geometry	buffer
		51.2326251, -0.9554138 51.2325633, -0.9527235 51.2319007, -0.9530744 51.2311648, -0.9530871 51.2310797, -0.9530776 51.2309833, -0.9528459 51.2301903, -0.9529036 51.2299176, -0.9530044 51.2298079, -0.9533236 51.2296207, -0.9535835 51.2295033, -0.953839 51.229163, -0.9539556 51.2288147, -0.9535686 51.2284177, -0.9513047 51.2279006, -0.9510746 51.2283258, -0.9510261 51.2285873, -0.9511221 51.2287731, -0.9512501	51.26537401365817, -0.969163938125872 51.26794924805306, -0.961281602674294 51.26964239407467, -0.958191913659704 51.26992446624372, -0.957734803924478 51.26997939522803, -0.95773086296829 3 51.26996655757047, -0.955554390803265 51.270165256678276, -0.95308424789419 51.27047701413416, -0.952847745102986 51.270477501133485, -0.948881734265543

country	name	geometry	buffer
		51.2288497, -0.952771 51.2292112, -0.9529454 51.22933709999999, -0.9530001 51.2294781, -0.9526864 51.230031, -0.952643 51.2302477, -0.952674 51.2303839, -0.952835 51.2307058, -0.9529505 51.2309603, -0.9529662 51.2310577, -0.9529308 51.2311285, -0.950464 51.2306224, -0.9484442 51.230189, -0.9476626 51.2299955, -0.9468799 51.2298144, -0.9468268 51.2298021, -0.9460993 51.2296705, -0.9453951 51.2295931,	51.270968049875925, -0.945253617529792 51.2714821597766, -0.936420354132451 51.271624153414514, -0.927713589409758 51.27068147585761 4, -0.919470291004977 51.2686905456551 4, -0.912009489571244 51.265728285883036, -0.90740548148312 51.262976444403535, -0.906582537144548 51.26257733274439, -0.905756304736021 51.26199068212415, -0.905619931704576

country	name	geometry	buffer
		-0.9441724 51.2295467, -0.9412045 51.2277973, -0.9407982 51.2275578, -0.9399779 51.2279757, -0.9397767 51.2282156, -0.9394362 51.2284787, -0.9388868 51.2289585, -0.938535 51.2289169, -0.9380575 51.229028, -0.9358649 51.22945, -0.9354275 51.2296396, -0.9353733 51.2297789, -0.9354352 51.2299104, -0.93559 51.23010389999999, -0.9361163 51.2304289, -0.9356132 51.2306688, -0.9354146 51.2307918,	51.26190916693708, -0.905536202670084 51.26183440157199, -0.9015338920085 51.25899252130111, -0.899031057883901 51.25806732830904, -0.892506231709278 51.254423618213956, -0.8872332051798 51.25005733866189, -0.883411852301174 51.24513381353597, -0.88118702140723 7 51.23983952199338, -0.880643044685644 51.23437505205347, -0.88180541567334

country	name	geometry	buffer
		-0.9340105 51.2316611, -0.9319522 51.2316074, -0.9273559 51.2314876, -0.9268876 51.2320419, -0.9269487 51.2322414, -0.9271027 51.2329284, -0.9270834 51.23313359999999, -0.9267873 51.2336402, -0.9268491 51.2336994, -0.9268222 51.2337254, -0.9267987 51.2337499, -0.9266937 51.2337587, -0.9255309 51.2353663, -0.9316177 51.2355419, -0.9326254 51.235571, -0.9332495 51.236627, -0.9348835 51.2365683,	51.2289475111371, -0.883046910125428 51.22665202647894, -0.883649018663805 51.22442744565272, -0.887185172186591 51.218888361723096, -0.887653472186591 51.2183339032873, -0.892268183047352 51.213925884721625, -0.898114589027587 51.210134091016634, -0.904987461906774 51.20709179347907, -0.912645541075297 51.20490594414062, -0.91524874528501

country	name	geometry	buffer
		-0.9350052 51.2398789, -0.9373441 51.2397675, -0.9376572 51.2418772, -0.9375548 51.2419286, -0.9372737 51.24201259999999, -0.9373025 51.2420499, -0.9373258 51.2420821, -0.9387241 51.2417319, -0.9390595 51.2423831, -0.9396889 51.2435895, -0.9413771 51.2432378, -0.941594 51.2433374, -0.943845 51.2429212, -0.943966 51.2428274, -0.9436515 51.2419364, -0.9445597 51.2418172, -0.9444564 51.241509,	51.204507067799774, -0.916253819592844 51.204139232683964, -0.916456865549243 51.204089154453925, -0.920157170423644 51.20256947958462, -0.928729234285478 51.2004567136492, -0.93780890058679 3 51.19948405514531, -0.947014292299082 51.199692485103725, -0.948234092720318 51.19988079611191, -0.949118079341054 51.19979803502879, -0.958040104175362

country	name	geometry	buffer
		-0.9451372 51.2413986, -0.9453094 51.2413961, -0.945377 51.2413904, -0.9457635 51.2411997, -0.9457988 51.2413059, -0.9461891 51.2412328, -0.9462701 51.241424, -0.9467368 51.2413439, -0.9467131 51.241306, -0.9471982 51.2413385, -0.9474999 51.2414264, -0.9477144 51.2419431, -0.9475243 51.2420211, -0.9476165 51.2422477, -0.9483601 51.2421334, -0.9485477 51.2425109, -0.9492629 51.2423739, -0.9501029 51.2422729,	51.20008290380428, -0.966695676949692 51.201468549172844, -0.96895957694969 2 51.20198594611359, -0.977960610775103 51.204793571468905, -0.985739299875511 51.208785106255995, -0.99190583466625 51.213760247524334, -0.9922928346662 5 51.2141573739563, -0.99338192153659 51.2155562870949, -0.996892415850687 51.218521413108796, -1.000618031136002

country	name	geometry	buffer
		-0.9500092 51.2420794, -0.9500521 51.2420715, -0.9502937 51.2420217, -0.9507009 51.2423233, -0.9515663 51.2415137, -0.9523005 51.2407759, -0.9521316 51.240661, -0.9521232 51.2406293, -0.9521155 51.240597, -0.9522704 51.2404923, -0.9524673 51.24060929999999, -0.9526691 51.240404, -0.9529181 51.240178, -0.953264 51.2398585, -0.9531385 51.2397743, -0.9532297 51.2397242, -0.9531479 51.2396579,	51.22341215023622, -1.0027773609402 51.228658962778745, -1.003290283867329 51.23406708150804, -1.002137768039602 51.23943581810392, -1.002018968039601 51.239753373835605, -1.001955345629355 51.23987243760896))

country	name	geometry	buffer
		-0.9533634 51.2393903)))	
England	North Weald Airfield	MULTIPOLYGON (((0.145508 51.71866439999999, 0.1443321 51.7160269, 0.1444523 51.7155802, 0.1445959 51.7152045, 0.1449834 51.7141908, 0.14512 51.7138335, 0.1453793 51.7131552, 0.1455737 51.713156, 0.1460665 51.7131582, 0.1462645 51.713159, 0.1468005 51.7131614, 0.14907 51.7131712, 0.1493312 51.7131678, 0.152418 51.7131272,	POLYGON ((0.099961014104789 51.712181926463444, 0.099096547080556 51.713968210463115, 0.09873056416365 3 51.715153063398574, 0.09851886416365 3 51.71583854266806, 0.09775267303586 4 51.719983459344746, 0.09799534347651 5 51.72415237500596, 0.09846234347651 5 51.72674589807469, 0.10055246502892 8

country	name	geometry	buffer
		0.1545485 51.7130992, 0.1557602 51.7130139, 0.1558562 51.713395, 0.1560916 51.7134516, 0.1589854 51.7134829, 0.1589131 51.7144682, 0.1588824 51.7153699, 0.1590046 51.7155183, 0.1591883 51.715733, 0.1596959 51.7162655, 0.1603329 51.7170586, 0.1608704 51.717728, 0.1613137 51.7185139, 0.1616209 51.7190584, 0.1615259 51.719504, 0.1610764 51.7200031, 0.1593276 51.721145, 0.1581281	51.73257380999185, 0.104602014068468 51.73799065273044, 0.110424503757038 51.742747163333135, 0.117751801104696 51.7466245377158 8, 0.1210093329527 51.7477059417249, 0.122045913092103 51.748687231560154, 0.128509450749433 51.75270435007199, 0.136154843850961 51.7558260254180 6, 0.14466420698783 51.757922658760364, 0.153683732011271

country	name	geometry	buffer
		51.72191069999999, 0.1575412 51.7223281, 0.1573191 51.7227368, 0.1572408 51.7232778, 0.1573803 51.7237849, 0.1577161 51.7245193, 0.1584521 51.7249944, 0.1599016 51.7257859, 0.1596044 51.7261747, 0.1594939 51.7273284, 0.1603479 51.7299015, 0.156934 51.73117, 0.1537091 51.72403, 0.1530869 51.7226523, 0.1526678 51.7214096, 0.1513025 51.7213695, 0.1508152 51.7214954, 0.1494184 51.7218866,	51.75890722159664, 0.162838398910972 51.758738850157066, 0.171747568654812 51.75742453241629, 0.18004080966014 51.755018819658765, 0.18345470966014 51.753750989076295, 0.190829008015867 51.75032976383942, 0.19692023177738 51.74604849128251, 0.201471976405446 51.741087171908156, 0.204292640338581 51.73565446109892, 0.205263490286987

country	name	geometry	buffer
		0.1446479 51.7234941, 0.1447134 51.7239326, 0.144225 51.7239436, 0.1431013 51.7236618, 0.1426343 51.7210681, 0.142846 51.7203827, 0.1432117 51.7191989, 0.145508 51.7186643999999)))	51.72997891708949, 0.204734115909498 51.72671037127081, 0.20605494830324 51.72314739045446, 0.20614994830324 51.72270182635912, 0.20630107214521 51.716212025445095, 0.204021278409392 51.709876182826854, 0.203714538061744 51.70933238715256 4, 0.203271697611418 51.70854714247215, 0.202793610129709 51.7078442873496, 0.201219507128744

country	name	geometry	buffer
			51.70400989179485, 0.197425186337249 51.69908508810418, 0.192153406543299 51.694713282861215, 0.185606792143585 51.69106269171689, 0.178036966658998 51.68827381671075, 0.169734881415622 51.68645401718042, 0.16834289414679 4 51.68632933228087, 0.167703547656563 51.68617799997844, 0.159260334965394 51.68526017525419, 0.153597868819641

country	name	geometry	buffer
			51.68532183839484, 0.153595996416639 51.685267110113465, 0.151465512974365 51.685295127122785, 0.148750205080674 51.685330834131356, 0.147119301160451 51.6853237873394, 0.146557389493955 51.68532127670092, 0.146374752383499 51.685320538319104, 0.145872013120932 51.68531829698495, 0.145677613120932 51.685317496492644, 0.137095919475759

country	name	geometry	buffer
			51.68579452441194, 0.128819038688952 51.68727865140606, 0.121151544440739 51.689715169207346, 0.114375586130326 51.69301427377761, 0.108740506307498 51.697054391043764, 0.10445366533472 51.70168667586157, 0.101672810914 93 51.706740514967585, 0.101413596496493 51.707418687264834, 0.101276750574904 51.707776681340036, 0.100888952944921

country	name	geometry	buffer
			51.70879130385161, 0.100745352944921 51.70916705712632, 0.10014800763111 51.71100374968583, 0.10002780763111 51.71145049488824, 0.099961014104789 51.712181926463444))
England	RAF College Cranwell	MULTIPOLYGON (((-0.5197834 53.0299059, -0.5192472 53.0294142, -0.5189193 53.0291462, -0.5187702 53.0290396, -0.5185733 53.02892509999999, -0.5181668 53.028727, -0.5165065 53.027992,	POLYGON ((-0.565084368682708 53.03376106134711, -0.56534064908867 4 53.0344073147424, -0.566468615098814 53.03889684236611 4, -0.566329878800393 53.04343607218261 5,

country	name	geometry	buffer
		-0.5161506 53.02785, -0.5156588 53.0276649, -0.5146659 53.0273049, -0.5145901 53.0273785, -0.5145552 53.0273731, -0.5145318 53.0273695, -0.5145203 53.0273677, -0.5145527 53.0272648, -0.5099629 53.0255138, -0.5097476 53.0257068, -0.5094468 53.0253745, -0.5091484 53.0254723, -0.5091285 53.02547879999999, -0.5088201 53.0255798, -0.5090418 53.025159, -0.507795 53.0246426, -0.5054326 53.023632,	-0.566202778800393 53.044178724565654, -0.564719901984724 53.048813172183905, -0.561917429303359 53.05322115676838, -0.55788971590247 53.057268110897105, -0.556122446647611 53.0584852468791 6, -0.555907257721384 53.05875839241611, -0.550163872536851 53.063270138567525, -0.542976494670554 53.06695927755132, -0.534663443897676 53.06966265094613,

country	name	geometry	buffer
		-0.5048168 53.023373, -0.5032107 53.02282909999999, -0.4953712 53.0202072, -0.4946127 53.0200211, -0.4919854 53.0197148, -0.4918321 53.0197368, -0.4918142 53.0197677, -0.4917844 53.0197808, -0.4916578 53.0201089, -0.4916153 53.0201031, -0.4915037 53.0200878, -0.4916293 53.0197653, -0.4916293 53.0197029, -0.4912513 53.0196257, -0.4835 53.0187387, -0.4780303 53.0179056, -0.4778935 53.0184416,	-0.532051549108116 53.07030893229255, -0.525896172787758 53.07224636912956 6, -0.5170578717351 53.0737594900667, -0.508765471741794 53.07412197242577, -0.507889064190576 53.07431187600905, -0.503108307103482 53.07463648552879, -0.497916809075752 53.0755080056209 5, -0.489016860576069 53.07590154405042, -0.482315660576069 53.07579670973641,

country	name	geometry	buffer
		-0.4771452 53.01836679999999, -0.4764375 53.02419829999999, -0.4765472 53.024427, -0.4769378 53.0245024, -0.4769216 53.02453389999999, -0.4769054 53.0245654, -0.4765293 53.02449449999999, -0.476368 53.0247345, -0.4763568 53.02512749999999, -0.4763776 53.02549759999999, -0.4763823 53.0255805, -0.4764124 53.0261861,	-0.475598838584939 53.0753866944775, -0.474792938584939 53.07530034775691, -0.46978745896725 53.0745284126186, -0.46976747978382 6 53.0745687162086 4, -0.46907037978382 6 53.07443991130316, -0.468788120882605 53.07437429502407, -0.468291862396593 53.0742977619967 2, -0.46230291489135 53.0727729199234, -0.46073358348834 53.07238540003969,

country	name	geometry	buffer
		-0.4764175 53.0262448, -0.4765716 53.0272961, -0.4767523 53.0276255, -0.4768622 53.0276452, -0.4768564 53.0276584, -0.4768281 53.0277224, -0.4767396 53.0277066, -0.476626 53.0280107, -0.4766252 53.028294, -0.4766101 53.0284783, -0.4765842 53.02861319999999, -0.4765394 53.0287762, -0.4764622 53.029015, -0.4763944 53.0291894, -0.4762535 53.029539, -0.4761707 53.0297164, -0.4759955 53.0301118,	-0.45324878782523 53.06936803698215, -0.44691740962121 9 53.06551322661315, -0.44199441694930 6 53.06097600303186, -0.43867806142462 6 53.05593889855628 5, -0.43735776148537 7 53.05147060677267, -0.43479061589787 1 53.04935039822810 1, -0.43108545608665 8 53.04451505890605, -0.42903043236207 3 53.03933608032135, -0.42870542979403 9 53.03401469897604,

country	name	geometry	buffer
		-0.4758738 53.0303676, -0.4756882 53.0307898, -0.4755079 53.0311964, -0.4753047 53.0316708, -0.4750797 53.0321972, -0.474806 53.0328288, -0.4746458 53.0331899, -0.4746271 53.0332322, -0.4743954 53.0337423, -0.4741541 53.0342867, -0.4738865 53.0348927, -0.4738727 53.0349239, -0.4738618 53.0349485, -0.4735348 53.0356891, -0.4874913 53.036134, -0.4874877 53.0362567, -0.4874638 53.0370715, -0.4875751 53.037244,	-0.430123082228368 53.02875775922477, -0.430457357368841 53.028000581338965, -0.430478602824047 53.02795257780455, -0.430753534233321 53.027329920814196, -0.430994834233321 53.02678543299111, -0.431060764781686 53.02663832919031, -0.431279229085404 53.026156302583146, -0.431374616116697 53.02594126003404, -0.431462498212397 53.02573842875744,

country	name	geometry	buffer
		-0.4876107 53.0374252, -0.4875303 53.0387465, -0.4874209 53.0389312, -0.4875114 53.0400889, -0.4871201 53.040514, -0.486616 53.040399, -0.4852296 53.0402971, -0.4846466 53.0405026, -0.4844781 53.0403706, -0.4832166 53.0408816, -0.4832494 53.0415119, -0.4826338 53.0415397, -0.4824705 53.0448952, -0.4822465 53.04521779999999, -0.4818727 53.0484325, -0.4818905 53.0485744, -0.4825876 53.0486992,	-0.431447632821951 53.024664495624215, -0.431458832821951 53.02427149140596, -0.431704682640493 53.02291888169719, -0.431640934860905 53.02223135640174, -0.432348634860905 53.0163995905163, -0.433987281086304 53.010881153941725, -0.437483249393965 53.00568422802949, -0.442686089083295 53.001032619513246, -0.445206196828433 52.999560393634546,

country	name	geometry	buffer
		-0.482679 53.0487275, -0.4834849 53.0488139, -0.4901861 53.0489188, -0.4903055 53.0488492, -0.4903871 53.04849369999999, -0.4905494 53.04841659999999, -0.4913055 53.0483807, -0.491664 53.04836369999999, -0.4959123 53.04784369999999, -0.4963073 53.0478386, -0.4972096 53.0480248, -0.4976779 53.048026, -0.4988157 53.0476846, -0.4992248 53.0476945,	-0.446012547080621 52.99895175213878, -0.447573728282035 52.998177255815214, -0.449371893411599 52.99712671843604, -0.450732086667287 52.99661036320982, -0.453219049916273 52.9953765163096, -0.461498245186418 52.99277533331479, -0.470492189212283 52.99126084652879 6, -0.479812036785332 52.99089864952857, -0.489054852545657 52.99170443034789,

country	name	geometry	buffer
		-0.5029625 53.0453913, -0.5034742 53.0452516, -0.5039884 53.0449785, -0.5092659 53.0441071, -0.5092854 53.04480729999999, -0.5093945 53.0461972, -0.5092326 53.0471792, -0.5114962 53.0462778, -0.5124269 53.0459721, -0.5175598 53.0447013, -0.5176833 53.0441149, -0.5198164 53.04240619999999, -0.5215229 53.0414148, -0.52165 53.0406721, -0.521223 53.0395955, -0.5208468 53.0386312,	-0.493217920346282 52.99233890125545, -0.499645101477025 52.99307483036495, -0.50021620261972 52.99316540926677, -0.500531461140548 52.99318158308178, -0.503158761140548 52.9934880714189, -0.511576058191049 52.9949963849713, -0.512334558191049 52.99518259289662, -0.517197802927596 52.99658700848927, -0.525037302927596 52.99921034371851,

country	name	geometry	buffer
		-0.5208161 53.0376331, -0.5192361 53.0376038, -0.5189124 53.0374811, -0.5187175 53.0366961, -0.5186543 53.0365993, -0.5187593 53.035619, -0.5191433 53.0342268, -0.5191898 53.031649, -0.5192488 53.0313941, -0.5196873 53.0309292, -0.5197834 53.0299059)))	-0.525246312418524 52.99928072216261, -0.526852412418524 52.99982491901285, -0.530555811267385 53.00122688458659, -0.531171611267385 53.00148601752990 6, -0.531465071319744 53.00161056110876, -0.533549766803469 53.002502819613404, -0.533966410089558 53.002675474299, -0.533991826332781 53.002683694424 04, -0.538278001872304 53.0043169169903,

country	name	geometry	buffer
			-0.538848380426622 53.00452383215195, -0.539485954308978 53.0047595017127, -0.539977754308978 53.00494469999578, -0.540980786813081 53.0053336636165, -0.541336686813081 53.00547573773463, -0.543132543936467 53.00623122669905, -0.544792843936467 53.00696597470395, -0.546444282854201 53.00773425098431, -0.546850782854201 53.00793244739172,

country	name	geometry	buffer
			-0.549794898391911 53.00950120186884, -0.549991798391911 53.00961575342802, -0.553142378957614 53.01164733904013, -0.553291478957614 53.01175398202197, -0.555096550072041 53.01313363843874, -0.555424450072041 53.013401737927346, -0.556806169272232 53.01459767484555, -0.557342369272232 53.01508954374671, -0.561689262840116 53.0201828821529,

country	name	geometry	buffer
			-0.564154604089786 53.025712173436624, -0.564627700430061 53.0314290368739, -0.56459071199646 53.0317338807953, -0.5647574592605 9 53.03203773703958, -0.565084368682708 53.03376106134711))
England	Graveley Airstrip	MULTIPOLYGON (((-0.2038616 51.9382788, -0.2037708 51.9386178, -0.2032597 51.9405272, -0.2029175 51.9417987, -0.2026956 51.9417709, -0.2022576 51.9417161, -0.2021093	POLYGON ((-0.247622371908781 51.94597891817388, -0.24755685489531 9 51.946256029899786, -0.245501038578035 51.95141567348772, -0.24188398945460 5

country	name	geometry	buffer
		51.9420697, -0.2031106 51.9422632, -0.2034866 51.9406727, -0.2039343 51.9395445, -0.2043219 51.9385836, -0.2038616 51.9382788)))	51.95623771129807, -0.236838922842973 51.96054468419738, -0.23055164770779 51.964178136168435, -0.223253723347134 51.96700442554132, -0.215213931102051 51.96891962105096, -0.206728375184451 51.96985330618582, -0.1981095772082 51.96977115513138, -0.189674966070038 51.96867618798746, -0.188673666070038 51.96848280194473, -0.180821016079827

country	name	geometry	buffer
			51.96644423653757, -0.173734583603971 51.963528469062666, -0.167669426715618 51.95984028612979, -0.162843845276448 51.95551226234129, -0.159431523789613 51.950700013163924, -0.157555280068781 51.945576616876025, -0.157282644724005 51.940326403086424, -0.158623430569554 51.93513832881888, -0.158771730569554 51.93478467418369, -0.16006811811152

country	name	geometry	buffer
			51.93258043916865, -0.161924310772692 51.9283618611104, -0.166017616395597 51.923361635624104, -0.171658493451371 51.91897103275987, -0.178616266959306 51.91536980201165, -0.18606409486195 51.912705415081284, -0.195302176457567 51.91108700206872, -0.204347967873896 51.91058086057126, -0.213373870024988 51.91120772590753, -0.222010782541525

country	name	geometry	buffer
			51.91294191711491, -0.22990551218628 51.91571239462628, -0.236735216147668 51.9194056851599, -0.237195516147668 51.91971061336548, -0.242589927822359 51.92408374732167, -0.246478622397895 51.92902700824428, -0.248708592932216 51.93434574126217, -0.249192097648303 51.93983057706151 4, -0.247910112275506 51.94526568469132,

country	name	geometry	buffer
			-0.247622371908781 51.94597891817388))
England	Norton Malreward Airstrip	MULTIPOLYGON (((-2.5654583 51.3846383, -2.5657733 51.3847671, -2.5661948 51.3844554, -2.568844 51.3826929, -2.5703246 51.3817381, -2.5713854 51.3810539, -2.5711039 51.3808904, -2.5700389 51.3815952, -2.5685795 51.382561, -2.5654583 51.3846383)))	POLYGON ((-2.59886930315520 51.40358072761641 -2.59340815076084 51.40685957733174, -2.58553608030195 51.40993232440705, -2.57681923638420 51.41192951590333, -2.56763022641780 51.41276592494875, -2.55836184087120 51.41240586243619 -2.54941026317591 51.41086469179492, -2.54115813459679

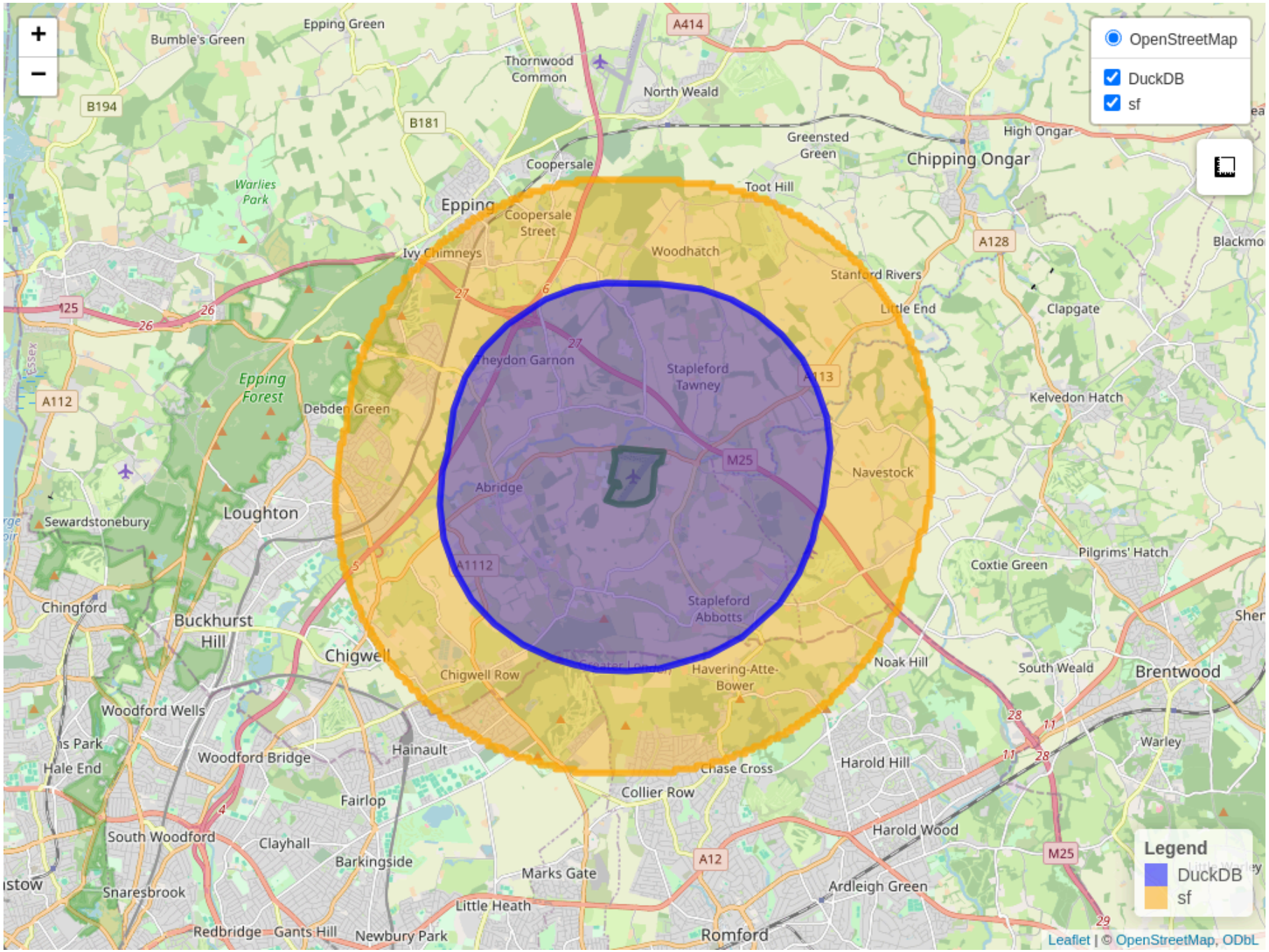
lander analytics

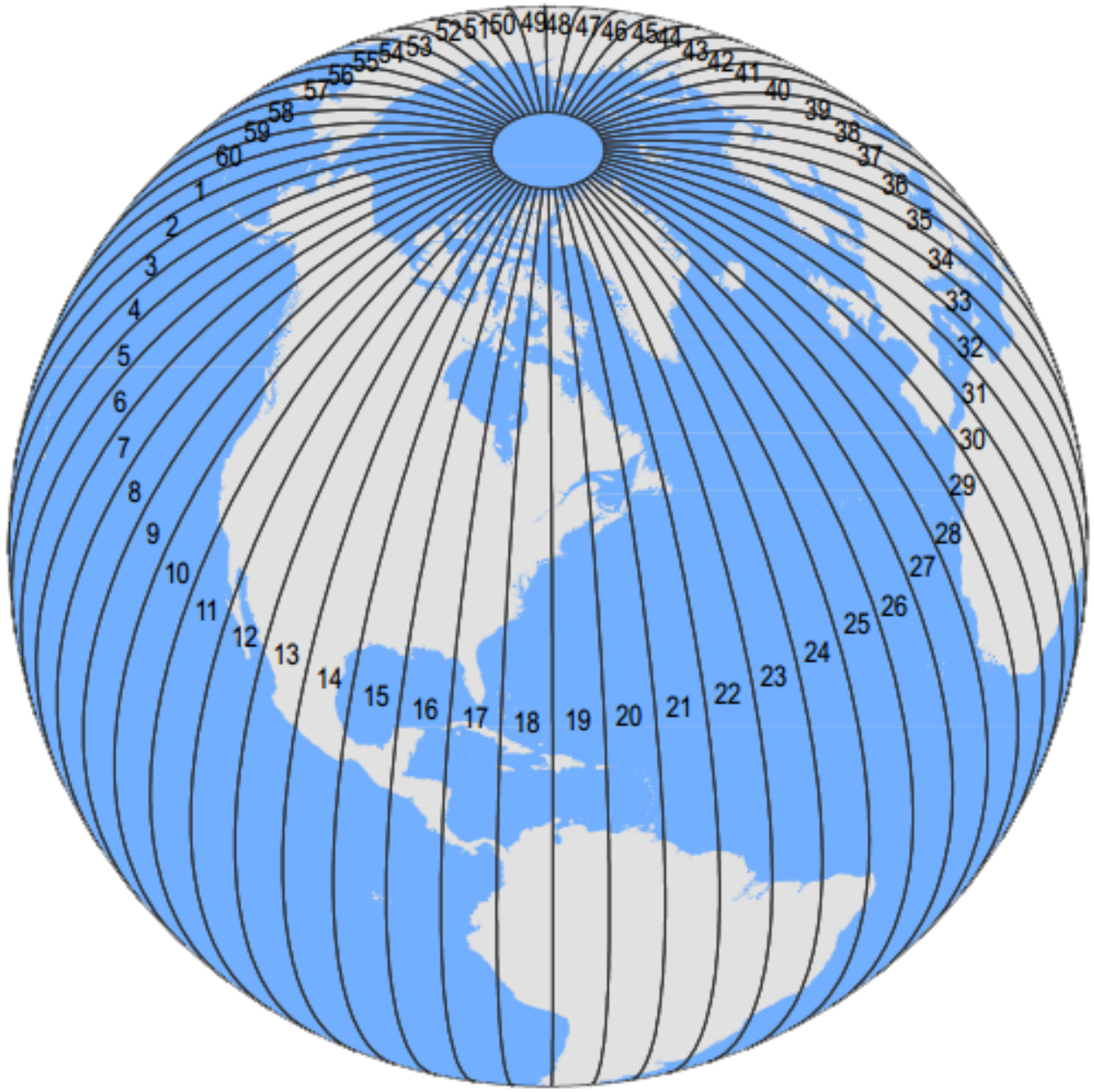
country	name	geometry	buffer
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country	name	geometry	buffer
			51.3697580841978, -2.532694375493727 51.36545990164824, -2.535815575493727 51.363381731235314, -2.535903237487776 51.36332352877753, -2.537362796787093 51.362357217411, -2.538427796787093 51.36165212120361, -2.545037291923404 51.35805483902127, -2.552640052040171 51.35532769770708, -2.560946374873231 51.35357477728614, -2.569639748985341

country	name	geometry	buffer
			51.352862986787315, -2.578388914396598 51.35321949743729, -2.586860485206326 51.354630699975004, -2.594731653222908 51.3570427269254 9, -2.601702488531292 51.36036351937339, -2.601983988531292 51.36052709268941, -2.60787476512224 51.364704377801374, -2.612328342873167 51.369525288773396, -2.615169309667249 51.374799774287006, -2.616285768951411

country	name	geometry	buffer
			51.380319969876055, -2.615633746981999 51.385868403667715, -2.613238924809229 51.39122656955616, -2.609195626783146 51.39618352894677, -2.603663105420575 51.40054420298085, -2.602599893102684 51.40122966669798, -2.601362697425271 51.40202716319527, -2.598952952966085 51.40362967999909, -2.598869303155205 51.403580727616415))


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Bumble's Green
Thornwood Common
North Weald
A414
B194
B181
Greensted Green
High Ongar
Chipping Ongar
Coopersale
Toot Hill
Warlies Park
Epping
Coopersale Street
Woodhatch
Ivy Chimneys
A128
Stanford Rivers
Little End
Clapgate
Blackmore
Theydon Garnon
Stapleford Tawney
A113
Kelvedon Hatch
Epping Forest
Debden Green
M25
Navestock
Abridge
Loughton
Sewardstonebury
A112
A1112
Coxtie Green
Pilgrims' Hatch
Stapleford Abbotts
Chingford
Buckhurst Hill
Chigwell
Chigwell Row
Havering-Atte-Bower
Noak Hill
South Weald
Brentwood
Woodford Wells
Woodford Bridge
Hainault
Hale End
Chase Cross
Harold Hill
Warley
Collier Row
Fairlop
South Woodford
Clayhall
Barkingside
Harold Wood
A12
Marks Gate
Ardleigh Green
Snaresbrook
Little Heath
Redbridge
Gants Hill
Newbury Park
Romford


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```
CREATE TABLE IF NOT EXISTS utm AS SELECT * FROM ST_Read('utm_crs.geojson');
```

```sql
SELECT
  country, name, ST_AsText(airports.geometry) AS geometry,
  ST_AsText(ST_Transform(
          ST_Buffer(ST_Transform(airports.geometry, 'EPSG:4326', crs, always_xy := true), 5000),
          crs, 'EPSG:4326', always_xy := true
      )) AS buffer
FROM airports
INNER JOIN utm
ON ST_Intersects(airports.geometry, utm.geom);
```

Displaying records 1 - 10

country	name	geometry	buffer
France	Inia William Tuuta Memorial Airport	MULTIPOLYGON (((-176.4796917 -43.8194645, -176.47966739999998 -43.8194369, -176.47958789999998 -43.8193468, -176.4795869 -43.8193458, -176.479586 -43.81934479999999,	POLYGON ((-176.44116146690575 -43.85534779846877, -176.44233001077177 -43.85615801017851, -176.44247254067034 -43.85624005810316, -176.4511380000413 -43.860421536795286, -176.45121743601243 -43.860453257639655,

country	name	geometry	buffer
		-176.47958509999998 -43.8193437, -176.4794264 -43.8191743, -176.4794259 -43.8191738, -176.4794254 -43.8191733, -176.4794249 -43.8191727, -176.47927869999998 -43.8190215, -176.4792757 -43.8190185, -176.4792727 -43.8190156, -176.4792695 -43.8190127,	-176.46287517765973 -43.86404171042794, -176.47529680709562 -43.86584592583661, -176.48796625124177 -43.86579093448761, -176.50035706910444 -43.86387901559863 4, -176.51195446987316 -43.86018960260216, -176.5222768317351 -43.85487596258788, -176.53089580021873 -43.84815879176381, -176.53745411132846 -43.840317000774085, -176.5416803901686 -43.83167608260479,

country	name	geometry	buffer
		-176.4791275 -43.8188887, -176.4791247 -43.8188863, -176.4791218 -43.8188839, -176.4791188 -43.8188816, -176.47893919999999 -43.8187455, -176.4789294 -43.81873859999999, -176.4789189 -43.8187322, -176.4789079 -43.81872639999999, -176.4786823 -43.81861749999999,	-176.54401411170517 -43.82471922941402, -176.54573888271068 -43.81551869121849, -176.54482020559252 -43.80625763574413, -176.54129835276933 -43.79732995414846, -176.53532416313047 -43.78911518954301, -176.52715245346752 -43.78196242975213, -176.51713106427954 -43.776175517174266, -176.50568602497157 -43.77200019488024, -176.49330347570287 -43.76961372382893,

country	name	geometry	buffer
		-176.47867979999998 -43.8186162, -176.4786772 -43.8186151, -176.47867449999998 -43.8186139, -176.4783529 -43.81847469999999, -176.4783472 -43.81847229999999, -176.4783414 -43.8184701, -176.4783355 -43.818468, -176.478064 -43.8183772, -176.4780638 -43.8183772, -176.47806359999998	-176.49136188007455 -43.76939139119805, -176.4890872565748 -43.76913090410596, -176.4661321222443 -43.76376660254903, -176.45432403350367 -43.76190042862618, -176.4422410834752 -43.76172548206416, -176.43033966871 81 -43.76324836575558, -176.41906937102348 -43.76641154905943, -176.40885608061 16 -43.771095527922604, -176.40008598646693 -43.77712331297464,

country	name	geometry	buffer
		-43.8183771, -176.4780634 -43.818377, -176.4777733 -43.818281, -176.4775502 -43.8182016, -176.4773361 -43.8181154, -176.4771442 -43.8180209, -176.47694429999999 -43.8178923, -176.4767614 -43.817751, -176.4764751 -43.817522, -176.47647469999998	-176.3930910230567 -43.784267081005396, -176.38813631441937 -43.7922567452439, -176.38731838997566 -43.79401611989654, -176.38458416490994 -43.80259286068862, -176.3842061488362 -43.81139100938984, -176.38619982053953 -43.82007421719951, -176.39048993329536 -43.8283103872521, -176.39691324352304 -43.835784388635446, -176.40522463348725 -43.8422101408549,

country	name	geometry	buffer
		-43.8175216, -176.47647419999998 -43.8175213, -176.4764738 -43.8175209, -176.476009 -43.8171571, -176.47600789999998 -43.8171562, -176.4760068 -43.8171553, -176.4760057 -43.8171545, -176.4757069 -43.8169326, -176.4756807 -43.8169521, -176.47546459999998	-176.41510641208492 -43.847341601281485, -176.42618044903088 -43.85098222795414, -176.43451385956075 -43.85303680199201, -176.4356680146101 -43.85331222127302, -176.4382717668321 -43.85391316943369, -176.44116146690575 -43.85534779846877))

country	name	geometry	buffer
		-43.8171123, -176.47194449999998 -43.8163031, -176.47267639999998 -43.8146015, -176.4545585 -43.8104217, -176.4462303 -43.8083686, -176.4470467 -43.8066088, -176.4746124 -43.81305039999999, -176.4816585 -43.8138575, -176.4836006 -43.8140799, -176.4812603	

country	name	geometry	buffer
		-43.8210355, -176.4811809 -43.8210038, -176.4810384 -43.8209218, -176.4808864 -43.8207951, -176.4806609 -43.8205822, -176.47991159999998 -43.8197335, -176.4797495 -43.8195302, -176.479748 -43.8195284, -176.4797466 -43.8195267, -176.4797451	

country	name	geometry	buffer
		-43.819525, -176.4796917 -43.8194645)))	
France	Rarotonga International Airport	MULTIPOLYGON (((-159.8138578 -21.2036137, -159.808842 -21.2036203, -159.7942697 -21.2036206, -159.79428289999998 -21.202698, -159.7942498 -21.2026985, -159.7941869 -21.2024526, -159.7941869 -21.2024241,	POLYGON ((-159.86535543023948 -21.20069602419728, -159.86532892852114 -21.19980190236837, -159.86532017947113 -21.19964940644852, -159.86433326094982 -21.19266709739076, -159.8643071266562 -21.19255200605553, -159.86152502932973 -21.18428922159925, -159.86145189132606 -21.184127841761118,

country	name	geometry	buffer
		-159.7942061 -21.2023623, -159.79429639999998 -21.2022325, -159.7942914 -21.2015537, -159.79490339999998 -21.2006796, -159.79503889999998 -21.2007471, -159.7953466 -21.2002941, -159.7953795 -21.2002457, -159.7955973 -21.2002473, -159.7956021 -21.1999806,	-159.85561350326878 -21.17463972953056, -159.8555001893221 -21.17449869883932, -159.84792573657333 -21.16701503259161 4, -159.84776415004774 -21.16688816126661 6, -159.83902522275892 -21.16142667434697 3, -159.83887235438536 -21.16135229307020 5, -159.83047453995783 -21.15816619745826 4, -159.83023790413023 -21.15809991437064, -159.8290301248124 -21.15777762947441 3,

country	name	geometry	buffer
		-159.79568039999998 -21.1999616, -159.7957137 -21.1999239, -159.7957825 -21.1998771, -159.79620989999998 -21.1998744, -159.7967139 -21.1998765, -159.7967136 -21.199938, -159.7969633 -21.199939, -159.7970081 -21.1999327, -159.79712179999999 -21.19992, -159.7974548	-159.82886657017042 -21.157736139981075, -159.8277036990174 -21.157455690704708, -159.8273287049878 -21.157369912191996, -159.8267732326288 -21.15724611606452, -159.82631206400973 -21.15714640965994, -159.82607827609866 -21.157095882675783, -159.8255918151334 -21.15699270826896, -159.82499403626412 -21.156869662202194, -159.8247971929676 -21.15683071859606,

country	name	geometry	buffer
		-21.1999212, -159.7974538 -21.2001595, -159.7975888 -21.20016, -159.7975888 -21.200033, -159.7976578 -21.2000333, -159.7976568 -21.2001538, -159.7977928 -21.2001543, -159.7977938 -21.2000298, -159.7982418 -21.2000302, -159.79824280000003 -21.1999163,	-159.81969100195295 -21.156077134719563, -159.8194781660502 -21.156056638744918, -159.8165653263951 -21.15605725922414, -159.8164007062663 -21.156030614578675, -159.81489909857342 -21.156057591610242, -159.81033620034154 -21.15605841784731, -159.80459656950308 -21.154942118894365, -159.80054559360968 -21.15485726593023, -159.80054660903272 -21.15484017814553,

country	name	geometry	buffer
		-159.7987348 -21.1999207, -159.7987388 -21.200131, -159.79895890000003 -21.2001435, -159.7990147 -21.2001448, -159.7990158 -21.2001163, -159.7992345 -21.2001143, -159.79926 -21.2000428, -159.799084 -21.1999921, -159.7991372 -21.1998244, -159.79955669999998	-159.79980593360952 -21.15479622405008, -159.7991939044403 -21.15477650209 2076, -159.79919418117666 -21.15474929661 9197, -159.79870233066205 -21.15474489320 4597, -159.79819140537114 -21.15474419287 7114, -159.7969280268637 -21.15470346737 5317, -159.79642417995825 -21.15470136317167, -159.79588569496985 -21.15470193696 8625, -159.79545842469392 -21.15470463207 0786,

country	name	geometry	buffer
		-21.1999569, -159.79959739999998 -21.1999557, -159.7995221 -21.2001882, -159.7995029 -21.2002614, -159.7995006 -21.200463, -159.7995188 -21.2006583, -159.7997646 -21.2006592, -159.79980329999998 -21.2006848, -159.7998029 -21.200769, -159.800253 -21.2007708,	-159.78680613778116 -21.155495064574296, -159.7784609662748 -21.157731433729175, -159.7706505314156 -21.16134092787424, -159.77047015877997 -21.16144440061588, -159.7636155297979 -21.1662070248681 5, -159.76262150016728 -21.167196065107646, -159.76259627098298 -21.167170540048087, -159.76215307879121 -21.16755595524403, -159.7612192795936 -21.168591215674724,

country	name	geometry	buffer
		-159.80028260000003 -21.2006571, -159.8009337 -21.2007974, -159.8008836 -21.2015532, -159.8009217 -21.2015549, -159.80260130000002 -21.2015448, -159.8042992 -21.2015498, -159.80769279999998 -21.2015501, -159.8085652 -21.2015435, -159.8095228 -21.2015498,	-159.75776377345198 -21.172029140455027, -159.75754114435478 -21.17229419227198, -159.75577568323624 -21.174625899245207, -159.75464331434955 -21.17588114315326, -159.75403116956574 -21.1767551040061, -159.74898893193375 -21.18620393376336, -159.7464244573245 -21.19649279525615 5, -159.746319678394 -21.197363174561158, -159.74601560129426 -21.20241723078454,

country	name	geometry	buffer
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country	name	geometry	buffer
		-159.81416539999998 -21.2010632, -159.8143472 -21.2010142, -159.8145592 -21.2009937, -159.8147721 -21.2010142, -159.814969 -21.2010535, -159.81545559999998 -21.2011567, -159.8159169 -21.2012568, -159.8161011 -21.2013001, -159.816292 -21.2013426,	-159.79426878666257 -21.24879384463826, -159.80884552449402 -21.248793404021022, -159.80890910018567 -21.248793360021267, -159.81384800986726 -21.24878681418219, -159.81733587812084 -21.24879274681221, -159.82681604936937 -21.24792592373788, -159.83592882733242 -21.24532731471325, -159.84431785143227 -21.241098557538297, -159.85165513921186 -21.23540502914341,

country	name	geometry	buffer
		-159.8164556 -21.2013841, -159.8166923 -21.2014504, -159.8168452 -21.2015248, -159.8170068 -21.2016517, -159.81712009999998 -21.201793, -159.8171932 -21.2019544, -159.8172193 -21.2020695, -159.817228 -21.202222, -159.8172287 -21.2026531, -159.81722729999998	-159.85765392953962 -21.22846936235692, -159.8620798957625 -21.2205627224637, -159.86476028948348 -21.211994188166404, -159.86477526626115 -21.211919684799746, -159.86559203530186 -21.20235603607036, -159.86535543023948 -21.20069602419728))

country	name	geometry	buffer
		-21.2031381, -159.8172238 -21.2032499, -159.81731019999998 -21.2033989, -159.817438 -21.2035453, -159.817423 -21.2036198, -159.817165 -21.2036183, -159.8138578 -21.2036137)))	
France	Rangiroa Airport	MULTIPOLYGON (((-147.6710741 -14.9506628, -147.671484 -14.9519454,	POLYGON ((-147.6577114959049 -15.00236477250186, -147.65780061367408 -15.00237040592846,

country	name	geometry	buffer
		-147.6623837 -14.9545632, -147.6625491 -14.9549813, -147.6625465 -14.9551165, -147.66221819999998 -14.9552272, -147.6619332 -14.9553821, -147.6614419 -14.9557927, -147.6610653 -14.9560583, -147.6607003 -14.9562291, -147.6599316 -14.9564323,	-147.65805456688634 -15.002367503172193, -147.6653967597705 -15.001715368265023, -147.67206178807052 -15.000062141085039, -147.672133599069 -15.000051645147993, -147.67290243960773 -14.999848398859937, -147.6737272034344 -14.999549293619292, -147.6741133136717 -14.99942106586 7, -147.67423854804886 -14.999363849724348, -147.68086961130228 -14.996958901459305,

country	name	geometry	buffer
		-147.6598876 -14.9562799, -147.6596669 -14.9563393, -147.659649 -14.9562772, -147.6595012 -14.956317, -147.65947979999999 -14.9562428, -147.6594461 -14.9562516, -147.65942239999998 -14.9561676, -147.65934610000002 -14.9561881, -147.6593194 -14.9560954,	-147.6812346614786 -14.996788067587266, -147.68296623677404 -14.995783283469809, -147.68467944765467 -14.995290405078508, -147.69319491087467 -14.991918872498305, -147.7008611379629 -14.986984410017945, -147.7073783515036 -14.980680024686414, -147.71249177976202 -14.973252283316944, -147.7160016150829 4 -14.96499165677996, -147.71777081030865 -14.956221149834247,

country	name	geometry	buffer
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country	name	geometry	buffer
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country	name	geometry	buffer
			-147.60432108890674 -14.9520080924695, -147.60424510087617 -14.960890198632363, -147.60595722023047 -14.969615261446739, -147.60626843170147 -14.970640628640881, -147.6096782515632 -14.97882626455903, -147.61466053164978 -14.986211084932407, -147.62102518613418 -14.992513128407523, -147.62852928433085 -14.997491755618078, -147.63688632340646 -15.00095684952897,

country	name	geometry	buffer
			-147.64577717661257 -15.002776085944816, -147.6548629721688 -15.00287999450913, -147.6577114959049 -15.00236477250186))
France	Forks Airport	MULTIPOLYGON (((-124.400856 47.9356161, -124.4006844 47.9355931, -124.4005041 47.9356276, -124.40010929999998 47.9357484, -124.3997917 47.9352826, -124.390419	POLYGON ((-124.44277256994208 47.9005550610518, -124.44357056587178 47.90098607416624, -124.4527189327173 47.90697760357207, -124.4600929096564 47.914028392340484, -124.46517553954148 47.92188184309476, -124.46802860255345

country	name	geometry	buffer
		47.9383302, -124.39050479999999 47.9388075, -124.3900328 47.93898, -124.39044480000001 47.9396527, -124.4015341 47.9361567, -124.4016542 47.9360474, -124.400856 47.9356161)))	47.930252030516144, -124.4684634333719 47.9388340785425, -124.46646299641854 47.947315245155664, -124.46209905954365 47.955386314675785, -124.45552974336296 47.962752883280686, -124.45540969767806 47.96286223859961, -124.44813259290602 47.968456660336514, -124.43958213023389 47.973169813638854, -124.42999166775823 47.976872889300964, -124.41889569237223

country	name	geometry	buffer
			47.98037168194821, -124.4061252541395 47.98338255680625 5, -124.39271316707728 47.98460715851026, -124.37920820639823 47.98399536533917 6, -124.36616298494373 47.98157219730068 6, -124.35411117033702 47.97743678687647 4, -124.34354550486474 47.97175829549083, -124.33489755748111 47.96476894849235, -124.32852005648559 47.95675448282938, -124.32810871504388

country	name	geometry	buffer
			47.95608155632302, -124.32418007093995 47.947075969082775, -124.3231191240911 47.937718717464314, -124.32373879906991 47.93460579148529 6, -124.32373447039237 47.93442373430186, -124.32386648741712 47.93396430680313, -124.32497052344524 47.92841718082619, -124.32604087166273 47.92639615935332, -124.32635300153275 47.9253095835266, -124.32808368479569

country	name	geometry	buffer
			47.92253848163061, -124.32965218335424 47.9195760992008, -124.33054055702434 47.91860408898843, -124.33169788258084 47.91675054605574, -124.3365794848101 47.91199548561705, -124.33695911456924 47.911579977691794, -124.33713041950992 47.91145876516726, -124.33954043014886 47.90911077320328, -124.34954610843896 47.902715153099145, -124.36128886774802

country	name	geometry	buffer
			47.89783555262163, -124.37065606880319 47.89479036433554, -124.38227195059889 47.89187139351677, -124.39448854803288 47.89044352068405, -124.40688693286216 47.89055569672713, -124.4137643029534 47.89148851939235, -124.41376659174134 47.89148079528186, -124.41393805084768 47.89150377731184, -124.41403584928929 47.89152534182475, -124.41904199708343

country	name	geometry	buffer
			47.89220406444574, -124.42725612057242 47.89443946920732, -124.42916611157499 47.89486032355464, -124.42984030163979 47.89514257002215, -124.43053691819173 47.8953320913012 6, -124.4314291042845 47.89564235948638, -124.43133294866 47.89576741488471, -124.44277256994208 47.900550610518))
France	Samoa Field Airport	MULTIPOLYGON (((-124.2115995 40.7800884,	POLYGON ((-124.27083538650729 40.79141395617655,

country	name	geometry	buffer
		-124.2115905 40.7822606, -124.21175419999999 40.7846255, -124.2124879 40.7846292, -124.21252670000001 40.7818924, -124.21298480000002 40.7818976, -124.2130067 40.7780672, -124.2122536 40.7770947, -124.2108991 40.778005, -124.2095612 40.7780282,	-124.27048729075348 40.79385341689555, -124.26702019740218 40.80225544107618, -124.26146686667421 40.809983978704224, -124.25403909619249 40.81674331473374, -124.24502065624269 40.82274732035794, -124.23475646885954 40.82636645074315, -124.22363939687702 40.82886177383552, -124.2120951517415 40.829665119985556, -124.21136095533417 40.8296614245309,

country	name	geometry	buffer
		-124.2078692 40.7800629, -124.2115995 40.7800884)))	-124.20023173747188 40.82880326162852, -124.18951343889941 40.82637154803562, -124.17958825630613 40.82245299659151, -124.1708099505012 40.81718732852529, -124.16349118790279 40.810762266211434, -124.16060565662313 40.8069716280918, -124.15880591729916 40.80532047768334, -124.15333960918383 40.79768875715699, -124.14990455216983 40.78940125634115,

country	name	geometry	buffer
			-124.14862791481336 40.78076663450676, -124.14955639098717 40.77210636079687, -124.15265458352287 40.76374273699338, -124.15780644530352 40.75598690731317, -124.15949939653643 40.75395292064963, -124.16666033280373 40.746974558844194, -124.17547618977518 40.74119553340751, -124.1822396456409 40.73828691625419, -124.18241796782468 40.738188916514304,

country	name	geometry	buffer
			-124.18267961179289 40.73809768689268, -124.18560653918861 40.73683874637575, -124.1880261069049 40.73623329557584, -124.19294251883686 40.73451857093846, -124.20420404263182 40.732475269227365, -124.21577270876186 40.73213698112234, -124.22720704058449 40.73351603969605, -124.2380706638821 40.736561475268154, -124.24794886550397 40.74115537274103,

country	name	geometry	buffer
			-124.2564643479786 40.747122927483474, -124.26329159318144 40.75423628606085, -124.2640451623564 40.75520844955126, -124.26858105085836 40.76247317593386, -124.27134621943775 40.77023539223815, -124.272251926961 40.778247737888464, -124.2722334316901 40.78207809870154, -124.27103680064414 40.79091942823077, -124.27083538650729 40.79141395617655))

country	name	geometry	buffer
France	Rohnerville Airport	MULTIPOLYGON (((-124.1307244 40.5555241, -124.13072229999999 40.5567096, -124.1307194 40.5568319, -124.1307242 40.5572349, -124.13072569999999 40.5572969, -124.13073049999998 40.557715, -124.1307375 40.558101, -124.1307524 40.559388, -124.135391 40.559362, -124.135394	POLYGON ((-124.19751538596871 40.564417054469324, -124.19745938888157 40.564925817809595, -124.19476692874761 40.57261956044942 5, -124.19033889665485 40.57983132653773, -124.18431328509566 40.586335500184376, -124.18286055662554 40.58764105680804, -124.17379136634943 40.59422576766302, -124.16767735912326 40.59707395136245, -124.16763835914898

country	name	geometry	buffer
		40.55928, -124.135438 40.558541, -124.137372 40.558502, -124.137829 40.558496, -124.139282 40.557191, -124.139276 40.556078, -124.136635 40.554877, -124.136633 40.554538, -124.139934 40.554509, -124.139985 40.552184, -124.13918 40.551816, -124.138905 40.551615, -124.138618 40.551382, -124.138163 40.551189, -124.137592 40.551127, -124.136851 40.551105, -124.136406 40.550922, -124.13557 40.550627, -124.132746	40.597097632332975, -124.16755524991024 40.597130829685355, -124.16310353454185 40.59920428025839, -124.16088426401171 40.59979520372557, -124.15771027478831 40.60106267821431, -124.1469776036408 40.60352644917694, -124.13582718125373 40.60440011962638, -124.13118546936381 40.60442617866054, -124.11966833464649 40.60362751135879, -124.10857650989526

country	name	geometry	buffer
		40.550394, -124.130231 40.550226, -124.130184 40.551137, -124.1282309 40.5501066, -124.1263329 40.5498103, -124.12513179999998 40.5509703, -124.1253974 40.5524686, -124.1291745 40.5546101, -124.1304163 40.5553034, -124.13071540000001 40.5553019,	40.60113338979175, -124.09833555400058 40.597039507986295, -124.08933820372019 40.59150292606523, -124.08192925441234 40.584736014417025, -124.07720942083274 40.57814027790062, -124.07452238910516 40.575342448735306, -124.06959427578728 40.567207286549426, -124.06687661639464 40.55848905435422, -124.06661229147113 40.55699060500051, -124.06621751647717

country	name	geometry	buffer
		-124.1307244 40.5555241)))	40.547970037209424, -124.06818823288559 40.53907052430095, -124.07244441432532 40.53064933092262, -124.07881444499289 40.52304439087219, -124.08001586662724 40.52188486305695 4, -124.0874957146114 40.515891039911736, -124.0962851950716 40.51104239553359, -124.10608768786769 40.50750241494221, -124.11657259544975 40.50539043244773, -124.12738644759698

country	name	geometry	buffer
			40.50477763044017, -124.13440313039622 40.50536822069143, -124.13537978283594 40.505357891814924, -124.13789311344678 40.50552580349148, -124.1390927058959 40.50561535928849, -124.14191484129928 40.50584823109654, -124.15133866041461 40.50722421085681, -124.15389880021998 40.50794132906926, -124.15697478698908 40.5084978465909, -124.1668431445859

country	name	geometry	buffer
			40.511822891319994, -124.16729795528289 40.51201578219531, -124.16945134266783 40.51326314133437, -124.1695169640656 40.51317951155951, -124.17032165767287 40.51354730668547, -124.18018983487 02 40.51920492647852, -124.18830202165262 40.526304591940466, -124.19430327121242 40.53453616677355, -124.19793054939231 40.54353995524377, -124.19902433297904

country	name	geometry	buffer
			40.5529223747645, -124.19897537628687 40.55524737168706, -124.1975938987787 40.56423513300584, -124.19751538596871 40.564417054469324))
France	California Redwood Coast - Humboldt County Airport	MULTIPOLYGON (((-124.1007444 40.9765508, -124.1007471 40.9776362, -124.10080079999999 40.9778914, -124.1020694 40.9779157, -124.1020659 40.977979,	POLYGON ((-124.17527454442266 40.975963463231736, -124.17558743449506 40.97927408216488, -124.17458628666498 40.98690827462728, -124.17443929892029 40.98750564169517, -124.17386648728103 40.989565162419 6,

country	name	geometry	buffer
		-124.10206139999998 40.9780615, -124.10177979999999 40.9782721, -124.101659 40.9782901, -124.1015625 40.9783045, -124.101069 40.978025, -124.10082220000001 40.978025, -124.10091340000001 40.9786629, -124.1010958 40.9793878, -124.1013694 40.9801208, -124.1017449	-124.173669592879 40.99019924561901, -124.17356756624135 40.99052759273683, -124.17321667367571 40.99155269517511, -124.17304317098329 40.99357926248231, -124.17149331366842 40.99763343053538, -124.17125613595795 40.998899923011784, -124.17108755652696 40.9994102010111, -124.16946673448294 41.00293386316367, -124.16945910165126 41.00295382488531,

country	name	geometry	buffer
		40.9808862, -124.1021419 40.9815868, -124.10250659999998 40.9820809, -124.1028339 40.982498, -124.1032201 40.9829597, -124.1037136 40.9834335, -124.1042179 40.983806, -124.10445929999999 40.9840328, -124.10533369999999 40.9840976, -124.1067982	-124.16944900445232 41.00297240604173, -124.16756875646105 41.00705956637143, -124.16229701395972 41.014107456112804, -124.15544251615184 41.02032563145259, -124.14722688907524 41.02551266109708, -124.13791604528154 41.02950047095953, -124.12781156642 77 41.03215981515406, -124.12776864007151 41.03216792079148, -124.11658822565921 41.0334398648666,

country	name	geometry	buffer
		40.9845228, -124.1074044 40.9849318, -124.1078446 40.9849394, -124.1079339 40.9849409, -124.10904590000001 40.9849601, -124.1095984 40.9853772, -124.11127749999999 40.9854137, -124.1133884 40.9884689, -124.11343129999999 40.9884608, -124.11360029999999	-124.1052919119809 41.03308564659365 5, -124.09428872471663 41.03111808105862, -124.08397701792906 41.02760839696946, -124.07708428052038 41.0239376333605, -124.07622266390725 41.02366500309331, -124.06645290298854 41.01866280985611, -124.06288443937287 41.01591761423968, -124.06271482652534 41.01604929095799 4, -124.06221050658051 41.01567661155564,

country	name	geometry	buffer
		40.9879506, -124.11363239999999 40.9872987, -124.1137229 40.987128, -124.11377189999999 40.9870355, -124.1140938 40.9865455, -124.1141635 40.9864159, -124.1142145 40.9862519, -124.1142547 40.9859097, -124.11450149999999 40.9857964, -124.1139624	-124.05837702419683 41.012449598430806, -124.058180209467 41.01229815622882, -124.05803519815142 41.012161828543505, -124.05704405375685 41.01132740290465, -124.05655067134661 41.0108534037838, -124.05300638622022 41.0070609212218 4, -124.05262038876157 41.006599052304125, -124.05173529231227 41.00550581461608, -124.0514081944374 41.00508856860582,

country	name	geometry	buffer
		40.9850067, -124.1138792 40.9845106, -124.11388989999998 40.9843527, -124.11394890000001 40.9842231, -124.11422789999999 40.9841543, -124.1143888 40.9837453, -124.1157219 40.9801917, -124.1158242 40.9798634, -124.11601960000002 40.9792359, -124.11609879999999	-124.0506222888889 41.0040551128622, -124.05025784822703 41.00356084729609, -124.04752000274607 40.99934477402361, -124.04712346652981 40.99864398227201, -124.04602824198038 40.9965741635364, -124.04565328972778 40.995801830142256, -124.04417455949498 40.992365393856595, -124.04390153658893 40.991632252557196, -124.04271278451245 40.98780920674067,

country	name	geometry	buffer
		40.9788928, -124.11611080000002 40.9788411, -124.1161671 40.9786386, -124.1161162 40.9783935, -124.11604109999998 40.9782518, -124.1158024 40.9775674, -124.11583990000001 40.9773689, -124.1160357 40.9764779, -124.1160867 40.9764556, -124.1161242	-124.04253099681176 40.98708420793098 4, -124.04212448814211 40.98501111118177, -124.04210991448959 40.9849690163827, -124.04205643386855 40.984713786677844, -124.04204520560863 40.9846067730567 4, -124.04182803193889 40.98349916789608, -124.04173739269 40.9828612148621 5, -124.04171076836475 40.9814191628029, -124.04132121472477 40.977705794166006,

country	name	geometry	buffer
		40.9762673, -124.115995 40.97627209999999, -124.1159606 40.9762734, -124.1157785 40.9757816, -124.11564409999998 40.9757651, -124.1156517 40.9757155, -124.1156555 40.975686, -124.1156817 40.9755201, -124.1146597 40.9728652, -124.1140777	-124.04131948893867 40.97662038099788, -124.04132309273479 40.976067169021434, -124.0415031468061 40.96374992132910 4, -124.0427817873433 40.95494198122318, -124.04630985225144 40.94649423304367, -124.05195001821663 40.93873351016431, -124.05948345402702 40.93195995608119, -124.06861836719501 40.926435448686206, -124.07900132460956 40.92237351361076,

country	name	geometry	buffer
		40.971403, -124.113957 40.9711924, -124.1138041 40.9710628, -124.11360289999999 40.9709676, -124.11338029999999 40.970917, -124.1131765 40.9708947, -124.10991759999997 40.9708745, -124.1099122 40.9705626, -124.1099015 40.9704917, -124.1098318 40.9704451,	-124.09023090528106 40.919931109336304, -124.10187316118505 40.919202594335644, -124.11347829971864 40.92021610323244, -124.12459795966313 40.92293246788513, -124.1348024325629 40.92724672361344, -124.13572485399605 40.927732558920006, -124.13613605543634 40.92799582168958, -124.13682152521422 40.92829133835458, -124.13937428741 33 40.929663795090484,

country	name	geometry	buffer
		-124.1096815 40.9704229, -124.109357 40.9703783, -124.1090217 40.9703054, -124.1086999 40.9702062, -124.1083324 40.9700603, -124.10814730000001 40.9699712, -124.1080025 40.9699004, -124.1077477 40.9697161, -124.1075867 40.9695601,	-124.14257803093479 40.93191265616398, -124.1450507754052 40.93276000491236, -124.14525190208822 40.93285515157907, -124.15807759070749 40.94103425500249, -124.15823050530707 40.94116379671171, -124.16397350366164 40.946889846303456, -124.16844175134635 40.953235990874646, -124.16856258919714 40.95344653258391, -124.17095382459807 40.958381695655525,

country	name	geometry	buffer
		-124.1072327 40.9691652, -124.105382 40.9699915, -124.10537930000001 40.9669536, -124.1053525 40.9667693, -124.105221 40.966589, -124.10501450000001 40.9664007, -124.102461 40.9650275, -124.10246639999998 40.9655541, -124.1017127 40.9652787, -124.1018361	-124.17153695243702 40.959843596390485, -124.17169159137828 40.960237750362516, -124.17268241928258 40.96280596832545, -124.17322537661158 40.963813182927275, -124.17541980313732 40.97332541344173, -124.17527454442266 40.975963463231736))

country	name	geometry	buffer
		40.9647197, -124.10091340000001 40.9642336, -124.1007444 40.9765508)))	
France	Siletz Bay State Airport	MULTIPOLYGON (((-124.0306755 44.8776022, -124.03083160000001 44.8773723, -124.02984570000001 44.8770582, -124.0298563 44.8762403, -124.0300655 44.8754268, -124.03062209999999 44.8733944,	POLYGON ((-124.09424879981485 44.87441546440513, -124.09452738828074 44.87571326907617, -124.09378820410537 44.88503357272551, -124.09283216946649 44.88754664791759 6, -124.09270924708352 44.88841565836934, -124.09090880955807 44.89260180462818 5,

country	name	geometry	buffer
		-124.03157719999999 44.8699102, -124.0295501 44.8699113, -124.0276151 44.87723539999999, -124.02718480000001 44.8777419, -124.0271312 44.8779547, -124.0273587 44.8781948, -124.0263899 44.8819321, -124.0278983 44.8821322, -124.0282942 44.8821846,	-124.09035968521012 44.89404490034623, -124.09018111111651 44.89429357856256, -124.08907777323549 44.89685845524748, -124.08319603459177 44.90463464638913, -124.08241432619333 44.9053806183158, -124.08144617067 17 44.906643098034 8, -124.07369863922295 44.913555482687535, -124.06419782369395 44.919258147759 4, -124.0533101757996 44.92353085527967,

country	name	geometry	buffer
		-124.0289819 44.8795208, -124.0306503 44.8795253, -124.0306557 44.8781272, -124.0309813 44.8781838, -124.0312994 44.877836, -124.0306755 44.8776022)))	-124.04145601921014 44.92620854634082, -124.0290932570397 44.927187755865965, -124.01669958164909 44.92643063720354, -124.01627870701398 44.92637492996537, -124.01476918428214 44.92617468803086, -124.00323166790238 44.92382163467324, -123.99252730784632 44.919963719688695, -123.98304099094723 44.91473972055377, -123.9751135384853 44.90833751701199,

country	name	geometry	buffer
			-123.96902943390855 44.9009872980899, -123.9650066265627 3 44.89295324864952, -123.96318877495328 44.88452402102171, -123.96364019820527 44.87600234006063, -123.96438575912164 44.87202530704679, -123.96483072533418 44.870003578696654, -123.96488454857464 44.869790805746916, -123.96581237870117 44.86740229519719, -123.96735550194227 44.86158508960075,

country	name	geometry	buffer
			-123.97087201548092 44.85305789110818, -123.9766740840814 44.84518809855763, -123.98453487403452 44.83828218998644, -123.99414769536358 44.83260900292806 6, -124.00513799507074 44.82838931300387, -124.01707792855072 44.82578728691243, -124.02950294588395 44.82490413386101, -124.03152846774353 44.82490304914199, -124.04384630951748 44.82575490590185,

country	name	geometry	buffer
			-124.05569531515233 44.828301570693846, -124.0666226218283 44.832438063040314, -124.07621037099032 44.83800886574505, -124.08409161694958 44.84480100916138, -124.0899643441518 44.85255475550079, -124.09360306177605 44.860973488665636, -124.09486752749417 44.86973502419582, -124.09424879981485 44.87441546440513))
France	Seaside Municipal	MULTIPOLYGON (((-123.9073933	POLYGON ((-123.97143749253982

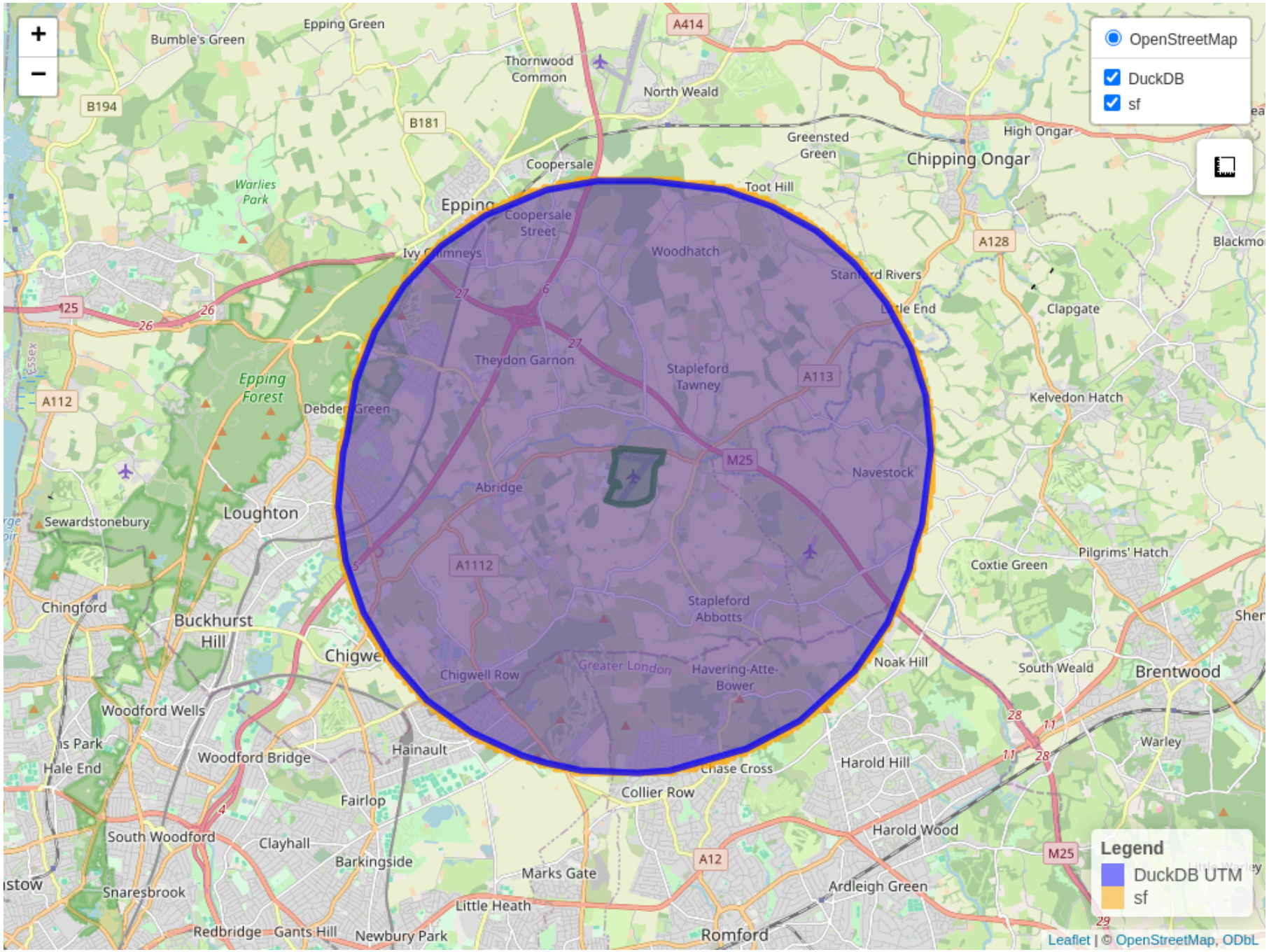
country	name	geometry	buffer
	Airport	46.0188313, -123.908502 46.0187753, -123.9087843 46.0184392, -123.908727 46.0172304, -123.9088886 46.0168795, -123.910213 46.016854, -123.9103297 46.0167666, -123.91020169999999 46.0162567, -123.91007629999999 46.0158616, -123.9086639 46.0158691,	46.00251929002398, -123.9731286006025 46.00612848818462, -123.97325442534778 46.0065235162562 2, -123.97381433351329 46.0084867202406 5, -123.97394289790597 46.0089654515299 6, -123.97491393236086 46.0172587233308 6, -123.97369303128232 46.0255047968297 5, -123.97032068068607 46.0334548434308 9, -123.96491051475664 46.0408388731944 6, -123.96452238802347

country	name	geometry	buffer
		-123.908409 46.0158081, -123.9084056 46.0115761, -123.9083092 46.0113074, -123.90790179999998 46.01113, -123.9076759 46.0111336, -123.9072808 46.0113858, -123.90719240000001 46.0146776, -123.9073078 46.0170709, -123.9073933 46.0188313)))	46.04118977085051, -123.96427207466665 46.0414881472699, -123.95694940516391 46.04854559555983, -123.94781002341406 46.05448827210681, -123.93719616357784 46.0590933015060, -123.92550568230781 46.06218792406055, -123.91317709176823 46.06365601609588, -123.91206749971072 46.06371206766549, -123.89909058901503 46.06345697959065, -123.8864493101438

country	name	geometry	buffer
			46.06140062619834, -123.8746546405079 46.057626127780786, -123.86418310815971 46.05228603967045 6, -123.85545744041151 46.04559614765991, -123.84882945241893 46.037826699302016, -123.84456587568145 46.02929143531732, -123.84283769495322 46.02033487456296, -123.84275372811932 46.018563572396936, -123.84264110832177 46.01617018871656, -123.84261873706511

country	name	geometry	buffer
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country	name	geometry	buffer
			45.96705373464755, -123.90620078116605 45.966146267402884, -123.90642649839717 45.96614267164846, -123.91887923451833 45.96678631894807, -123.9309218649548 45.96908911086352, -123.94210442206375 45.972965008955825, -123.94251164751287 45.973142289513795, -123.95232231769143 45.97838537797541 4, -123.96052130250466 45.98483570497605.


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Thornwood Common
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B194
B181
Greensted Green
High Ongar
Chipping Ongar
Coopersale
Toot Hill
Warlies Park
Coopersale Street
Woodhatch
A128
Clapgate
Theydon Garnon
Stapleford Tawney
A113
Kelvedon Hatch
Epping Forest
A112
M25
Navestock
Abridge
Loughton
Sewardstonebury
A1112
Coxtie Green
Pilgrims' Hatch
Stapleford Abbotts
Chingford
Buckhurst Hill
Chigwell Row
Greater London
Havering-Atte-Bower
Noak Hill
South Weald
Brentwood
Woodford Wells
Woodford Bridge
Hainault
Warley
Hale End
Chase Cross
Harold Hill
Collier Row
Fairlop
South Woodford
Clayhall
Harold Wood
Barkingside
A12
Marks Gate
Ardleigh Green
Snaresbrook
Little Heath
Redbridge
Gants Hill
Newbury Park
Romford

{geos}

```r
utm <- sf::read_sf(here::here('Talks', 'BiggerGIS', 'utm_crs.geojson'))

tic(msg='geos split')
air_5k_geos_split <- airports |>
  sf::st_join(utm |> dplyr::select(crs, geometry)) |>
  dplyr::select(country, name, crs, geom=geometry) |>
  dplyr::group_by(crs) |>
  dplyr::group_split() |>
  purrr::map(
    \(x) sf::st_transform(x, x$crs[1]) |>
      dplyr::mutate(geometry=geos::as_geos_geometry(geom)) |>
      sf::st_drop_geometry() |>
      dplyr::mutate(buffer=geos::geos_buffer(geometry, distance=5000)) |>
      sf::st_as_sf() |>
      sf::st_transform(4326) |>
      sf::st_set_geometry('buffer') |>
      sf::st_transform(4326)
  ) |> purrr::list_rbind() |>
  tibble::as_tibble() |>
  sf::st_as_sf()
toc(log=TRUE)
```

```
## geos split: 11.75 sec elapsed
```

Clean Up Airports

```sql
SELECT name, sum(1) AS n FROM airports GROUP BY name ORDER BY n DESC;
```

Displaying records 1 - 10

name	n
	44
Селскостопанско летище	7
Airport	6
NA	6
Letališče Slovenj Gradec	6
Flugplatz Ferlach - Glainach	6
Letališče Edvarda Rusjana Maribor	6
Zračna luka Pribislavec	6
Aeroportul Internațional Caransebeș	6
Športno letališče Ptuj	6

```
1  SELECT name, country, substring(ST_AsText(geometry), 1, 50) AS geometry FROM airports WHERE name ='St
```

2 records

name	country	geometry
Stapleford Aerodrome	England	MULTIPOLYGON(((0.1606512 51.6543247,0.1615611 51.6
Stapleford Aerodrome	Netherlands	MULTIPOLYGON(((0.1606512 51.6543247,0.1615611 51.6

```sql
CREATE TABLE IF NOT EXISTS airports_clean AS
SELECT
    a.name,
    a.country, a.geometry, w.iso3, w.name AS state
FROM
    airports a
INNER JOIN
    world w
ON
    ST_Intersects(a.geometry, w.geometry)
WHERE
    a.country = w.name
    OR
    (a.country IN ('England', 'Wales', 'Scotland', 'Northern Ireland') AND w.name = 'United Kingdom')
 ;
```

```sql
CREATE INDEX airports_cln_geom_gist ON airports_clean USING gist (geometry);
```

```sql
SELECT count(*) FROM airports;
```

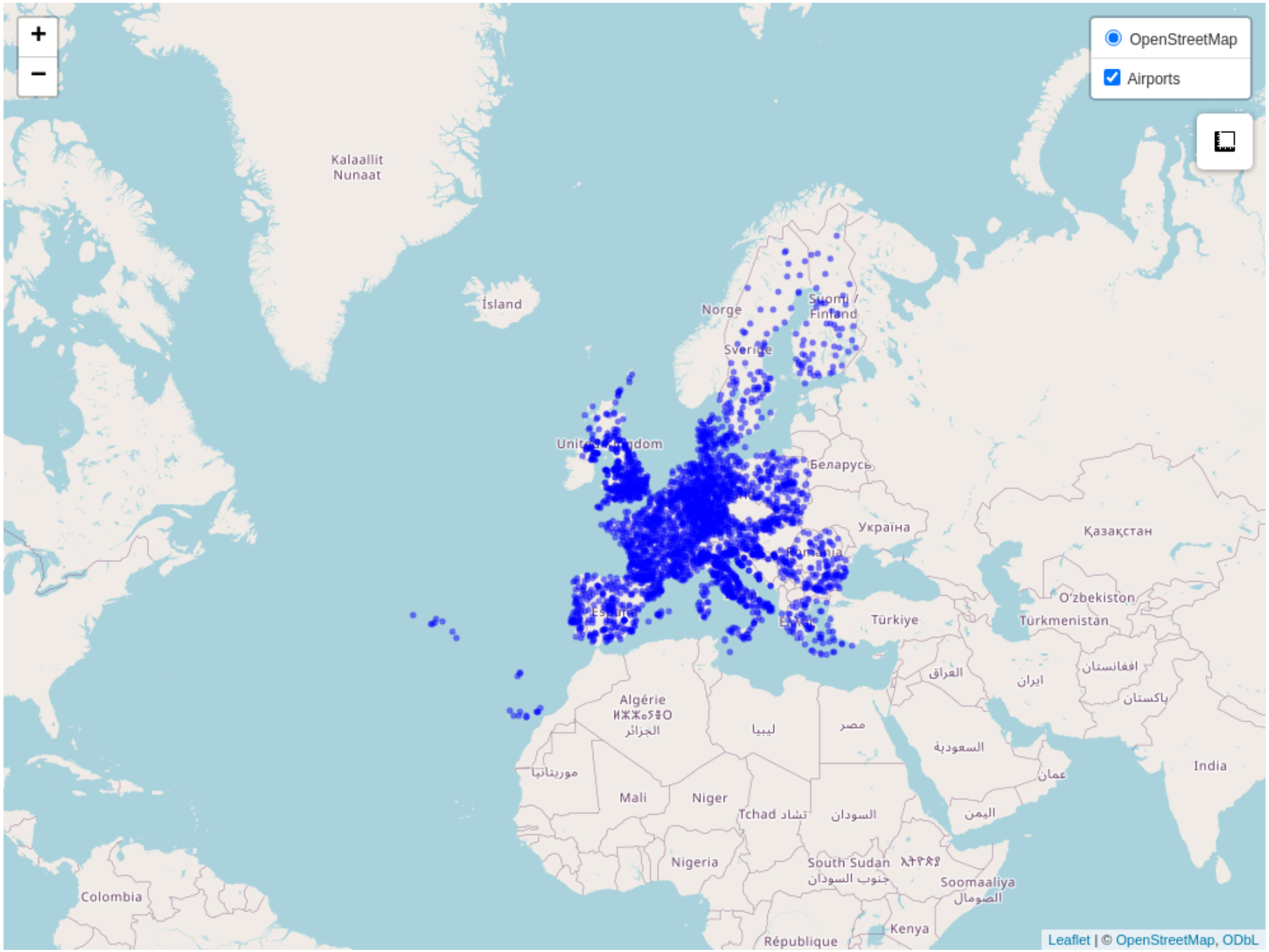
1
records

count
23642

```sql
SELECT count(*) FROM airports_clean;
```

1
records

count
3252


OpenStreetMap
Airports
Kalaallit Nunaat
Ísland
Norge
Suomi / Finland
Sverige
Беларусь
Україна
Қазақстан
Türkiye
O'zbekiston
Türkmenistan
ایران
افغانستان
پاکستان
India
العراق
السعودية
عمان
اليمن
مصر
ليبيا
Algérie
الجزائر
موريتانيا
Mali
Niger
Tchad تشاد
السودان
Nigeria
South Sudan جنوب السودان
Soomaaliya الصومال
Kenya
Colombia
Leaflet | © OpenStreetMap, ODbL

Locations in Buffers

```sql
WITH buffer AS (
  SELECT
    country, name, geometry,
    ST_Buffer(geometry::geography, 5000)::geometry AS buffer
  FROM
    airports_clean
)
SELECT
  latitude, longitude, id, timestamp, l.geometry
FROM
  locations l
INNER JOIN
  buffer b
ON
  ST_Intersects(l.geometry, b.geometry)
;
```

Displaying records 1 - 10

latitude	longitude	id	timestamp	geometry
51.22926	-0.9409358	o8s1vn	2022-08-24 01:59:41	0101000020E610000048C3C
51.23239	-0.9393596	o8s1vn	2022-11-14 09:36:25	0101000020E6100000DD651

latitude	longitude	id	timestamp	geometry
51.71974	0.1454667	gs4fwq	2022-11-13 18:05:24	0101000020E61000008DAB4
51.72596	0.1554094	mr0fsc	2022-05-16 15:37:43	0101000020E61000000E110
51.72254	0.1439458	cr9hce	2023-02-10 04:44:01	0101000020E61000003F1F0
51.20696	-1.5991936	8e1uap	2022-07-14 20:09:31	0101000020E610000081B68
52.40566	0.5494488	cnb96e	2022-05-17 01:23:32	0101000020E61000006894

latitude	longitude	id	timestamp	geometry
52.41688	0.5493928	ttk8ww	2023-02-13 14:47:38	0101000020E61000002194F(
52.20131	0.1800275	29ec9g	2023-05-04 04:34:52	0101000020E61000007CCA2
51.87353	-0.3760772	vztb7r	2022-11-22 12:44:41	0101000020E6100000B279D

```sql
CREATE TABLE IF NOT EXISTS
airports_clean_tbl AS
SELECT
  a.* EXCLUDE(geometry),
  u.crs,
  ST_GeomFromHexWKB(a.geometry) AS geometry,
FROM
  db.airports_clean a
INNER JOIN
  utm u
ON
  ST_Intersects(ST_GeomFromHexWKB(a.geometry), u.geom)
;

CREATE TABLE IF NOT EXISTS
locations_tbl AS
SELECT * EXCLUDE(geometry), ST_GeomFromHexWKB(geometry) AS GEOMETRY FROM db.locations;

CREATE INDEX air_idx ON airports_clean_tbl USING RTREE (geometry);
CREATE INDEX loc_idx ON locations_tbl USING RTREE (geometry);
```

```sql
WITH buffer AS (
  SELECT
    country, name, geometry,
    ST_Transform(
      ST_Buffer(ST_Transform(geometry, 'OGC:CRS84', crs, always_xy := true), 5000),
        crs, 'EPSG:4326', always_xy := true
    )
  FROM
    airports_clean_tbl
)
SELECT
  latitude, longitude, id, timestamp, l.geometry
FROM
  locations_tbl l
INNER JOIN
  buffer b
ON
  ST_Intersects(l.geometry, b.geometry)
;
```

Displaying records 1 - 10

latitude	longitude	id	timestamp	GEOMETRY
44.20118	12.05326	uxof4n	2022-05-21 13:48:26	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 37, fe, e5, 89, 44, 1b, 28, 40, d4, d5, c7, 23, c0, 19, 46, 40

latitude	longitude	id	timestamp	GEOMETRY
45.74996	12.05640	v7ef9q	2023-05-04 18:38:06	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 5c, 8f, 3e, 81, e0, 1c, 28, 40, 60, e1, 7e, be, fe, df, 46, 40
42.43555	12.05835	4jnb5o	2022-07-12 19:03:51	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 58, 45, 26, cc, df, 1d, 28, 40, 3e, b0, 01, fd, bf, 37, 45, 40
42.43273	12.05963	7t1gk6	2022-08-16 05:52:39	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, ac, 3f, f3, 6b, 87, 1e, 28, 40, 81, 60, f4, b8, 63, 37, 45, 40
42.43124	12.06620	59uoud	2022-08-28 09:13:35	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 24, f0, a0, b1, e4, 21, 28, 40, 1f, b4, 5f, e7, 32, 37, 45, 40

latitude	longitude	id	timestamp	GEOMETRY
42.42799	12.07171	ys5e97	2023-04-03 18:13:33	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 54, 91, 38, 64, b7, 24, 28, 40, 7a, 9c, 75, 70, c8, 36, 45, 40
41.81707	12.22165	7brki6	2022-11-19 04:16:29	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 8e, 7a, b7, 51, 7c, 71, 28, 40, b4, 2b, a9, b4, 95, e8, 44, 40
41.81150	12.22354	bs7c6b	2023-04-05 22:22:43	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, 45, c6, 2e, b1, 73, 72, 28, 40, 39, 9f, 1d, 13, df, e7, 44, 40
44.36092	12.22449	u7umml	2023-03-21 11:39:50	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 01, 00, 00, 00, ad, be, 78, 6d, f0, 72, 28, 40, 56, 2c, 0b, a0, 32, 2e, 46, 40

- [x] Store All of this Data in PostGIS/Timescale
- [x] Execute Spatial Queries with DuckDB
- [ ] Extract Data to GeoArrow for Interactive Consumption
- [ ] Visualize with deck.gl

Postgres to Arrow

```sql
COPY
(
  SELECT
    * EXCLUDE(geometry),
    st_AsWKB(ST_GeomFromHexWKB(geometry)) AS geometry,
    'ID: ' || id || ' Time: ' || timestamp AS tooltip
  FROM
    db.locations
)
TO 'locations.arrow' (FORMAT GDAL, DRIVER 'Arrow');
```

```r
uri <- glue::glue(
  'postgresql://{Sys.getenv("DATABASE_HOST")}:{Sys.getenv("DATABASE_PORT")}/{Sys.getenv("DATABASE_NAM
)
db <- adbcdrivermanager::adbc_database_init(adbcpostgresql::adbcpostgresql(), uri = uri)
con <- db |>
  adbcdrivermanager::adbc_connection_init()

fix_batch <- function(x) {
  # Convert the geometry column to geoarrow
  x$geometry <- geoarrow::as_geoarrow_vctr(
    x$geometry,
    schema = nanoarrow::as_nanoarrow_schema(geoarrow::geoarrow_point(crs='WGS84', coord_type="INTERLE
  )
  x
}

# Execute the query as a stream; use arrow::map_batches() to apply fix batchwise
adbcdrivermanager::read_adbc(
  con,
  query="SELECT
          latitude, longitude, id, timestamp, geometry,
          'ID: ' || id || ' Time: ' || timestamp AS tooltip
        FROM
          locations"
) |>
  arrow::map_batches(fix_batch) |>
  nanoarrow::write_nanoarrow('locations.arrow')
```

```r
fix_batch <- function(x) {
  x$geometry <- geoarrow::as_geoarrow_vctr(
    x$geometry,
    schema = nanoarrow::as_nanoarrow_schema(geoarrow::geoarrow_multipolygon(crs='WGS84', coord_type='
  )
  x$center <- geoarrow::as_geoarrow_vctr(
    x$center,
    schema = nanoarrow::as_nanoarrow_schema(geoarrow::geoarrow_point(crs='WGS84', coord_type="INTERLI
  )
  x$buffer <- geoarrow::as_geoarrow_vctr(
    x$buffer,
    schema = nanoarrow::as_nanoarrow_schema(geoarrow::geoarrow_polygon(crs='WGS84', coord_type="INTEI
  )
  x
}

# Execute the query as a stream; use arrow::map_batches() to apply fix batchwise
adbcdrivermanager::read_adbc(
  con,
  query="SELECT
          country, name, geometry, name AS tooltip,
          ST_Centroid(geometry) as center,
          ST_Buffer(geometry::geography, 5000)::geometry AS buffer
        FROM airports_clean;"
) |>
  arrow::map_batches(fix_batch) |>
  nanoarrow::write_nanoarrow('airports.arrow')
```

- [x] Store All of this Data in PostGIS/Timescale
- [x] Execute Spatial Queries with DuckDB
- [x] Extract Data to GeoArrow for Interactive Consumption
- [ ] Visualize with deck.gl

Map Time

```
<!doctype html>
<html>

<head>
    <meta charset='UTF-8' />
    <title>deck.gl w/ Leaflet example</title>
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/leaflet/1.9.4/leaflet.css" />
    <script src="https://cdnjs.cloudflare.com/ajax/libs/leaflet/1.9.4/leaflet.js"></script>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/leaflet-measure@3.1.0/dist/leaflet-meas
    <script src="https://cdn.jsdelivr.net/npm/leaflet-measure@3.1.0/dist/leaflet-measure.min.js"></sc
    <script src="https://cdn.jsdelivr.net/npm/deck.gl@9.0.30/dist.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/jquery@3.7.1/dist/jquery.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/mgrs@2.0.0/dist/mgrs.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/apache-arrow@15.0.2/Arrow.es2015.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/arquero@7.0.0/dist/arquero.min.js"></script>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/deck.gl@9.0.30/dist/stylesheet.min.css'
    <script src="https://cdn.jsdelivr.net/npm/deck.gl-leaflet@1.3.1/dist/deck.gl-leaflet.umd.min.js">
    <script src="https://cdn.jsdelivr.net/npm/@geoarrow/geoarrow-js@0.3.1/dist/geoarrow.umd.min.js"><
    <script src="https://cdn.jsdelivr.net/npm/@geoarrow/deck.gl-layers@0.3.0-beta.17/dist/dist.umd.mi
    <script src="www/js/arquero-helpers.js"></script>
    <script src="www/js/workers.js"></script>
    <script src="www/js/map-workers.js"></script>
    <script src="www/js/mouse-coords.js"></script>
    <link rel="stylesheet" href="www/css/leaflet-custom.css" />
    <link rel="stylesheet" href="www/css/movements-filter.css" />
```

```
<html>

...

<body>
    <div id="map"></div>
    <script type="module" src='app.js'></script>
</body>

</html>
```

```
const geoarrowLayers = window['@geoarrow/deck']['gl-layers'];
```

```
const LOCATIONS_URL = "https://files.server.com/locations-r.arrow";
const AIRPORTS_URL = "https://files.server.com/airports-r.arrow";

const locations = await Arrow.tableFromIPC(fetch(LOCATIONS_URL));
const airports = await Arrow.tableFromIPC(fetch(AIRPORTS_URL));
```

```
// create the map object based on the map div in the html file
const map = L.map(document.getElementById('map'), {
    center: [46.68, 1.4],
    zoom: 5
});
```

```
// this will create a group out of all the layers to be added
// which in reality will all be in one object
// this way we can clear all the layers at once
const overlayGroup = L.layerGroup();
overlayGroup.addTo(map);
```

```
// OSM tiles
const streetLayer = L.tileLayer.wms(
    "https://ows.terrestris.de/osm/service?",
    {
        layers: "OSM-WMS",
        styles: "", format: "image/png", transparent: false,
        opacity: 1.0,
        version: "1.1.1",
        attribution: "Street Map"
    }
);
// image tiles
const imageLayer = L.tileLayer.wms(
    "https://basemap.nationalmap.gov:443/arcgis/services/USGSImageryTopo/MapServer/WmsServer?",
    {
        layers: "0",
        styles: "", format: "image/png", transparent: false,
        version: "1.1.1",
        attribution: "US Gov"
    }
);
// We add the OSM tiles to the map but not the imagery
// because we want OSM as default
// imagery will be added later by the toggle
streetLayer.addTo(map)
```

```
// layer controls
const baseMaps = {
    "Street Map": streetLayer,
    "Imagery": imageLayer
};
// we are only adding base layers, no data layers
// that's why this is empty
let overlayMaps = {
}
const layerSwitcher = L.control.layers(baseMaps, overlayMaps, { collapsed: false });
layerSwitcher.addTo(map);

// add ID to switcher panel for easier use later
const layerSwitcherPanel = document.getElementsByClassName('leaflet-control-layers leaflet-control-la
layerSwitcherPanel.setAttribute('id', 'layerSwitcherPanel')
```

```
function createLeafletSeparator(containerClass) {
    const newDiv = document.createElement('div');
    newDiv.setAttribute('class', 'leaflet-control-layers-separator');
    newDiv.setAttribute('style', '');

    const containerSection = document.getElementsByClassName(containerClass)[0];
    containerSection.appendChild(newDiv);
}

function createLeafletOverlayOptions(containerClass, options) {
    // creates the entire overlay area
    const newOverlayDiv = document.createElement('div');
    newOverlayDiv.setAttribute('class', 'leaflet-control-layers-overlays');
    newOverlayDiv.setAttribute('id', 'leaflet-control-layers-overlays-panel');

    const containerSection = document.getElementsByClassName(containerClass)[0];
    containerSection.appendChild(newOverlayDiv);

    options.forEach((opt, index) => {
        // console.log(opt)
        createNewCheckBoxes(
            'leaflet-control-layers-overlays-panel',
            'leaflet-control-layers-overlays-panel' + '_' + opt.id,
            'features_checkBoxGroup',
            opt.id,
            opt.label,
            opt.checked
        );
    });
}
```

```
let mapOverlayLayers = [
    { id: 'airport_buffers', label: 'Buffers', checked: true },
    { id: 'locations', label: 'Locations', checked: true }
  ];

// add checkbox for each deck layer
createLeafletSeparator('leaflet-control-layers-list')
createLeafletOverlayOptions('leaflet-control-layers-list', mapOverlayLayers)
```

```
// each time a box is checked, we redraw the map
const featureLayerCheckBoxGroup = document.getElementsByName('features_checkBoxGroup');
featureLayerCheckBoxGroup
    .forEach(
        box => box.addEventListener('change', e => {
            drawMap(
                map, overlayGroup, locations, 'locations',
                airports, 'airports',
                airports, 'airport_buffers'
            );
        })
    );
```

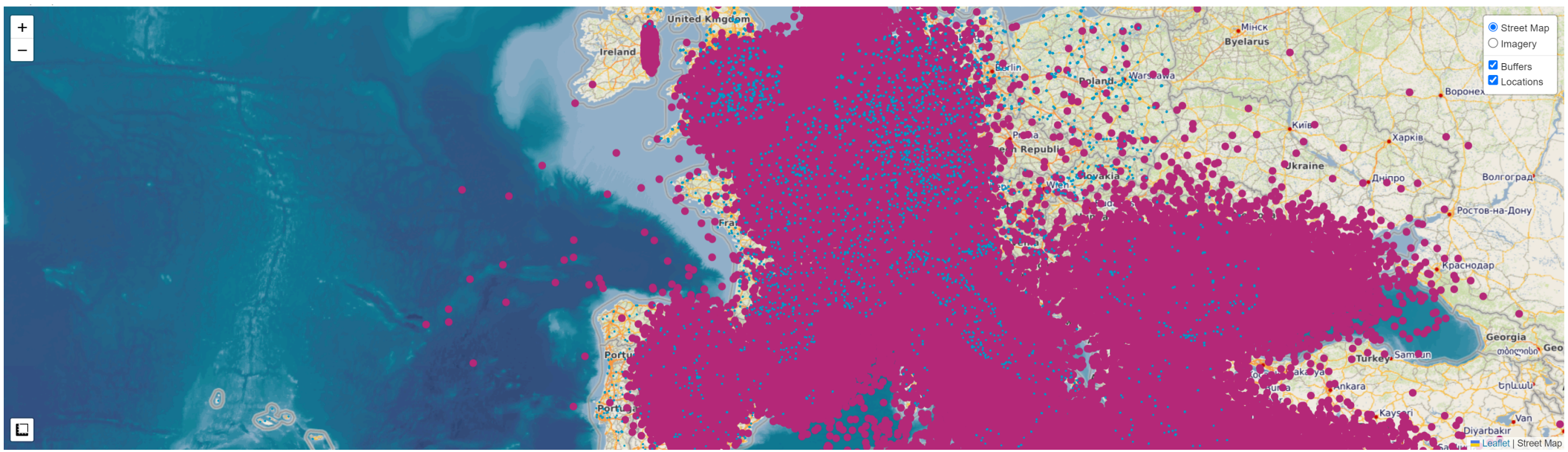
```
function buildGeomsLayer(scatterPlotData, scatterPlotDataID = 'locations',
    polyData, polyDataID = 'polys', polyBufferData, polyBufferDataID = 'buffers') {
    const thisLayer = new DeckGlLeaflet.LeafletLayer({
        views: [
            new deck.MapView({
                repeat: true
            })
        ],
        layers: [
            new geoarrowLayers.GeoArrowScatterplotLayer({
                id: scatterPlotDataID, data: scatterPlotData,
                pickable: true, visible: true, getFillColor: [180, 40, 120],
                getRadius: 5, radiusUnits: 'pixels', radiusScale: 1, radiusMinPixels: 4, radiusMaxPi
                getPosition: scatterPlotData.getChild('geometry')
            }),
            new geoarrowLayers.GeoArrowSolidPolygonLayer({
                id: polyBufferDataID, data: polyBufferData,
                filled: true, getFillColor: [0, 155, 200], pickable: true,
                getPolygon: polyData.getChild('buffer')
            })
        ],
        getTooltip: ({ object }) => (object) && ({
            html: `${object.tooltip}`,
            style: {
                backgroundColor: 'gray', fontSize: '0.em',
            }
        }),
        layerFilter: ({ layer, viewport }) => {
            if (getCheckGroupValues('features_checkBoxGroup').includes(layer.id)) {
                return true;
            }
            return false;
        }
    });
```

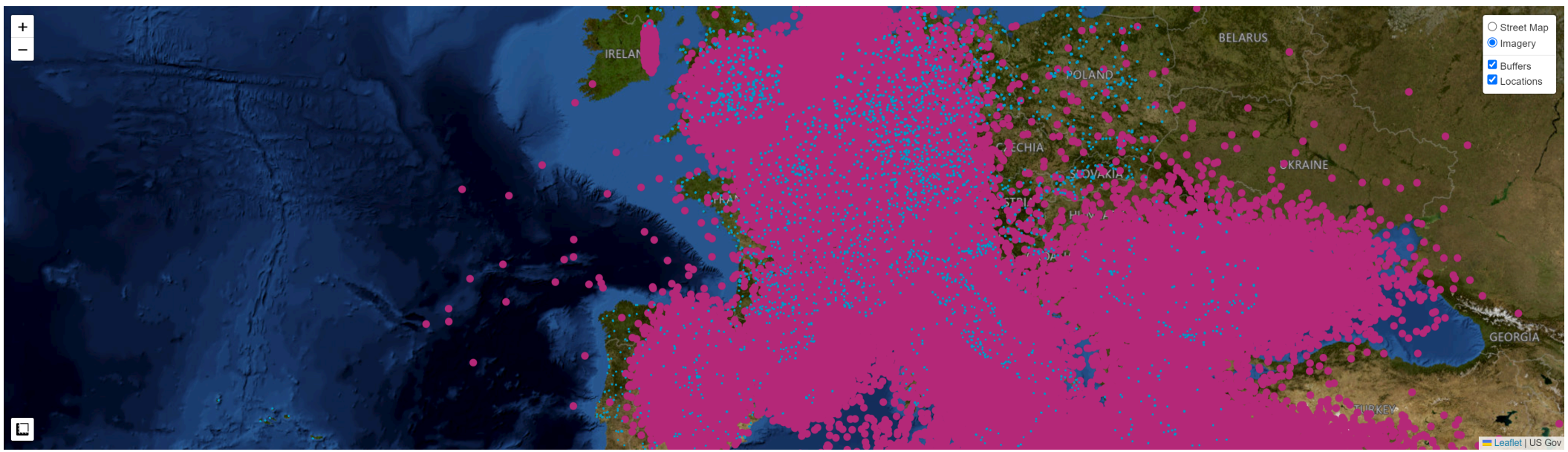
```
35      return thisLayer;
36  }
```

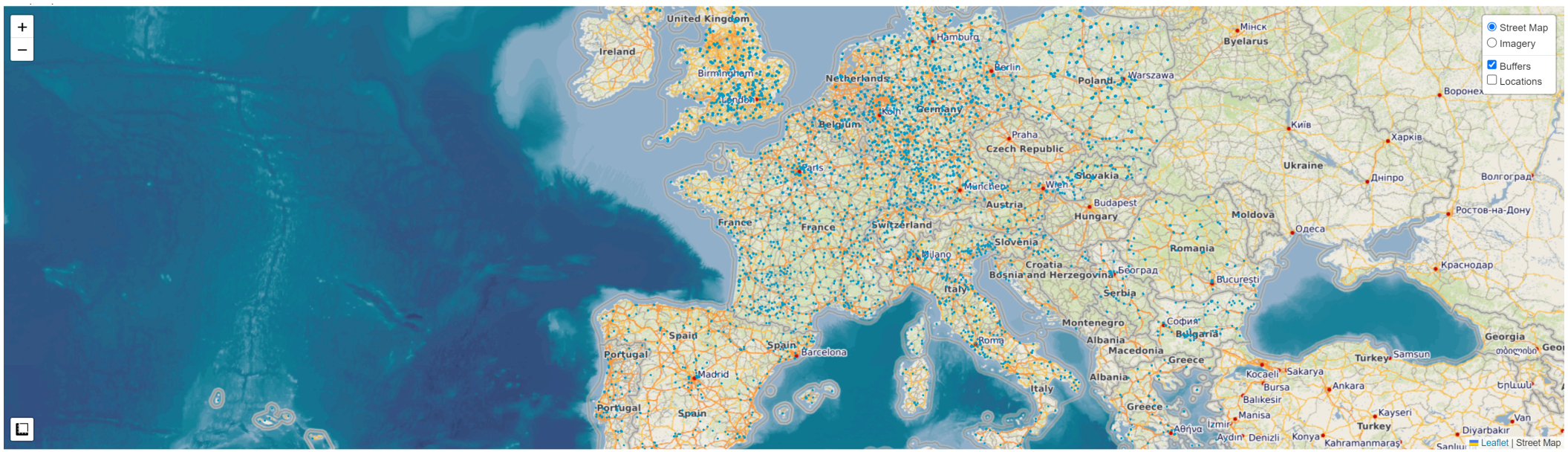
```
function drawMap(
    map, group,
    scatterData, scatterDataID = 'locations',
    polyData, polyDataID = 'polys',
    polyBufferData, polyBufferDataID = 'buffers',
) {
    group.clearLayers();
    const dataLayer = buildGeomsLayer(
        scatterData, scatterDataID,
        polyData, polyDataID,
        polyBufferData, polyBufferDataID
    );

    dataLayer.addTo(group);
}
```

```
drawMap(
    map, overlayGroup,
    locations, 'locations',
    airports, 'airports',
    airports, 'airport_buffers'
);
```


United Kingdom
Ireland
Мінск
Byelarus
Berlin
Poland
Warszawa
Воронеж
Київ
Харків
Ukraine
Дніпро
Волгоград
Ростов-на-Дону
Краснодар
Georgia
Turkey
Ankara
Kayseri
Van
Diyarbakır
Street Map
Imagery
Buffers
Locations
Leaflet | Street Map


+
−
Street Map
Imagery
Buffers
Locations
BELARUS
POLAND
UKRAINE
SLOVAKIA
GEORGIA
Leaflet | US Gov


United Kingdom
Ireland
Birmingham
London
Netherlands
Hamburg
Berlin
Polska
Warszawa
Germany
Köln
Belgium
Praha
Czech Republic
Paris
France
France
Switzerland
München
Wien
Slovakia
Austria
Budapest
Hungary
Slovenia
Milano
Croatia
Bosnia and Herzegovina
Italy
Београд
Serbia
Montenegro
Albania
Macedonia
Greece
Roma
Spain
Barcelona
Portugal
Madrid
Spain
Portugal
Spain
Italy
Albania
Greece
Мінск
Byelarus
Київ
Ukraine
Харків
Дніпро
Волгоград
Ростов-на-Дону
Воронеж
Moldova
Одеса
Romania
București
София
Bulgaria
Краснодар
Georgia
თბილისი
Turkey
Samsun
Sakarya
Kocaeli
Bursa
Ankara
Balıkesir
Manisa
İzmir
Aydın
Denizli
Konya
Kayseri
Turkey
Kahramanmaraş
Diyarbakır
Van
Street Map
Imagery
Buffers
Locations
Leaflet | Street Map

- [x] Store All of this Data in PostGIS/Timescale
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- [x] Visualize with deck.gl

Thank You


lander
analytics