

**av\_manufacturing\_supply\_chain**

Column	Description	Units
sn	Unique serial number for a given part	Unique numeric value
pn	part number (3 parts represented in this dataset: 54321P01, 65421P11, and 44321P02)	Alphanumeric value
op	Manufacturing operation for the particular part	opXXX
part_desc	description of the part type (3 represented: shroud, disk and blade)	--
kc	Key characteristic number. For each operation there may be multiple key characteristic measurements taken, with each measurement given a numeric value	integer value
msmts	measurement value for the key characteristic. Each kc must be within tolerances (min and max) for the part to be acceptable	real number representing a measurement
max	max value for a kc measurement. Each pn-op-kc combination should have a shared max value	real number representing a measurement
min	min value for a kc measurement. Each pn-op-kc combination should have a shared max value	real number representing a measurement

**av\_bom\_manufacturing**

desc	description of the part type (3 represented: shroud, disk and blade)	--
esn	Engine Serial Number - unique number given for a specific engine	Unique 6-digit number per engine
pn	part number (3 parts represented in this dataset: 54321P01, 65421P11, and 44321P02)	Alphanumeric value
sn	Unique serial number for a given part	Unique numeric value
vstream	Supply chain value stream for the part (3 represented in this dataset: cmc's, machine_airfoils, and rotating_parts)	integer value

**av\_esn\_rul**

Column	Description	Units
esn	Engine Serial Number - unique identifier for a specific engine	--
rul	Remaining Useful Life. Within this case	cycles (remaining



Column	Description	Units
	<p>study, RUL is depicted as the number of cycles remaining until the engine needs to be overhauled. It can be determined algorithmically based on assumed wear of life limiting parts (which is what we will be doing) or via inspection</p> <p>IMPORTANT: The RUL assigned to the ESN is the number of operational cycles after the last cycle that the engine will continue to operate</p>	until overhaul following the last cycle depicted for a specific ESN)

#### Flight Data (4 tables, all with prefix 'av\_engine\_data...')

Column	Description	Units
dataset	Master data set for the case study	--
esn	Engine Serial Number - unique number given for a specific engine	Unique 6-digit number per engine
unit	Engine unit number assigned to a given ESN	Unique number assigned to a given ESN
flight cycle	Several flight cycles are recorded for a given ESN. The 'flight cycle' column reflects each cycle sequentially. <b>The goal of the exercise is to predict the RUL for the LAST flight cycle for a given ESN</b>	Sequential integer that starts at 1 and ends at the last recorded cycle for a given ESN
datetime	Date and time when the engine measurements were taken. All measurements are taken in zulu time (corrected for time zones to the time zone at the prime meridian)	YYYY-MM-DDTHH:MM:SS.SSS Z
operator	3-4 letter unique code for a specific airline	4 airlines represented (AIC, FRON, PGS, AXM)
depart_icao	4 letter code for the departure airport.	For a full list of ICAO codes see <a href="http://airportsbase.org/ICAO.php">http://airportsbase.org/ICAO.php</a>
destination_icao	4 letter code for the destination airport	For a full list of ICAO codes see <a href="http://airportsbase.org/ICAO.php">http://airportsbase.org/ICAO.php</a>
hpc_eff_mod	High Pressure Compressor (HPC) efficiency modifier. An operational profile for HPC efficiency set by the airframe operator (In actuality, this was a modifier variable to simulate	--



	degradation within the simulation modeling software)	
hpc_flow_mod	High Pressure Compressor (HPC) flow modifier. An operational profile for HPC flow set by the airframe operator (In actuality, this was a modifier variable to simulate degradation within the simulation modeling software)	--
tra	Throttle Resolver Angle	Degrees
t2	Total temperature at fan inlet	Degrees Rankine ( <a href="https://en.wikipedia.org/wiki/Rankine_scale">https://en.wikipedia.org/wiki/Rankine_scale</a> )
t24	Total temperature at Low Pressure Compressor (LPC) outlet	Degrees Rankine ( <i>at least this is what it should be...</i> )
t30	Total temperature at High Pressure Compressor (HPC) outlet	Degrees Rankine
t50	Total temperature at Low Pressure Turbine (LPT) outlet	Degrees Rankine
p2	Pressure at fan inlet	pounds per square inch absolute (psia) - pressure relative to vacuum
p15	Total pressure in bypass-duct	pounds per square inch absolute (psia) - pressure relative to vacuum
p30	Total pressure at High Pressure Compressor (HPC) outlet	pounds per square inch absolute (psia) - pressure relative to vacuum
nf	Physical fan speed	rpm
nc	Physical core speed	rpm
epr	Engine pressure ratio (p30/p2)	--
ps30	Static pressure at HPC outlet	pounds per square inch absolute (psia) - pressure relative to vacuum
phi	Ratio of fuel flow to ps30	[pounds per second (pps)] / [pounds per square inch absolute (psia)]
nrf	Corrected fan speed	rpm
nrc	Corrected core speed	rpm
bpr	Bypass Ratio	--
farb	Burner fuel-air ratio	--
htbleed	Bleed Enthalpy	--
nf_dmd	Demanded fan speed	rpm

pcnfr_dmd	Demanded corrected fan speed	rpm
w31	HPT coolant bleed	lbm/s (pound-mass per second)
w32	LPT coolant bleed	lbm/s (pound-mass per second)

#### av\_lkp\_airport\_codes\_t

Column	Description	Units
airport_icao	Unique 4-letter identifier for a given airport. icao = International Civil Aviation Organization	--
latitude	The angular distance of a place north or south of the earth's equator, expressed in signed degrees format (positive values are north of the equator)	DDDD.ddd
longitude	The angular distance of a place east or west of the meridian at Greenwich, England (positive values are east of the Prime Meridian)	DDD.ddd