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Type Package

Title Helper functions for EUROCONTROL useRs

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Description The helper functions in this package are designed to make it easy, homogeneous and transparent to perform common tasks usually needed by data analysts and useRs in EUROCONTROL.

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acc_sf	<i>Retrieve ACC/OAC airspace geometries for a given AIRAC cycle</i>
--------	---

Description

Returns ACC (Area Control Centre) and OAC (Oceanic Area Control Centre) airspace geometries as an sf object for the specified CFMU AIRAC cycle.

Usage

```
acc_sf(conn = NULL, cfmu_airac)
```

Arguments

- | | |
|------------|--|
| conn | Database connection or instantiate the default one. |
| cfmu_airac | the AIRAC cycle number (CFMU format), e.g. "517" or 517. Both character and numeric inputs are accepted. See airac::cfmu_airac() to look up the cycle number for a given date. |

Value

An sf object with the following columns:

- AC_ID: the AIRAC cycle id
- AV_AIRSPACE_ID: the airspace identifier
- MIN_FLIGHT_LEVEL: the minimum flight level
- MAX_FLIGHT_LEVEL: the maximum flight level
- NAME: the airspace name
- CODE: the airspace code
- AIRSPACE_TYPE: the airspace type (ACC or OAC)
- geometry: the airspace polygon geometry

Note

You need to either provide a connection `conn` that has access to `ENV_SP.AIRSPACE`, `PRU_STAT_AUA` and `SWH_MAP` or go with the default which uses `PRU_DEV` to establish a [db_connection\(\)](#).

The `sf` package is required but only suggested; install it if not available.

See Also

[airac::cfmu_airac\(\)](#) from the [airac](#) package.

Examples

```
## Not run:
acc <- acc_sf(cfmu_airac = "517")

# write to GeoJSON
sf::st_write(acc, "acc-517.geojson", driver = "GeoJSON")

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_DEV")
acc <- acc_sf(conn = conn, cfmu_airac = "517")

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

adrr_flights_tidy	<i>Extract ADRR flight list in an interval of dates</i>
-------------------	---

Description

Extract ADRR flight list in an interval of dates

Usage

```
adrr_flights_tidy(conn = NULL, wef, til)
```

Arguments

conn	Database connection or instantiate the default one.
wef	With EF fect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
til	un TIL l date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>

Value

A `dbplyr::tbl_dbi()` with the following columns (as defined in the Aviation Data Repository for Research manual):

Flight details:

- ECTRL ID: flight unique id.
- ADEP: **ICAO code** of the **A**erodrome of **DE**Parture
- ADEP Latitude: ADEP latitude (decimal degrees North)
- ADEP Longitude: ADEP longitude (decimal degrees East)
- ADES: **ICAO code** of the **A**erodrome of **DE**Stination
- ADES Latitude: ADES latitude (decimal degrees North)
- ADES Longitude: ADES longitude (decimal degrees East)
- FILED OFF BLOCK TIME: (Last) filed off-block time
- FILED ARRIVAL TIME: (Last) filed arrival time
- ACTUAL OFF BLOCK TIME: actual off-block time for flown (M3) trajectory
- ACTUAL ARRIVAL TIME: arrival time for flown (M3) trajectory
- AC Type: the **ICAO code for the aircraft type**, for example A30B for an Airbus A-300B2-200.
- AC Operator: the **ICAO Airline Designator**, i.e. OAL for Olympic
- AC Registration: the **aircraft registration** (with spaces, dashes, ... stripped), e.g. GEUUU
- ICAO Flight Type: flight type (see **FPL Item 8**). Possible values:
 - S for scheduled air service
 - N for non-scheduled air service
- STATFOR Market Segment: market segment type as defined on the **Market Segment Rules**, it can be:
 - “Mainline”
 - “Regional”

- “Low-Cost”
- “Business Aviation”
- “All-Cargo”
- “Charter” (Non-Scheduled)
- “Military”
- “Other”
- “Not classified”
- Requested FL: requested cruising flight level (FL)
- Actual Distance Flown (nm): route length (in Nautical Miles) for for flown (M3) trajectory

Note

You need to either provide a connection `conn` that has access to `SWH_FCT.DIM_FLIGHT_TYPE_RULE` (for `FLT_RULES`), `PRUDEV.V_COVID_DIM_A0` (for aircraft and aircraft group info) and `SWH_FCT.V_FAC_FLIGHT_MS` (for market segment info) or go with the default which uses `PRU_READ` to establish a [db_connection\(\)](#).

Examples

```
## Not run:
withr::local_envvar(c(TZ = "UTC", ORA_SDTZ = "UTC", NLS_LANG = ".AL32UTF8"))
conn <- withr::local_db_connection(db_connection(schema = "PRU_READ"))
wef <- "2025-01-01"
til <- "2025-01-04"
adrr_flights_tidy(conn, wef, til)

## End(Not run)
```

aircraft_model	<i>ICAO's Manufacturer codes</i>
----------------	----------------------------------

Description

A data frame with the following fields

model_full_name the model full name, e.g. "A-320neo".

manufacturer_code the manufacturer's code, e.g. "AIRBUS".

designator the model's designator, e.g. "A20N"

last_updated the date when the data have been last updated, e.g. "2023-05-19".

Usage

```
aircraft_model
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 7260 rows and 4 columns.

aircraft_type	<i>ICAO's Aircraft types</i>
---------------	------------------------------

Description

A data frame with the following fields

designator the aircraft type designator, e.g. "A310".

aircraft_description the aircraft description, e.g. "LandPlane".

description the aircraft , e.g. "IT".

wtc the aircraft **wake turbulence category**, e.g. "M".

engine_count the number pf engines, e.g. "2". **Note:** this is not a number unfortunately, there is one model encoded C

engine_type the engine type, e.g. "Jet".

last_updated the date when the data have been last updated, e.g. "2023-05-19".

Usage

```
aircraft_type
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 2612 rows and 7 columns.

airlines_tbl	<i>Return a reference to the Airlines table</i>
--------------	---

Description

The returned `dbplyr::tbl_dbi()` is referencing the airlines table in PRISME. You can use `dplyr/dbplyr` verbs to filter, join, ... with other datasets.

Usage

```
airlines_tbl(conn = NULL)
```

Arguments

conn	Database connection or instantiate the default one.
------	---

Value

a `dbplyr::tbl_dbi()` referencing the Oracle table for airlines.

Note

You need to either provide a connection `conn` that has access to `PRUDEV.V_COVID_DIM_A0` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
arl <- airlines_tbl()
# other operations on arl, i.e. filtering,
# followed by a collect() to retrieve the concrete data frame
arl_filtered <- arl |>
  dplyr::filter(AO_ISO_CTRY_CODE == "IT") |>
  collect()

# NOTE: you can reuse the connection for other API calls
conn <- arl$src$con

# other ops requiring conn
# ...

# IMPORTANT: close the DB connection
DBI::dbDisconnect(conn)

## End(Not run)
```

airlines_tidy

*Airline info including group affiliation***Description**

Airline info including group affiliation

Usage

```
airlines_tidy(conn = NULL)
```

Arguments

`conn` Optional connection to the `PRU_READ` schema.

Value

A `dbplyr::tbl_dbi()` with the following columns:

- `AO_CODE`: the the **ICAO Airline Designator**, i.e. 'OAL'
- `AO_NAME`: the airline's name, i.e. 'Olympic'
- `AO_GRP_CODE`: the airline's affiliation group code, i.e. 'AEE_GRP'
- `AO_GRP_NAME`: the airline's affiliation group, i.e. 'AEGEAN Group'

- A0_ISO_CTRY_CODE: the ISO2C code of the airline's country, i.e. 'GR'
- EU: (a character) whether the airlines is in a EUROCONTROL's Member State (full, comprehensive or transition plus Kosovo), i.e. 'TRUE'

Note

You need to either provide a connection `conn` that has access to `PRUDEV.V_COVID_DIM_A0` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
arls <- airlines_tidy()
# other operations on arls, i.e. filtering,
# followed by a collect() to retrieve the concrete data frame
arls_filtered <- arls |>
  filter(stringr::str_starts("A")) |>
  collect()

# NOTE: you can reuse the connection for other API calls
conn <- arls$src$con

# other ops requiring conn
# ...

# IMPORTANT: close the DB connection
DBI::dbDisconnect(conn)

## End(Not run)
```

airports_oa

retrieve latest airport list from OurAirports

Description

retrieve latest airport list from OurAirports

Usage

```
airports_oa()
```

Value

a data frame

Examples

```
## Not run:
apts <- airports_oa()

## End(Not run)
```

airspace_profile_tbl *Return a reference to the Airspace Profile table*

Description

The returned `dbplyr::tbl_dbi()` is referencing the airspace profiles table in PRISME. You can use `dplyr/dbplyr` verbs to filter, join, ... with other datasets.

Usage

```
airspace_profile_tbl(conn = NULL)
```

Arguments

conn Database connection or instantiate the default one.

Value

a `dbplyr::tbl_dbi()` referencing the Oracle table for airspace profiles.

Note

You need to either provide a connection `conn` that has access to `FSD.ALL_FT_ASP_PROFILE` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
pp <- airspace_profile_tbl()
# other operations on pp, i.e. filtering,
# followed by a collect() to retrieve the concrete data frame
# IMPORTANT: close the DB connection when done
DBI::dbDisconnect(pp$src$con)

# if you use a DB connection for many different APIs
conn <- eurocontrol::db_connection("PRU_READ")
pp <- airspace_profile_tbl(conn = conn)

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

airspace_profiles_tidy

Provide all airspace profile segments intersecting an interval of interest

Description

The returned `dbplyr::tbl_dbi()` includes segments for scheduled and non-scheduled flights temporally intersecting the right-opened interval `[wef, til)`.

General aviation, State, military and sensitive flight are excluded.

Usage

```
airspace_profiles_tidy(
  conn = NULL,
  wef,
  til,
  airspace = "FIR",
  profile = "CTFM"
)
```

Arguments

<code>conn</code>	Database connection or instantiate the default one.
<code>wef</code>	With Effect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
<code>til</code>	until date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
<code>airspace</code>	the type of airspace (default: 'FIR'), one of: • 'FIR' (Flight Information Region) • 'NAS' (National Airspace) • 'AUA' (ATC Unit Airspace) • 'ES' (Elementary Sector)
<code>profile</code>	the model of the trajectory profile (default: 'CTFM'), one of: • 'FTFM', Filed Tactical Flight Model • 'RTFM', Regulated Tactical Flight Model • 'CTFM', Current Tactical Flight Model • 'CPF', Correlated Position reports for a Flight • 'DCT', Direct route • 'SCR', Shortest Constrained Route • 'SRR', Shortest RAD restrictions applied Route • 'SUR', Shortest Unconstrained Route

Value

a `dbplyr::tbl_dbi()` with the following columns

- ID: the so called SAM ID, used internally by PRISME
- FLT_UID: flight unique id.
- SEQ_ID: the sequence number of the segment for the relevant airspace profile
- ENTRY_TIME: the time of entry into the relevant airspace
- ENTRY_LON: the longitude of entry into the relevant airspace
- ENTRY_LAT: the latitude of entry into the relevant airspace
- ENTRY_FL: the flight level of entry into the relevant airspace
- EXIT_TIME: the time of exit out of the relevant airspace
- EXIT_LON: the longitude of exit out of the relevant airspace
- EXIT_LAT: the latitude of exit out of the relevant airspace
- EXIT_FL: the flight level of exit out of the relevant airspace
- AIRSPACE_ID: the airspace ID
- AIRSPACE_TYPE: the airspace type as per airspace input parameter
- MODEL_TYPE: the trajectory model as per profile input parameter

Note

You need to either provide a connection `conn` that has access to as noted in `airspace_profile_tbl()` and `flights_tidy()` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
ps <- airspace_profiles_tidy(wef = "2023-01-01", til = "2023-04-01")
# IMPORTANT: always close the DB connection when done
DBI::dbDisconnect(ps$src$con)

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_READ")
ps <- airspace_profiles_tidy(conn = conn)

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

ansp_sf

*Retrieve ACE ANSP airspace geometries for a given AIRAC cycle***Description**

Returns ANSP (Air Navigation Service Provider) airspace geometries from the ACE (ATM Cost-Effectiveness) benchmarking dataset as an sf object for the specified CFMU AIRAC cycle.

Airspaces with code AIRPORT, UNKNOWN or MILITARY are excluded.

Usage

```
ansp_sf(conn = NULL, cfmu_airac)
```

Arguments

conn	Database connection or instantiate the default one.
cfmu_airac	the AIRAC cycle number (CFMU format), e.g. "517" or 517. Both character and numeric inputs are accepted. See airac::cfmu_airac() to look up the cycle number for a given date.

Value

An sf object with the following columns:

- airac_cfmu: the AIRAC cycle id
- id: the airspace identifier
- code: the ANSP code
- name: the ANSP name
- ace_code: the ACE benchmarking code
- min_fl: the minimum flight level
- max_fl: the maximum flight level
- airspace_type: the airspace type
- geometry: the airspace polygon geometry

Note

You need to either provide a connection conn that has access to ENV_SP.AIRSPACE, PRU_CFMU_ANSP and SWH_MAP or go with the default which uses PRU_DEV to establish a [db_connection\(\)](#).

The sf package is required but only suggested; install it if not available.

See Also

[airac::cfmu_airac\(\)](#) from the [airac](#) package.

Examples

```
## Not run:
ansps <- ansp_sf(cfm_uairac = "481")

# write to GeoJSON
sf::st_write(ansps, "ansp_ace_481.geojson", driver = "GeoJSON")

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_DEV")
ansps <- ansp_sf(conn = conn, cfm_uairac = "481")

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

apdf_tbl

Return a reference to the Airport Operator Data Flow table

Description

The returned `dbplyr::tbl_dbi()` is referencing the airport operator data flow table in PRISME. You can use `dplyr/dbplyr` verbs to filter, join, ... with other datasets.

Usage

```
apdf_tbl(conn = NULL)
```

Arguments

`conn` Database connection or instantiate the default one.

Value

a `dbplyr::tbl_dbi()` referencing the Oracle table for airport operator data flow.

Note

You need to either provide a connection `conn` that has access to `SWH_FCT.FAC_APDS_FLIGHT_IR691` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
apdf <- apdf_tbl()
# ...
# IMPORTANT: close the DB connection when done with `aodf`
DBI::dbDisconnect(apdf$src$con)

## End(Not run)
```

apdf_tidy

Extract a clean airport operator data flow list in an interval

Description

The returned `dbplyr::tbl_dbi()` includes movements information in the interval `[wef, til)`.
NOTE: it can only cover ONE month at a time

Usage

```
apdf_tidy(conn = NULL, wef, til)
```

Arguments

<code>conn</code>	Database connection or instantiate the default one.
<code>wef</code>	With EF fect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
<code>til</code>	unTIL l date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>

Value

A `dbplyr::tbl_dbi()` with the following columns:

- `APDS_ID`: the airport operator dataflow unique record id.
- `ID`: the so called SAM ID, used internally by PRISME
- `AP_C_FLTID`: flight identifier (aource Airport)
- `AP_C_FLTRUL`: which sets of regulations the flight is operated under. Possible values are:
 - IFR for IFR
 - VFR for VFR
 - NA if unknown
- `AP_C_REG`: the **aircraft registration** (with spaces, dashes, ... stripped), e.g. GEUUU.
- `ADEP_ICAO`: (**ICAO code** of the) **A**erodrome of **DEP**arture (source airport).
- `ADES_ICAO`: (**ICAO code** of the) **A**erodrome of **DES**tination (source airport).
- `SRC_PHASE`: flight phase. DEP=departure, ARR=arrival.

- MVT_TIME_UTC: (best available) movement time (takeoff if SRC_PHASE = DEP, landing if SRC_PHASE = ARR).
- BLOCK_TIME_UTC: Block time (off-block if SRC_PHASE = DEP, in-block if SRC_PHASE = ARR).
- SCHED_TIME_UTC: scheduled time (of departure if SRC_PHASE = DEP, of arrival if SRC_PHASE = ARR; source airport).
- ARCTYP: (best available) the **ICAO code for the aircraft type**, for example A21N for Airbus A321neo.
- AP_C_RWY: Runway ID (of departure if SRC_PHASE = DEP, of arrival if SRC_PHASE = ARR; source airport).
- AP_C_STND: Stand ID (of departure if SRC_PHASE = DEP, of arrival if SRC_PHASE = ARR; source airport).
- C40_CROSS_TIME: time of first (last) crossing at 40 NM from ARP for departure (arrival).
- C40_CROSS_LAT: latitude of first (last) crossing at 40 NM from ARP for departure (arrival).
- C40_CROSS_LON: longitude of first (last) crossing at 40 NM from ARP for departure (arrival).
- C40_CROSS_FL: flight level of first (last) crossing at 40 NM from ARP for departure (arrival).
- C40_BEARING: bearing of first (last) crossing at 40 NM from ARP for departure (arrival).
- C100_CROSS_TIME: time of first (last) crossing at 100 NM from ARP for departure (arrival).
- C100_CROSS_LAT: latitude of first (last) crossing at 100 NM from ARP for departure (arrival).
- C100_CROSS_LON: longitude of first (last) crossing at 100 NM from ARP for departure (arrival).
- C100_CROSS_FL: flight level of first (last) crossing at 100 NM from ARP for departure (arrival).
- C100_BEARING: bearing of first (last) crossing at 100 NM from ARP for departure (arrival).

Note

You need to either provide a connection conn that has access to SWH_FCT.FAC_APDS_FLIGHT_IR691, or go with the default which uses PRU_READ to establish a [db_connection\(\)](#).

Examples

```
## Not run:
my_apdf <- apdf_tidy(wef = "2023-01-01", til = "2023-01-02")
# ...
DBI::dbDisconnect(my_apdf$src$con)

## End(Not run)
```

db_connection	<i>Provide a connection to the relevant Oracle database</i>
---------------	---

Description

Provide a connection to the relevant Oracle database

Usage

```
db_connection(schema = "PRU_READ")
```

Arguments

schema the Oracle DB schema to connect to.

Value

A connection to a database (specifically an implementation of [DBI::DBIConnection](#) for an Oracle database.)

Note

The schema is in fact the prefix of the environment variables where the credentials are stored, like <schema>_USR, <schema>_PWD and <schema>_DBNAME. Possible values for schema are PRU_READ, PRU_PROD, PRU_DEV, PRU_TEST, ...

Examples

```
## Not run:
# Within a function call (or interactive session, a restart will close the
# `withr` calls) you should use the following snippet of code
withr::local_envvar(c(TZ = "UTC", ORA_SDTZ = "UTC", NLS_LANG = ".AL32UTF8"))
# connect with PRU_READ credentials
conn <- db_connection("PRU_READ") |> withr::local_db_connection()
# or alternatively more basically (you need to explicitly close the
# the DB connection):
conn <- db_connection()
# ... perform other API operations re-using the same connection
# ...
DBI::dbDisconnect(conn)

## End(Not run)
```

es_sf	<i>Retrieve Elementary Sector airspace geometries for a given AIRAC cycle</i>
-------	---

Description

Returns ES (Elementary Sector) airspace geometries as an sf object for the specified CFMU AIRAC cycle.

Usage

```
es_sf(conn = NULL, cfmu_airac)
```

Arguments

conn	Database connection or instantiate the default one.
cfmu_airac	the AIRAC cycle number (CFMU format), e.g. "517" or 517. Both character and numeric inputs are accepted. See airac::cfmu_airac() to look up the cycle number for a given date.

Value

An sf object with the following columns:

- AC_ID: the AIRAC cycle id
- AV_AIRSPACE_ID: the airspace identifier
- MIN_FLIGHT_LEVEL: the minimum flight level
- MAX_FLIGHT_LEVEL: the maximum flight level
- NAME: the airspace name
- CODE: the airspace code
- AIRSPACE_TYPE: the airspace type (ES)
- geometry: the airspace polygon geometry

Note

You need to either provide a connection conn that has access to ENV_SP.AIRSPACE, PRU_CFMU_ES and SWH_MAP or go with the default which uses PRU_DEV to establish a [db_connection\(\)](#).

The sf package is required but only suggested; install it if not available.

See Also

[airac::cfmu_airac\(\)](#) from the [airac](#) package.

Examples

```
## Not run:
es <- es_sf(cfmu_airac = "517")

# write to GeoJSON
sf::st_write(es, "es-517.geojson", driver = "GeoJSON")

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_DEV")
es <- es_sf(conn = conn, cfmu_airac = "517")

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

fir_sf	<i>Retrieve FIR (Flight Information Region) airspace geometries for a given AIRAC cycle</i>
--------	---

Description

Returns FIR (Flight Information Region) airspace geometries as an sf object for the specified CFMU AIRAC cycle.

An icao column is derived from the first two characters of the airspace code.

Usage

```
fir_sf(conn = NULL, cfmu_airac)
```

Arguments

conn	Database connection or instantiate the default one.
cfmu_airac	the AIRAC cycle number (CFMU format), e.g. "517" or 517. Both character and numeric inputs are accepted. See airac::cfmu_airac() to look up the cycle number for a given date.

Value

An sf object with the following columns:

- airac_cfmu: the AIRAC cycle id
- icao: the 2-letter ICAO prefix (derived from code)
- id: the airspace volume id
- code: the FIR code

- name: the FIR name
- min_fl: the minimum flight level
- max_fl: the maximum flight level
- airspace_type: the airspace type (FIR)
- geometry: the airspace polygon geometry

Note

You need to either provide a connection `conn` that has access to `ENV_SP.AIRSPACE_VOLUME`, `PRU_CFMU_FIR` and `SWH_MAP` or go with the default which uses `PRU_DEV` to establish a [db_connection\(\)](#).

The `sf` package is required but only suggested; install it if not available.

See Also

[airac::cfmu_airac\(\)](#) from the [airac](#) package.

Examples

```
## Not run:
firs <- fir_sf(cfmu_airac = "517")

# write to GeoJSON
sf::st_write(firs, "ir-517.geojson", driver = "GeoJSON")

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_DEV")
firs <- fir_sf(conn = conn, cfmu_airac = "517")

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

flights_airspace_profiles_tidy

Extract the segments intersecting a set of airspace IDs in an interval of time and complement them with flight information

Description

The returned [dbplyr::tbl_dbi\(\)](#) includes scheduled and non-scheduled flights whose airspace segments temporally intersecting the right-opened interval `[wef, til)`. General aviation, State, military and sensitive flight are excluded.

Usage

```
flights_airspace_profiles_tidy(
  conn = NULL,
  wef,
  til,
  airspaces,
  airspace = "FIR",
  profile = "CTFM"
)
```

Arguments

conn	Database connection or instantiate the default one.
wef	With E ffect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
til	unTIL l date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
airspaces	list of airspace ids
airspace	the type of airspace (default: 'FIR'), one of: • 'FIR' (Flight Information Region) • 'NAS' (National Airspace) • 'AUA' (ATC Unit Airspace) • 'ES' (Elementary Sector)
profile	the model of the trajectory profile (default: 'CTFM'), one of: • 'FTFM', Filed Tactical Flight Model • 'RTFM', Regulated Tactical Flight Model • 'CTFM', Current Tactical Flight Model • 'CPF', Correlated Position reports for a Flight • 'DCT', Direct route • 'SCR', Shortest Constrained Route • 'SRR', Shortest RAD restrictions applied Route • 'SUR', Shortest Unconstrained Route

Value

a `dbplyr::tbl_dbi()` with the same columns as `flights_tidy()` plus the airspace id, AIRSPACE_ID, being crossed, one row per crossed airspace.

Note

You need to either provide a connection conn that has access to as noted in `airspace_profile_tbl()` and `flights_tidy()` or go with the default which uses PRU_READ to establish a `db_connection()`.

Examples

```
## Not run:
withr::local_envvar(c(TZ = "UTC", ORA_SDTZ = "UTC", NLS_LANG = ".AL32UTF8"))
conn <- withr::local_db_connection(db_connection("PRU_READ"))
flights_airspace_profiles_tidy(
  conn = conn,
  wef = "2023-01-01",
  til = "2023-04-01",
  airspace = "ES",
  profile = "CTFM",
  airspaces = c("LYBALW2", "LYBATW2")
)

## End(Not run)
```

flights_tbl

*Return a reference to the Flights table***Description**

The returned `dbplyr::tbl_dbi()` is referencing the flights table in PRISME. You can use `dplyr/dbplyr` verbs to filter, join, ... with other datasets.

Usage

```
flights_tbl(conn = NULL)
```

Arguments

conn Database connection or instantiate the default one.

Value

a `dbplyr::tbl_dbi()` object referencing the Oracle table for flights.

Note

You need to either provide a connection `conn` that has access to `SWH_FCT.V_FAC_FLIGHT_MS` or go with the default which uses `PRU_READ` to establish a `db_connection()`. Market Segment is not available before 2004.

Examples

```
## Not run:
flt <- flights_tbl()
# other operations on flt, i.e. filtering,
# followed by a collect() to retrieve the concrete data frame
flt_filtered <- flt |>
  filter(TO_DATE("2023-06-01 10:00", "YYYY-MM-DD HH24:MI") <= IOBT,
```

```

      IOBT <- TO_DATE("2023-06-02 10:30", "YYYY-MM-DD HH24:MI") |>
collect()

# NOTE: you can reuse the connection for other API calls
conn <- flt$src$con

# other ops requiring conn
# ...

# IMPORTANT: close the DB connection
DBI::dbDisconnect(conn)

## End(Not run)

```

flights_tidy	<i>Extract a clean flights list in an interval</i>
--------------	--

Description

The returned `dbplyr::tbl_dbi()` includes scheduled and non-scheduled flight departing in the right-opened interval `[wef, til)`.

Defaults values will assure that General aviation, State, military and sensitive flight will excluded. They can be retrieved via the other function call arguments in case of need.

Usage

```

flights_tidy(
  conn = NULL,
  wef,
  til,
  icao_flt_types = c("S", "N"),
  ids = NULL,
  include_sensitive = FALSE,
  include_military = FALSE,
  include_head = FALSE,
  extra_cols = NULL
)

```

Arguments

<code>conn</code>	Database connection or instantiate the default one.
<code>wef</code>	With EF fect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
<code>til</code>	unTIL l date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>

icao_flight_types	the types of flights as described below in ICAO_FLT_TYPE, default c('S', 'N'), NULL includes all notwithstanding other argument options. When including military via include_military you should either pass NULL or make sure 'M' is included
ids	list of IDs (aka SAM ID) to return, default NULL for all flights
include_sensitive	include sensitive flights, default FALSE
include_military	include military flights, default FALSE
include_head	include Head of State flights, default FALSE
extra_cols	a character vector with the name of additional columns from V_FAC_FLIGHT_MS, default NULL. This can be useful for example to get equipment data, i.e. ICAO_EQPT or similar (COM_EQPT, DATA_LINK_EQPT, NAV_EQPT, SSR_EQPT, SURVIVAL_EQPT).

Value

A `dbplyr::tbl_dbi()` with the following columns (grouped here by flight details, aerodrome details, aircraft info, aircraft operator info and operational details):

Flight details:

- FLT_UID: flight unique id.
- ID: the so called SAM ID, used internally by PRISME
- AIRCRAFT_ID: the **callsign** of the relevant flight, e.g. BAW6VB.
- LOBT: Last received **Off-Block Time**.
- IOBT: Initial **Off-Block Time**.
- FLT_RULES (see **FPL Item 8**): which sets of regulations the flight is operated under. Possible values are:
 - I for IFR
 - V for VFR
 - Y first IFR thereafter VFR
 - Z first VFR thereafter IFR
- ICAO_FLT_TYPE (see **FPL Item 8**): flight type. Possible values:
 - S for scheduled air service
 - N for non-scheduled air service
 - G for general aviation
 - M for military (note: filtered out)
 - X for other than the preceding categories
- RULE_NAME: market segment type as defined on the **Market Segment Rules**, it can be:
 - “Mainline”
 - “Regional”
 - “Low-Cost”
 - “Business Aviation”
 - “All-Cargo”
 - “Charter” (Non-Scheduled)

- “Military”
- “Other”
- "Not classified"
- SENSITIVE: 'Y' if sensitive
- SPECIAL_EXEMPT: reasons for special handling by ATS. One of:
 - "AEAP" ATFM exemption approved
 - "EMER" emergency
 - "FIRE" fire fighting
 - "HEAD" flights with Head of State status
 - "MEDE" medical evacuation
 - "NEXE" not exempted
 - "SERE" search & rescue

Aerodrome details:

- ADEP: **ICAO code** of the Aerodrome of **DE**Parture
- NAME_ADEP: the (AIU) name of the ADEP airport
- COUNTRY_CODE_ADEP: the ISO 2-alpha country code for ADEP
- COUNTRY_NAME_ADEP: the country name for ADEP
- ADES: **ICAO code** of the Aerodrome of **DE**Stination (different from ADES_FILED in case of diversion)
- NAME_ADES: the (AIU) name of the ADES airport
- COUNTRY_CODE_ADES: the ISO 2-alpha country code for ADES
- COUNTRY_NAME_ADES: the country name for ADES
- ADES_FILED: **ICAO code** of the Aerodrome of **DE**Stination filed in the Flight Plan. **Note:** it can be different from ADES in case of diversion
- NAME_ADES_FILED: the (AIU) name of the ADES_FILED airport
- COUNTRY_CODE_ADES_FILED: the ISO 2-alpha country code for ADES_FILED
- COUNTRY_NAME_ADES_FILED: the country name for ADES_FILED

Aircraft info:

- REGISTRATION: the **aircraft registration** (with spaces, dashes, ... stripped), e.g. GEUUU.
- AIRCRAFT_ADDRESS: the **ICAO 24-bit address** of the airframe for ADS-B/Mode S broadcasting.
- AIRCRAFT_TYPE_ICAO_ID: the **ICAO code for the aircraft type**, for example A30B for an Airbus A-300B2-200.
- WK_TBL_CAT (see **FPL Item 9**): wake turbulence category, can be
 - L LIGHT, i.e. maximum certificated takeoff mass of 7000 kg (15_500 lbs) or less.
 - M MEDIUM, i.e. maximum certificated takeoff mass less than 136_000 kg (300_000 lbs), but more than 7_000 kg (15_500 lbs)
 - H HEAVY, i.e. maximum certificated takeoff mass of 136_000 kg (300_000 lbs) or more (except those specified as J)
 - J SUPER, presently the only the AIRBUS A-380-800

Aircraft operator details:

- AIRCRAFT_OPERATOR: the **ICAO Airline Designator**, i.e. OAL for Olympic
- AO_GRP_CODE: Aircraft Operator group (code), i.e. AEE_GRP
- AO_GRP_NAME: : Aircraft Operator group (name), i.e. AEGEAN Group
- AO_ISO_CTRY_CODE: ISO country code for AO

Operational details:

- EOBT_1: **Estimated Off-Block Time** for FPL-based (M1) trajectory
- ARVT_1: **ARriVal Time** for FPL-based (M1) trajectory
- TAXI_TIME_1: Taxi time for FPL-based (M1) trajectory
- AOBT_3: **Actual Off-Block Time** for flown (M3) trajectory
- ARVT_3: **ARriVal Time** for flown (M3) trajectory
- TAXI_TIME_3: Taxi time for flown (M3) trajectory
- RTE_LEN_1: route length (in Nautical Miles) for FPL-based (M1) trajectory
- RTE_LEN_3: route length (in Nautical Miles) for for flown (M3) trajectory
- FLT_DUR_1: route duration (in minutes) for FPL-based (M1) trajectory
- FLT_DUR_3: route length (in minutes) for flown (M3) trajectory
- FLT_TOW: takeoff weight

Additional details:

- all extra columns as from extra_cols

Note

You need to either provide a connection conn that has access to SWH_FCT.DIM_FLIGHT_TYPE_RULE (for FLT_RULES), PRUDEV.V_COVID_DIM_AO (for aircraft and aircraft group info) and SWH_FCT.V_FAC_FLIGHT_MS (for market segment info) or go with the default which uses PRU_READ to establish a [db_connection\(\)](#).

Examples

```
## Not run:
flts <- flights_tidy(wef = "2023-01-01", til = "2023-01-05")
# other operations on flts, i.e. filtering,
# followed by a collect() to retrieve the concrete data frame
flts_filtered <- flts |>
  filter(TO_DATE("2023-06-01 10:00", "YYYY-MM-DD HH24:MI") <= IOBT,
         IOBT < TO_DATE("2023-01-02 10:30", "YYYY-MM-DD HH24:MI")) |>
  collect()

# NOTE: you can reuse the connection for other API calls
conn <- flts$src$con

# other ops requiring conn
# ...

# IMPORTANT: close the DB connection
DBI::dbDisconnect(conn)

## End(Not run)
```

generate_so6

*Export trajectory profiles to SO6 format***Description**

The data frame for point trajectories needs to have the following columns:

Name	Description	Type
FLIGHT_ID	Flight ID	int
TIME_OVER	Time over point	datetime
LONGITUDE	Longitude (decimal degrees)	double
LATITUDE	Latitude (decimal degrees)	double
FLIGHT_LEVEL	Flight level	int
POINT_ID	Point ID or NO_POINT	char
AIR_ROUTE	Air route or NO_ROUTE	char
LOBT	Last Off-block Time	datetime
SEQ_ID	Positions' sequence number	int
CALLSIGN	Flight call sign	char
REGISTRATION	Aircraft registration	char
MODEL_TYPE	Aircraft model	char
AIRCRAFT_TYPE	Aircraft ICAO type	char
AIRCRAFT_OPERATOR	Aircraft operator	char
ADEP	Departing aerodrome (ICAO) ID	char
ADES	Destination aerodrome (ICAO) ID	char

Usage

```
generate_so6(trajectory)
```

Arguments

trajectory A data frame for point profile trajectories.

Value

A data frame for trajectories in SO6 format.

Examples

```
## Not run:
conn <- eurocontrol::db_connection("PRU_READ")
pf <- point_profiles_tidy(conn = conn,
  wef = "2020-01-01",
  til = "2020-01-10") |>
  generate_so6()

# ... do something else with conn
# ...
```

```
# then manually close the connection to the DB
DBI::dbDisconnect(conn)
generate_so6(trj)

## End(Not run)
```

iata_season_for_date *Return the corresponding IATA season for a date*

Description

Return the corresponding IATA season for a date

Usage

```
iata_season_for_date(date)
```

Arguments

date a date

Value

the name of the IATA season in the form summer-yyyy

Examples

```
## Not run:
season_iata("2024-04-01")

## End(Not run)
```

member_state *EUROCONTROL's Member States*

Description

A data frame with the following fields

name the country name, e.g. "Italy"

iso3c the 3-letter ISO code, e.g. "ITA"

iso2c the 2-letter ISO code, e.g. "IT"

icao the 2-letter ICAO code, e.g. "LI"

iso3n the 3-digits ISO code, e.g. "380"

date the date of status code, e.g. 1996-04-01

status the status code, e.g. "M" (M Member State, C Comprehensive Agreement State, T Transitional State, NA for Kosovo)

These are useful to grab the right spatial polygons in case of need.

Usage

```
member_state
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 45 rows and 7 columns.

Note

Kosovo is also included in the list.

point_profile_tbl	<i>Return a reference to the Point Profile table</i>
-------------------	--

Description

The returned `dbplyr::tbl_dbi()` is referencing the point profiles table in PRISME. You can use `dplyr/dbplyr` verbs to filter, join, ... with other datasets.

Usage

```
point_profile_tbl(conn = NULL)
```

Arguments

`conn` Database connection or instantiate the default one.

Value

a `dbplyr::tbl_dbi()` referencing the Oracle table for point profiles.

Note

You need to either provide a connection `conn` that has access to `FSD.ALL_FT_POINT_PROFILE` or go with the default which uses `PRU_READ` to establish a `db_connection()`.

Examples

```
## Not run:
pt <- point_profile_tbl()

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_READ")
pt <- point_profile_tbl(conn = conn)

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)
```

```
## End(Not run)
```

```
point_profiles_tidy    Export point profile from NM trajectories
```

Description

Extract NM point profile trajectories from PRISME database. When a bbox is defined, we return only the (full) point profiles for the flights flying thru the region.

Usage

```
point_profiles_tidy(
  conn = NULL,
  wef,
  til = lubridate::today(tzone = "UTC"),
  profile = "CTFM",
  bbox = NULL
)
```

Arguments

conn	Database connection or instantiate the default one.
wef	With EF fect date (included) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
til	unTIL l date (excluded) at Zulu time in a format recognized by <code>lubridate::as_datetime()</code>
profile	the model of the trajectory profile (default: 'CTFM'), one of: • 'FTFM', Filed Tactical Flight Model • 'RTFM', Regulated Tactical Flight Model • 'CTFM', Current Tactical Flight Model • 'CPF', Correlated Position reports for a Flight • 'DCT', Direct route • 'SCR', Shortest Constrained Route • 'SRR', Shortest RAD restrictions applied Route • 'SUR', Shortest Unconstrained Route
bbox	(Optional) axis aligned bounding box (xmin, ymin, xmax, ymax)

Value

a dataframe representing a flight trajectory with the following columns:

- `FLIGHT_ID`: a unique identifier for the flight
- `TIME_OVER`: the time over lon/lat
- `LONGITUDE`: the longitude

- LATITUDE: the latitude
- FLIGHT_LEVEL: the **flight level**
- POINT_ID: the published point ID ('NO_POINT' otherwise)
- AIR_ROUTE: the air rout name ('DCT' otherwise)
- LOBT: the **last off-block time**
- SEQ_ID: the progressive sequence number in the trajectory points
- CALLSIGN: the **callsign** of the flight
- REGISTRATION: the aircraft **registration**
- MODEL_TYPE: the trajectory model as per profile input parameter
- AIRCRAFT_TYPE: the ICAO aircraft type
- AIRCRAFT_OPERATOR: the flight operator
- ICAO24: the ICAO 24-bit address of the aircraft
- ADEP: the Aerodrom of Departure
- ADES: the aerodrome of Destination

Note

You need to either provide a connection conn that has access to as noted in [airspace_profile_tbl\(\)](#) and [flights_tidy\(\)](#) or go with the default which uses PRU_READ to establish a [db_connection\(\)](#).

Examples

```
## Not run:
# export 1 day of NM (planned) trajectories
pf1 <- point_profiles_tidy(wef = "2019-07-14",
                          til = "2019-07-15",
                          profile = "FTFM")

# export 2 hours of NM (flown) trajectories
pf2 <- point_profiles_tidy(wef = "2019-07-14 22:00",
                          til = "2019-07-15")

# export 1 day of NM (flown) trajectories
pf3 <- point_profiles_tidy(wef = "2019-07-14",
                          til = "2019-07-15",
                          profile = "CTFM")

# export all CTFM trajectories within a bounding box 40 NM around EDDF
bb <- c(xmin = 7.536746, xmax = 9.604390, ymin = 49.36732, ymax = 50.69920)
pf4 <- point_profiles_tidy(wef = "2019-01-01 00:00",
                          til = "2019-01-02 00:00",
                          bbox = bb)

# if you re-use DB connections
conn <- eurocontrol::db_connection("PRU_READ")
pf <- point_profiles_tidy(conn = conn,
```

```
                                wef = "2020-01-01",
                                til = "2020-01-10")

# ... do something else with conn
# ...
# then manually close the connection to the DB
DBI::dbDisconnect(conn)

## End(Not run)
```

season_iata

return the interval for an IATA season

Description

IATA summer season begins on the last Sunday of March and ends on the last Saturday of October. IATA winter season begins on the last Sunday of October and ends Saturday of before next year summer season.

Usage

```
season_iata(year, season = "summer")
```

Arguments

year	the year for the season definition
season	the (northern hemisphere) season, either "summer" (default) or "winter"

Value

an interval for the season definition, end/start dates are inclusive

Examples

```
## Not run:
season_iata(2019)

## End(Not run)
```

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