



# Light Sport Eligible Aircraft Where the Numbers Come From

December 27, 2021

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*Last Updated: December 27, 2021*

*g:\faa aircraft registry database\where the numbers come from\where the numbers come from.docx*

# Light Sport Eligible Aircraft – Where the Numbers Come From

The [website](#) – and this document – were created by Steve Beste working with [Dan Johnson](#).

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## 1. Background

### 1.1 Purpose

The website analyzes the FAA's<sup>1</sup> aircraft registration database with two goals: to highlight the growth in light sport and similar aircraft registrations since the Light Sport Aircraft (LSA) program began in 2005, and to spot the current industry leaders. This information will be useful to manufacturers, dealers, buyers, owners, and the government.

### 1.2 What Aircraft Do I Count?

I count only these aircraft:

1. **Light Sport Aircraft (LSAs)** regardless of how they are registered (SLSA, ELSA...).
2. **Kit-built aircraft** that are similar to the LSA models. Thus, the Sonex is here even though it has never been an LSA.
3. **Modern-style gyroplanes.** The FAA does not currently allow gyroplanes to be LSAs, but I include certain models here that I think *might* become LSAs in the future. To do that, I first limited the list to "modern-style" models, by which I mean the design that has proven so popular in Europe. The hallmark of this design is the large horizontal stabilizer well aft as well as – to be honest – a certain look. Second, I wanted models that are participating in the current boom in gyroplane registrations in the U.S.

### 1.3 What Do I Not Count?

1. Any aircraft built before 2005, when the first LSA model appeared.
2. Any aircraft that doesn't fit the LSA rules – typically by being too heavy or too fast.
3. Two-seat ultralights grandfathered-in before 2008 as part of the launch of the LSA program – technically, those in the FAA database where Certification = "48A". However, I do include 48As for models that I know were never sold as ultralights. In these cases, the 48A has to be a miscode in the database.
4. Standard-category aircraft that can be flown as LSAs, such as early-model Ercoupes.
5. Earlier-design gyroplanes.

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<sup>1</sup> FAA = The Federal Aviation Administration, the United States government agency that regulates civil aviation in the U.S.



## Examples of the Aircraft Being Counted



*LSA Airplane*  
Flight Design CTLS



*LSA Airplane*  
M-Squared Breese LSA



*LSA Trike*  
Evolution Revolt



*Modern-style Gyroplane*  
DTA J-Ro



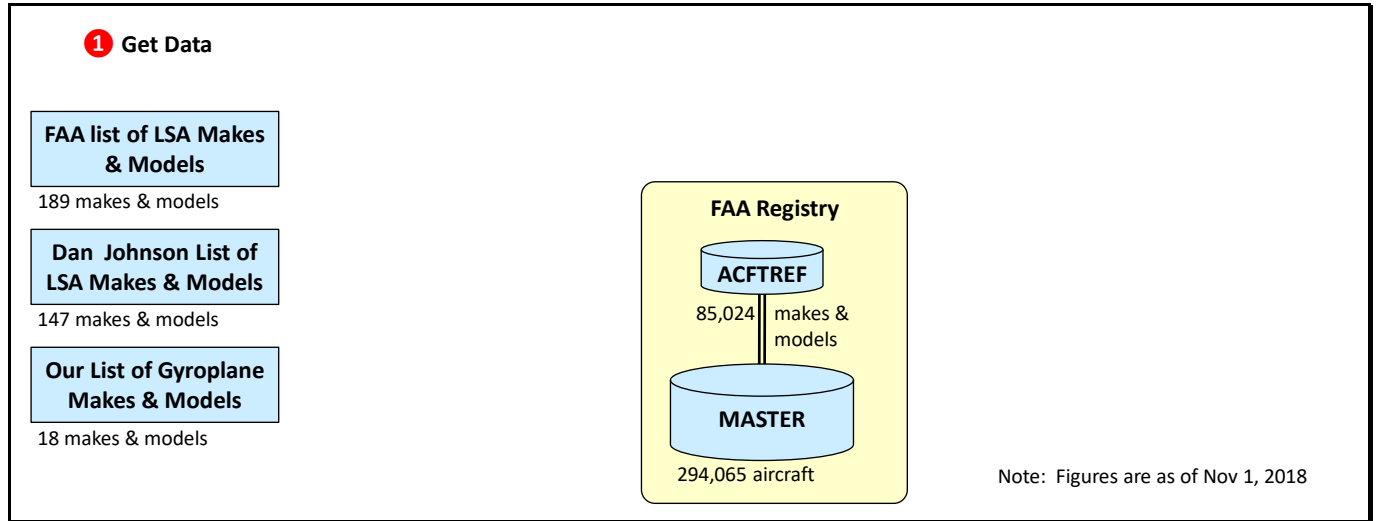
*LSA Powered Parachute*  
Powrachute Airwolf



*LSA Powered Parachute*  
Six Chuter Legend

## 2. Where the Data Comes From

### 2.1 Step One – Get Data



My analysis begins by getting four data sources:

#### 2.1.1 The FAA Aircraft Registry

The main data source is the FAA's registry of all N-numbered aircraft, almost 300,000 of them.

**FAA processing times.** New aircraft like experimental and light-sport that have not been assigned a registration number are generally worked within 3 workdays because they cannot obtain an airworthiness certificate or be operated until the aircraft is registered. Imported aircraft are worked within one day. For ownership transfers, expect a 36 workday cycle time before the transfer shows up here.

The FAA publishes the registry online at:

[https://www.faa.gov/licenses\\_certificates/aircraft\\_certification/aircraft\\_registry/releasable\\_aircraft\\_download/](https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/)



Inside the downloaded zipfile are two comma-separated text files that I load into my database software, Microsoft Access:

1. **MASTER** – This contains one row for every aircraft in the registry. The key is the N-number.
2. **ACFTREF** – This contains one row for every aircraft make and model in the registry, each with a unique “CODE”. For example, 05617ML is the Pipistrel Virus 912:

ACFTREF		
CODE	MFR	MODEL
05617ML	PIPISTREL	VIRUS 912

The CODE field links back to the MASTER table (where the CODE value shows up in the field MFR MDL CODE). Following that link gives us the seven Pipistrel Virus 912s in the MASTER table:

MASTER				
N-NUMBER	MFR MDL CODE	NAME	CITY	STATE
10ZG	05617ML	STERN JACK C	BURBANK	CA
126BF	05617ML	MCEL RATH HUGH D	HYATTSVILLE	MD
282TT	05617ML	CLARKE DENNIS	DANVILLE	CA
4610	05617ML	KANTNER ROBERT P	SONOMA	CA
8103D	05617ML	MACARTHUR RICHARD L	NEW BALTIMORE	MI
937R	05617ML	CLARK MICHAEL D	COUPEVILLE	WA
9HN	05617ML	GROSSO JOHN E	SANTA FE	NM

### 2.1.2 The FAA’s Current List of Approved LSAs

As manufacturers get approved to build certain models as Light Sport Aircraft, the FAA adds those models to a spreadsheet which it publishes online at [https://www.faa.gov/aircraft/gen\\_av/light\\_sport/](https://www.faa.gov/aircraft/gen_av/light_sport/). As of this writing, the spreadsheet lists 189 makes and models.

This list is my driver. At the end of the day, I filter the MASTER table looking for the aircraft in this list.

First, though, I have two problems to solve.

1. The FAA list omits some LSAs that used to be approved but no longer are. Yet the aircraft are still out there and should be counted for my purposes. This means that:
  - I need to keep my own list of LSA makes and models and never delete an entry.
  - I need to start with an older list that includes the discontinued models. That came from Dan Johnson.
2. I want to add modern-style gyroplanes to my list. But the FAA does not include these as LSAs. Hence, I need to make my own list of those.

Therefore, I need two more sources.



### 2.1.3 Dan Johnson's List of Approved LSAs

Dan Johnson is a longtime chronicler of light sport aviation.<sup>2</sup> He has closely tracked the emergence of LSA makes and models. Using data from his website gave me these models that were no longer in the FAA's list as of November, 2018. I include them.

Our Make	Our Model
Aerospool	WT-9 Dynamic
Air Creation	GTE 912
B.O.T.	SC07 Super Cruiser
Distar	Lambada
Distar	Samba XXL
Opus	Super 2
Raj Hamsa	X-Air LS

### 2.1.4 The List of Gyroplane Makes and Models

From vendors at Sun 'n Fun 2018, from discussions with two gyroplane instructors, and from web searches, I produced this list of modern-style gyroplane makes and models. I will expand this when more enter the market.

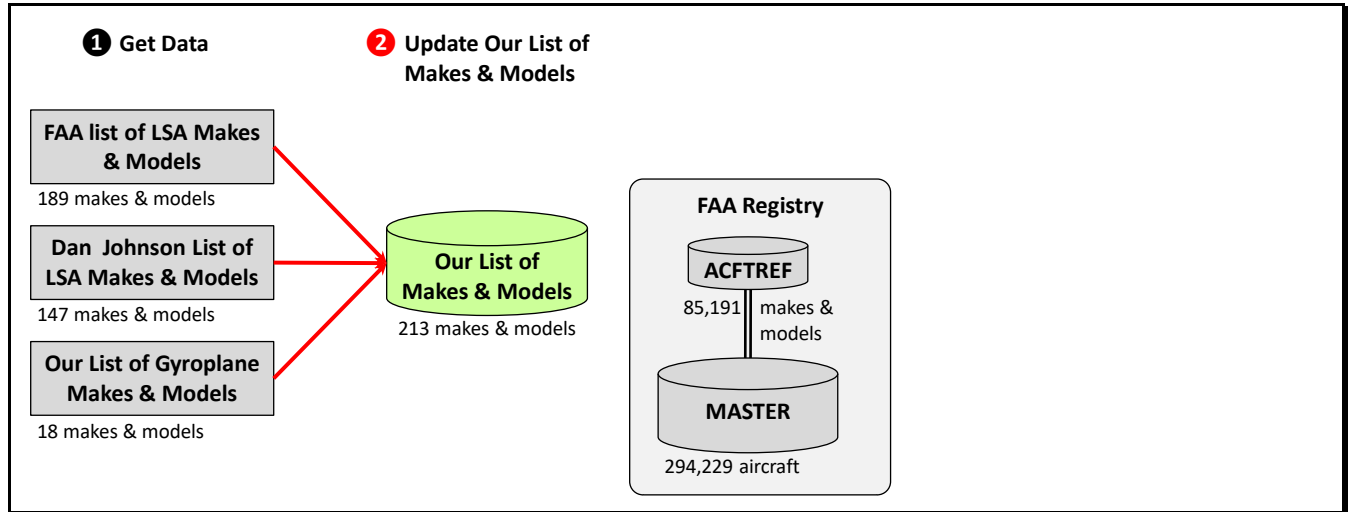
Our Make	Our Model
AutoGyro	Calidus
AutoGyro	Cavalon
AutoGyro	MTO
Brako	GT
Brako	Sprint
Celier	Xenon
DTA	J-Ro
ELA	Cougar
ELA	Cruiser
ELA	Eclipse
ELA	Scorpion
Magni	M-16
Magni	M-22
Magni	M-24 Orion
Silverlight	AR-1
TAG	Titanium Explorer
Tango	Tango 1
Tango	Tango 2

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<sup>2</sup> See <https://www.bydanjohnson.com/>



## 2.2 Step Two – Update The List of Makes & Models



1. Whenever I update the data, I add any new LSAs that have appeared in the FAA's latest spreadsheet.
2. The Dan Johnson feed was a one-time thing.
3. I ask around to see if any new modern-style gyroplane models have come on the market. If so, I add them to my list.

**Policy – Shorten Names.** I want to keep the make and model names short. When publishing online, screen real estate will be scarce, so I want short names. Here’s an example:

OUR MAKES & MODELS			
FAA SLSA Make	FAA SLSA Model	Our Make	Our Model
Evektor-Aerotechnik AS	SportStarSportStar PlusSportStar SL	Evektor	SportStar

**Policy – Combine Models.** I combine similar models into one. For example, American Legend Aircraft has three models in the FAA’s list of SLSAs. I combine them all into just one – the “Legend Cub”.

OUR MAKES & MODELS			
FAA SLSA Make	FAA SLSA Model	Our Make	Our Model
American Legend Aircraft Co	AL3(Legend Cub - Open Cowl)	American Legend	Legend Cub
American Legend Aircraft Co	AL18(Super Legend)	American Legend	Legend Cub
American Legend Aircraft Co	AL11(Legend Cub - Closed Cowl)	American Legend	Legend Cub

There are two reasons for combining models, both having to do with the reports:

1. **Trend line.** For measuring the popularity of the Legend Cub, the distinctions between the various models don’t matter. My approach highlights the overall statistics for all Legend Cubs.
2. **Usability.** At 213, the list of makes and models is already long enough that it will be difficult to work with using the pick lists in Tableau Public when I publish online. By combining the models, I ease that problem.

### **Policy – List Models Under their Current Manufacturers**

Many models have been produced by different companies over the years. For example, the Cygnet amphibious trike was first produced by Krucker in Ontario, then by Sea & Sky, and now by Airtime.

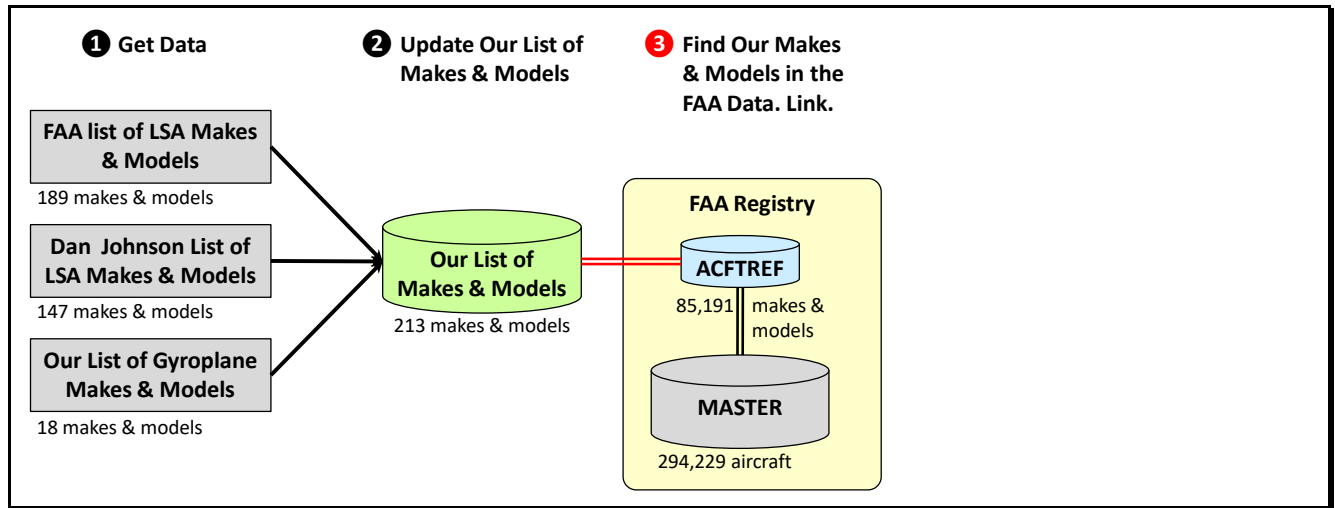
In these cases, I cite all the aircraft, but credit them all to the current manufacturer. Thus, the website shows all Cygnets but labels them all “Airtime Cygnet” even though Airtime did not build them all. This lets users see the overall trend in Cygnet registrations. By contrast, if I were to list “Sea & Sky Cygnet” separately from “Airtime Cygnet”, the overall Cygnet picture would be chopped up and obscure. It’s a tradeoff.

\* \* \*

At the end of Step Two, I have an updated list of “our” makes and models. Next, I go looking for them in the FAA data.



## 2.3 Step Three – Find Our Makes and Models in the FAA Data



The FAA Registry has a table of aircraft makes and models. It's called ACFTREF, and if you can identify a make and model there, you can follow a link into the MASTER table to count all the actual aircraft of that make and model. My task is to find my makes and models in ACFTREF and connect to them, as shown by the red double line in the diagram.

The problem is that the makes and models in ACFTREF don't exactly match the makes and models in the FAA's LSA spreadsheet – much less the makes and models in my list. For example, here's what ACFTREF says about the Pipistrel Virus: 14 different entries, all for essentially one model, the Virus.

CODE	MFR	MODEL	LSA Num
05617ML	PIPISTREL	VIRUS 912	
056304C	PIPISTREL	SW VIRUS	
05630K4	PIPISTREL	VIRUS	
05631H5	PIPISTREL	VIRUS SW	
056321F	PIPISTREL D.O.O. AJDOVSCINA	VIRUS	
056321O	PIPISTREL DOO AJDOVSCINA	VIRUS SW	
05632WR	PIPISTREL D.O.O. AJDOVSCINA	VIRUS 912 SW	
05634GR	BARNHART AVIATION SERVICE INC	SW VIRUS 100	
056353X	RUPP TIM A	VIRUS SWIS	
056354W	PIPISTREL AJDOVSCINA	VIRUS SW 914	
05635PY	MANOUCHER ADLI	VIRUS SW	
05636FW	INKS ALLEN W	VIRUS SW	
060008N	PIPISTREL LSA S R L	VIRUS 912 LSA	
060008T	PIPISTREL LSA S R L	VIRUS SW	

Here's what my list says about the Virus:

FAA SLSA Make	FAA SLSA Model	Our Make	Our Model	LSA Num
Pipistrel LSA SRL	Virus SWiS	Pipistrel	Virus	119
Pipistrel LSA SRL	Virus SW	Pipistrel	Virus	118
Pipistrel LSA SRL	Virus	Pipistrel	Virus	117



Notice the field **[LSA Num]** that's in both tables. (I added it to ACTREF.)

I manually find all the Viruses in ACTREF and set the value of **[LSA Num]** in each row to whatever is appropriate from my list. Here's the result:

ACFTREF			
CODE	MFR	MODEL	LSA Num
05617ML	PIPISTREL	VIRUS 912	117
056304C	PIPISTREL	SW VIRUS	118
05630K4	PIPISTREL	VIRUS	117
05631H5	PIPISTREL	VIRUS SW	118
056321F	PIPISTREL D.O.O. AJDOVSCINA	VIRUS	117
056321O	PIPISTREL DOO AJDOVSCINA	VIRUS SW	118
05632WR	PIPISTREL D.O.O. AJDOVSCINA	VIRUS 912 SW	118
05634GR	BARNHART AVIATION SERVICE INC	SW VIRUS 100	118
056353X	RUPP TIM A	VIRUS SWIS	119
056354W	PIPISTREL AJDOVSCINA	VIRUS SW 914	118
05635PY	MANOUCHER ADLI	VIRUS SW	118
05636FW	INKS ALLEN W	VIRUS SW	118
060008N	PIPISTREL LSA S R L	VIRUS 912 LSA	117
060008T	PIPISTREL LSA S R L	VIRUS SW	118

Mind you, **[LSA Num]** means nothing in the outside world. It's purely internal to this project.

With the **[LSA Num]** values in place in ACFTREF, all three tables are linked. I can now write a query that:

- Starts with "Pipistrel Virus" in my table,
- Then brings in all the above 14 corresponding rows in the ACFTREF table, based on the **[LSA Num]** values that are now in both tables.
- Then brings in all the 42 actual Pipistrel Virus aircraft in the MASTER table via the CODE field in ACFTREF.

The diagram on the next page shows how these linkages work.

OUR MAKES & MODELS				
FAA SLA Make	FAA SLA Model	Our Make	Our Model	LSA Num
Pipistrel LSA SRL	Virus SWIS	Pipistrel	Virus	119
Pipistrel LSA SRL	Virus SW	Pipistrel	Virus	118
Pipistrel LSA SRL	Virus	Pipistrel	Virus	117

Start here with  
“Pipistrel Virus”

ACFTREF				
CODE	MFR	MODEL	LSA Num	
05617ML	PIPISTREL	VIRUS 912	117	
056304C	PIPISTREL	SW VIRUS	118	
05630K4	PIPISTREL	VIRUS	117	
05631H5	PIPISTREL	VIRUS SW	118	
056321F	PIPISTREL D.O.O. AJDOVSCINA	VIRUS	117	
056321O	PIPISTREL DOO AJDOVSCINA	VIRUS SW	118	
05632WR	PIPISTREL D.O.O. AJDOVSCINA	VIRUS 912 SW	118	
05634GR	BARNHART AVIATION SERVICE INC	SW VIRUS 100	118	
056353X	RUPP TIM A	VIRUS SWIS	119	
056354W	PIPISTREL AJDOVSCINA	VIRUS SW 914	118	
05635PY	MANOUCHER ADLI	VIRUS SW	118	
05636FW	INKS ALLEN W	VIRUS SW	118	
060008N	PIPISTREL LSA S R L	VIRUS 912 LSA	117	
060008T	PIPISTREL LSA S R L	VIRUS SW	118	

Follow the  
links to  
ACFTREF

then from  
there to the  
MASTER  
table

MASTER							
Our Make	Our Model	CODE	N-NUMBER	NAME	CITY	STATE	
Pipistrel	Virus	05617ML	102G	STERN JACK C	BURBANK	CA	
Pipistrel	Virus	05617ML	126BF	MCLEATH HUGH D	HYATTSVILLE	MD	
Pipistrel	Virus	056321O	134S	SHELINE HANS E	SUGAR LAND	TX	
Pipistrel	Virus	056353X	142AT	RUPP TIM A	BASTROP	TX	
Pipistrel	Virus	05632WR	153EG	SHAHER JAMES W	PHOENIX	AZ	
Pipistrel	Virus	056321O	155CL	STEVENS RILEY R	ANDERSON	SC	
Pipistrel	Virus	056321O	193JH				
Pipistrel	Virus	060008N	2246	TENNESEN DAVID J	SEATTLE	WA	
Pipistrel	Virus	05631H5	228JW	WILBUR JOHN	DRIFTWOOD	TX	
Pipistrel	Virus	056321O	244RK	YOUNGWERTH ALBERT	BOISE	ID	
Pipistrel	Virus	05617ML	282TT	CLARKE DENNIS	DANVILLE	CA	
Pipistrel	Virus	056321O	3212H	GARNER L MICHELE TRUSTEE	NASHVILLE	TN	
Pipistrel	Virus	056321O	345M	ROGERS RAYLON R DBA	WELLSTON	OK	
Pipistrel	Virus	056321O	3852D	WILSON JOHN R	FAIRFAX	VA	
Pipistrel	Virus	05631H5	385W	WIELAND STEVEN M	DAVIDSON	NC	
Pipistrel	Virus	05631H5	42PV	JOHNSON DOUGLAS C	OCEAN	NJ	
Pipistrel	Virus	05635PY	442M	ADLI MANOUCHER	REDONDO BEACH	CA	
Pipistrel	Virus	060008T	447XS	SKY WEST AVIATION INC TRUSTEE	ALBUQUERQUE	NM	
Pipistrel	Virus	05617ML	4610	KANTNER ROBERT P	SANOMA	CA	
Pipistrel	Virus	056321O	4JW	WEBB JACK	PAULDING	OH	
Pipistrel	Virus	05634GR	510RL	BARNHART ROGER D	WILMINGTON	OH	
Pipistrel	Virus	056321O	536PV	FOUR DELTA TANGO LLC	WILMINGTON	DE	
Pipistrel	Virus	056321O	537PV	FOUR DELTA TANGO LLC	WILMINGTON	DE	
Pipistrel	Virus	056321O	5928Z	ZIMMERMANN STEVE	BROOMFIELD	CO	
Pipistrel	Virus	05636FW	608US	INKS ALLEN W	BOERNE	TX	
Pipistrel	Virus	060008N	624	SHELINE RAYMOND K	CARLSBAD	CA	
Pipistrel	Virus	05631H5	665EZ	CHAOUI CONSULTING GROUP INC	LOS ANGELES	CA	
Pipistrel	Virus	05631H5	667Z	FMD CONSULTANTS LLC	GEORGETOWN	TX	
Pipistrel	Virus	05631H5	678WX	BODO DIEHN	SCOTTSDALE	AZ	
Pipistrel	Virus	056321O	69PV	D J CAMPBELL AVIATION LLC	SIOUX FALLS	SD	
Pipistrel	Virus	056321O	727KL	SZABOLCS APAI	FULLERTON	CA	
Pipistrel	Virus	056321O	741TR	PROVEN TR	BROAD RUN	VA	
Pipistrel	Virus	056321F	78PV	REPS R1 DRIVE UNIT CO LLC	HELENA	MT	
Pipistrel	Virus	060008T	805W	KOLPAKCHI IGOR	CEDARHURST	NY	
Pipistrel	Virus	05617ML	8103D	MACARTHUR RICHARD L	NEW BALTIMORE	MI	
Pipistrel	Virus	056321O	811AW	EAGLES ON ANGEL WINGS LLC	DAVIE	FL	
Pipistrel	Virus	05631H5	869AR	HAULMAN STEVE R	PACIFICA	CA	
Pipistrel	Virus	056321O	913AT	TIMBERLINE MANAGEMENT INC	FRISCO	CO	
Pipistrel	Virus	05631H5	937M	J AND P COMPANY R1 LLC	SAINT GEORGE	UT	
Pipistrel	Virus	05617ML	937R	CLARK MICHAEL D	COUPEVILLE	WA	
Pipistrel	Virus	056354W	96YU	GREEN TAVIN V TRUSTEE	PHOENIX	AZ	
Pipistrel	Virus	05617ML	9HN	GROSSO JOHN E	SANTA FE	NM	

and see all 42  
Pipistrel  
Viruses



\*

\*

\*

At the end of Step Three, I have linked our list of makes and models with the actual aircraft in the FAA registry. Next, I use these links to extract a table of just the actual aircraft that interest us.

## Why not use the FAA's own LSA codes?

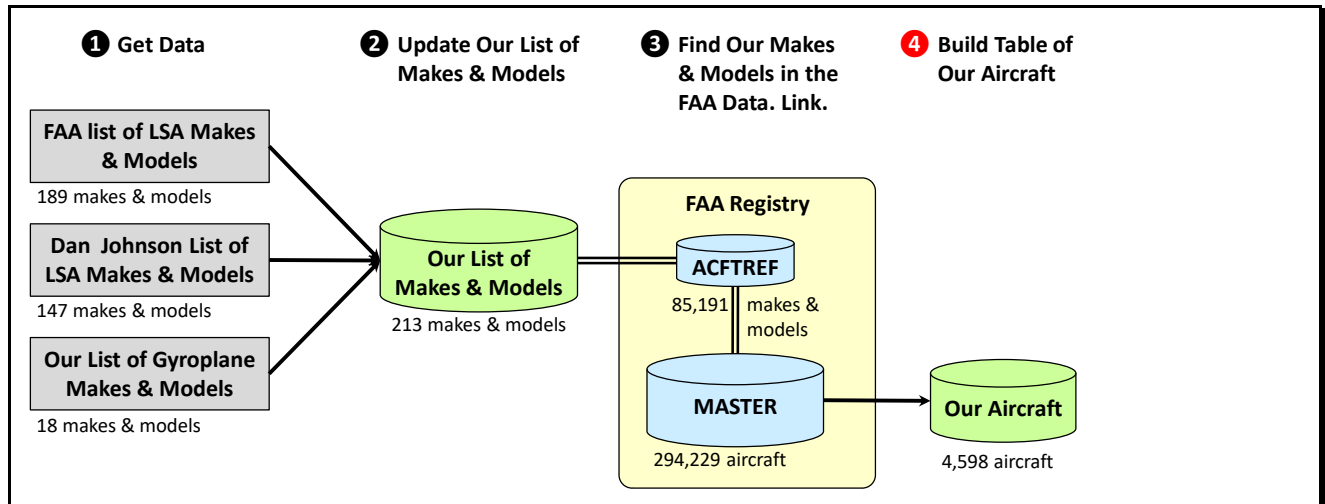
Why go to all this trouble spotting the LSAs based on make and model names when the FAA's registry already codes all the LSAs as such in its CERTIFICATION field?

1. **Accuracy.** 9% of the aircraft listed in the MASTER table have no certification listed. That is, the CERTIFICATION field is blank. This includes 600 aircraft that, on inspection, really are LSAs. If I identified the LSAs based on this field, we would lose those 600. Going the other way, the MASTER table does code 298 aircraft as being SLSAs or ELSAs of the kind that interest us – but on inspection they are neither, like the Quad City Challenger and the Buckeye Dream Machine. Together, these amount to 15% of the 6,305 aircraft we found. Thus, I get more accurate results by spotting the LSAs based on make and model name rather than by using the CERTIFICATION field in the database.
2. **Normalization of the Names.** To make the reports useful, I have to normalize the make and model names anyway. Looking at the MODEL field in the ACFTREF table, the computer thinks that these are all different models:
  - Virus
  - Virus 912
  - Virus 912 LSA
  - Virus 912 SW
  - Virus SW
  - Virus SW 914
  - Virus SWIS
  - SW Virus
  - SW Virus 100

But they're really all the same model. There's no value in reporting statistics separately for each of these. Therefore, at some point, I have to manually "normalize" these names, which means linking them all to one entry – "Virus" – in our master list of makes and models. So, there's just no avoiding the exercise. Step Three above described how I do it.



## 2.4 Step Four – Build a Table of Just Our Aircraft



With a query that uses the links described above, I create a table of aircraft that interest us. As of December 28, 2018, it had 6,305 aircraft.

### OUR AIRCRAFT

(the first 12 rows on December 28, 2018)

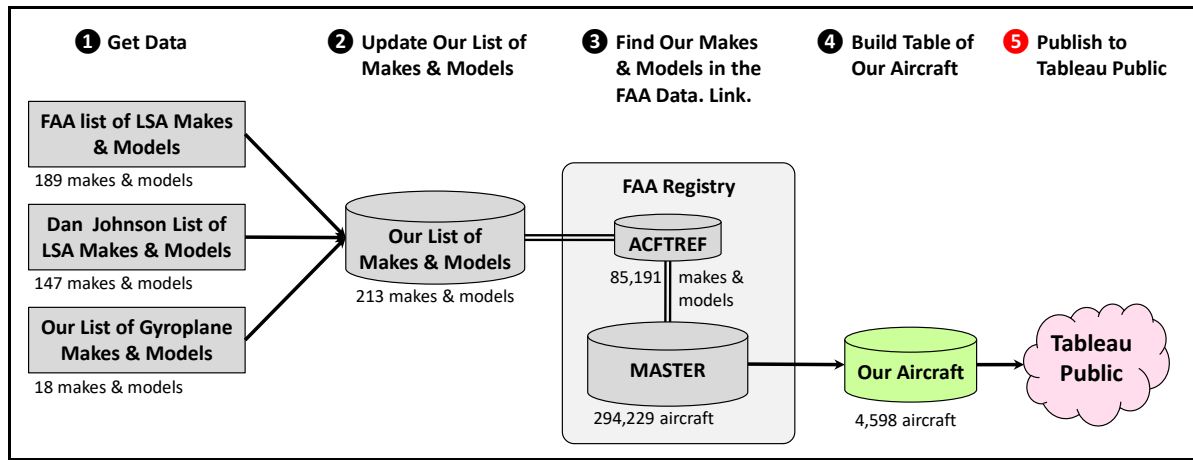
OUR AIRCRAFT							
N-Number	Make	Model	Aircraft Type	Amphibian?	Certification	Mfr Yr	
1001K	Flight Design	CT	Airplane	No	SLSA	2017	
1005A	LSA America	Allegro	Airplane	No	SLSA	2015	
100GH	Just	Highlander	Airplane	No	E-AB	2010	
100MG	Rans	S-7LS Courier	Airplane	No	E-AB	2011	
100NH	Pipistrel	Sinus	Glider	No	SLSA	2014	
1010Z	Just	Highlander	Airplane	No	E-AB	2006	
10120	Rans	S-6LS Coyote	Airplane	No	E-AB	2006	
1014C	Atec	Faeta	Airplane	No	SLSA	2005	
1017Q	Rans	S-6LS Coyote	Airplane	No	E-AB	2006	
101GX	Remos	GX	Airplane	No	SLSA	2008	
101LW	BRM	Bristell	Airplane	No	SLSA	2016	
101PF	Kitfox	Light Sport	Airplane	No	E-AB	2012	

OK – where did I get the *Aircraft Type*, *Certification*, *Manufacture Year*, and so on? For that story, read section 3 below, **Breakouts**.



## 2.5 Step Five – Publish to Tableau Public

But first, I need to publish to Tableau Public so everyone can see the numbers.



### Tableau Public

Tableau is the industry leader among products that let people explore data visually and interactively over the web. Their *visualizations* are famous.

Tableau Public is their free version that lets anyone publish visualizations interactively on the web. Of course, the data is then visible to anyone in the world, which is why most organizations prefer the paid version. The free version also has some limitations as to size and data sources, but it's perfect for my purposes.

See their [one-minute introductory video](#).

This step is easy. I export the OUR AIRCRAFT table to Excel and upload it to Tableau Public. That updates everything on the website.



### 3. Breakouts

In Tableau Public, you can filter the data by any of these breakout dimensions:

- Aircraft Type
- Make & Model
- Certification
- Certification Group

Those breakouts come straight from the OUR AIRCRAFT table, where every aircraft has them as attributes, as you see here.

OUR AIRCRAFT						
N-Number ↑	Make ▾	Model ▾	Aircraft Type ▾	Mfr Yr ▾	Amphibian ▾	Cert Cat ▾
1001K	Flight Design	CT	Airplane	2017	No	SLSA

Here's where I get those values.

#### 3.1 Aircraft Type

##### 3.1.1 Possible Values

AIRCRAFT TYPE	
Our Aircraft Type ▾	Aircraft Type Desc ▾
Airplane	Fixed-wing airplane or Fixed-wing amphibian
Glider	Glider or motorglider
Gyroplane	Gyroplane
Lighter-than-air	Lighter than air
PPC	Powered Parachute
Trike	Weight-shift-control

##### 3.1.2 Derivation

I set these manually in my table of makes and models based on my knowledge of the market, augmented by internet searches.

## **3.2 Year**

This attribute is critical to showing the trend in registrations over time.

### **3.2.1 Derivation**

The year of manufacture comes from the FAA registry. In preferential order, I take:

Source	MASTER-table Field	% of Aircraft
Year of manufacture	[YEAR MFR]	86.5% of our aircraft. The other entries are blank in this field so for them I use...
Year of Airworthiness Certificate	[AIR WORTH DATE]	3% of our aircraft. The rest are blank in this field, too, so for them I use...
Year of certification	[CERT ISSUE DATE]	10% of our aircraft. The rest are blank in this field, too, so for them I use...
Year of last action in the registry	[LAST ACTION DATE]	0.5% of our aircraft.

However, if the Year of Manufacture is prior to 2005 when the first LSAs were approved, I exclude the aircraft altogether.

## **3.3 Make & Model**

Section 2 above shows where make and model come from.





### 3.4 Certification

#### About Certifications

When the FAA issues an Airworthiness Certificate for an individual aircraft, it does so in one of several *categories*. Each category puts certain restrictions on both the manufacturer and the owner.

About 40% of the aircraft here are certified as *Special Light Sport Aircraft*. The rest are in other categories.

I've had to remedy some gaps and mistakes in the data. That story is told below.

#### 3.4.1 Possible Values

The FAA has dozens of certification codes. I summarize them into just these six:

CERTIFICATION CATEGORY		
	Certification	Certification Desc
+	E-AB	Experimental - Amateur-Built
+	ELSA	Experimental - Light Sport Aircraft, excluding those grandfathered in before 2008.
+	Exhibition	Experimental - Exhibition
+	Other	Other, such as Crew Training, R&D, and Market Survey
+	Primary	Primary Category
+	SLSA	Special Light Sport Aircraft
+	Standard	Standard category, like Cessnas and Pipers
+	Unknown	There should be none of these.

### 3.4.2 Derivation

The certification categories I publish mostly come straight from the FAA registry’s CERTIFICATION field. However, I do make the adjustments in the table below. Numbers come from the December 28, 2018 edition of the registry. I include them to give you a sense of which categories have lots of aircraft and which not so many.

FAA Cd <sup>3</sup>	Definition	# <sup>4</sup>	Comment	My Cat <sup>5</sup>
<blank>		852	Taking each model in turn, I set the blanks to the certification that’s used the most among the aircraft that DO have codes. For example, looking at the Zenair/Zenith CH601: <ul style="list-style-type: none"> <li>• 35 are SLSA</li> <li>• 13 are ELSA</li> <li>• 270 are E-AB</li> <li>• 12 are blank</li> </ul> Therefore, I assigned “E-AB” to the 12 aircraft where the certification was blank since that’s the most-used code.	Various
1	Standard category	14	On inspection, these are all SLSAs, miscoded.	SLSA
2	Limited category	2		Other
32	Restricted category	1	Aerial surveying. A miscode. Should have been “42”.	E-AB
41	R&D	11	Experimental – R&D.	Other
42	E-AB	3,285	Experimental – Amateur-Built. Gyroplanes plus LSAs that the owner chose to build from a kit and certify as an E-AB. That would let the builder make more modifications than would be possible for an ELSA.	E-AB
43	Exhibition	50	Experimental – Exhibition	Exhibition
44	Racing	19	No LSAs are racers, so these are miscodes. 18 Pipistrels and one Lambada. A friend has one of the Pipistrels, and his registration says EXPERIMENTAL – EXHIBITION – RACING. So I code these all as EXHIBITION.	Exhibition
45	Crew Training	2	Experimental – Crew Training.	Other
46	Market Survey	2	Experimental – Market Survey.	Other
47	Operating Kit-Built	4	Experimental – Operating Kit-Built aircraft.	Other

<sup>3</sup> FAA Cd = How this category is coded in the FAA’s aircraft registry in the CERTIFICATION field of the MASTER table. Find the definitions of the codes in the FAA’s [guide](#) to the downloadable aircraft registry.

<sup>4</sup> In data taken from the FAA registry on December 28, 2018, I found 6,613 of our aircraft. The table shows the number of our aircraft that the FAA had coded each way.

<sup>5</sup> The certification category I assigned to aircraft that the FAA coded this way.



	FAA Cd <sup>3</sup>	Definition	# <sup>4</sup>	Comment	My Cat <sup>5</sup>
	48A	Grandfathered-in ELSAs	817	Experimental – Light Sport Aircraft (ELSA). These are former two-seat ultralights from before the LSA rule that were grandfathered in as ELSAs before 2008. I exclude them except for 43 that were miscodes because they could never have been ultralights.	Excluded  ELSA
	48B	ELSA from kits	599	Experimental – Light Sport Aircraft. LSA manufacturers have the option of selling their aircraft as kits which the builder must complete exactly.	ELSA
	48C	Factory-built SLSAs downgraded	382	Experimental – Light Sport Aircraft. SLSA aircraft are all factory-built. But the owners can elect to change their certification to the less-restrictive ELSA category.	ELSA
	49	Unmanned aircraft	4	3 RV-12s and a Kitfox, probably miscoded.	ELSA
	7	Primary category	7	Some AutoGyro models can be certified in this category and thus be purchased factory-made.	Primary
	8	Production flight testing & export	36	These are all recent SLSAs.	SLSA
	9	SLSA	2,881	Special Light Sport Aircraft.	SLSA

**8,968** aircraft of our makes and models.  
 - 355 excluded 48As – the grandfathered ultralights  
 - 639 excluded because built prior to 2005  


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**7,974** The number reported on the website

### 3.5 Certification Group

This site uses FAA certification as a surrogate for sales. That works for factory-built aircraft since both certification and sale happen around the same time. That's very much not the case for kit aircraft, where years may pass between the sale of the kit and the certification of the completed plane. For kit-built aircraft, the data measures *completions* more than kit sales. To support both kinds of analyses, I have included a filter that lets you look at just factory-built or just kit-built aircraft. I assigned aircraft to the two groups based on their certification category:

- **Factory-built** = SLSA, ELSA, Exhibition, Primary, Standard
- **Kit-built** = Experimental Amateur-Built

#### Why Count ELSAs as Factory-built?

The original concept was that manufacturers could sell their Light Sport Aircraft either ready-to-fly (SLSA) or as a kit (ELSA). The idea was that purchasers of the kits would build them at home much as they build Experimental-Amateur-Built kits.

That's not what happened. In practice, most ELSAs come ready-to-fly but are registered ELSA so that the owners can do their own maintenance. Others are built under builder-assist programs that effectively produce factory-built aircraft.



## 4. How to Share Your Work with Others

Let's say you filtered the Tableau Public display to show only the aircraft where Certification = SLSA and now you want to share what you're seeing. Of course, you can take a screen shot and share that. But you want to share the Tableau Public view itself so others can manipulate it further. It's complicated, but here's how.

The key is the URL. You have to change the URL to reflect the filtering you've done. Then share that customized URL.

**Step 1:** Grab the URL from your browser's address bar. It will probably look like this:

```
https://public.tableau.com/views/U_S_LightSportAircraftRegistrations/Home?%3Aembed=y%3Adisplay_count=yes&publish=yes%3AshowVizHome=no#2
```

**Step 2:** If it's there, remove the "#2" (or #3 or #1, or #whatever) from the tail of the URL. This is a temporary view counter for your current browser session. It will mess things up.

**Step 3:** Append text for every filter you have applied, such as "Certification=SLSA".

- Start each string with an ampersand.

Thus, "&Certification=SLSA". The URL would be:

```
https://public.tableau.com/views/U_S_LightSportAircraftRegistrations/Home?%3Aembed=y%3Adisplay_count=yes&publish=yes%3AshowVizHome=no&Certification=SLSA
```

**Step 4:** If you want more than one value, separate them with commas. Thus, if you want both SLSAs and ELSA, your text would be "&Certification=SLSA,ELSA"

```
https://public.tableau.com/views/U_S_LightSportAircraftRegistrations/Home?%3Aembed=y%3Adisplay_count=yes&publish=yes%3AshowVizHome=no&Certification=SLSA,ELSA
```

**Step 5:** *Encode* any characters that are not allowable in these URLs – the four characters below. For example, spaces become %20. Ampersands become %26. So "Make & Model" becomes Make%20%26%20Model. These are characters that must be substituted.<sup>6</sup>

Character	Substitute	Character	Substitute
space	%20	&	%26
#	%23	+	%2B

Or, ready-made for you, here are the filters in this data:

Filter	Substituted version
Aircraft Type	Aircraft%20Type
Cert Group	Cert%20Group
Certification	Certification
Make & Model	Make%20%26%20Model

<sup>6</sup> These *escape characters* consist of the % character followed by the hexadecimal number of the character as listed in the ASCII character set. For the complete list of substitutions, see any ASCII Table, such as [this one](#).



**Example.** Let's say you want these filters:

- Make & Model = CubCrafters Carbon Cub and
- Certification = ELSA

Your text would be

- **&Make%20%26%20Model=CubCrafters%20Carbon%20Cub&Certification=ELSA**

And the entire URL would be:

```
https://public.tableau.com/views/U_S_LightSportAircraftRegistrations/Home?%3Aembed=y&%3Adisplay_count=yes&publish=yes&%3AshowVizHome=no&Make%20%26%20Model=CubCrafters%20Carbon%20Cub&Certification=ELSA
```

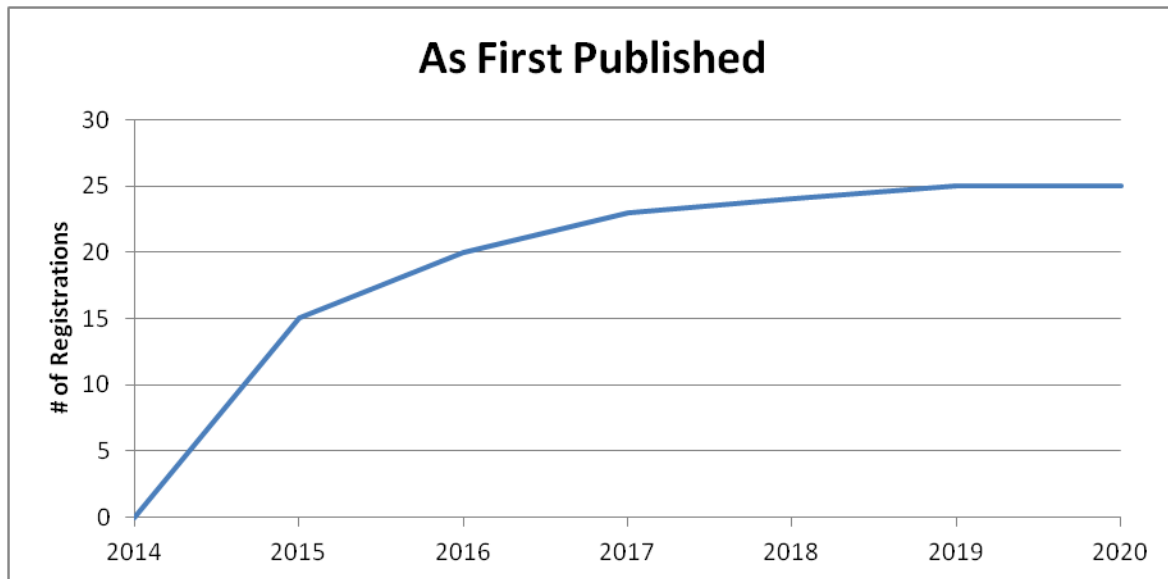
**Reference:** [Tableau's paper on how Tableau Public URLs are structured.](#)

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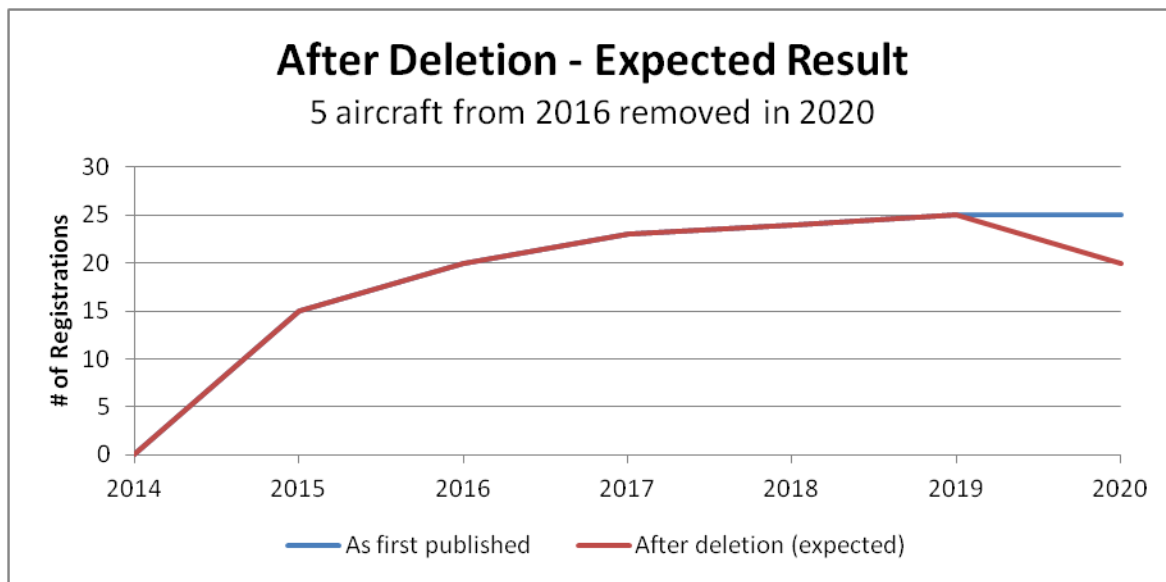
## 5. About Deletions

What happens when aircraft disappear from the FAA registry? Do they disappear from this website? Yes, they do, but not in the way you expect. Consider this example.

From 2014 to 2020, 25 Blitzwing 600s were registered. They show up in this website as below.

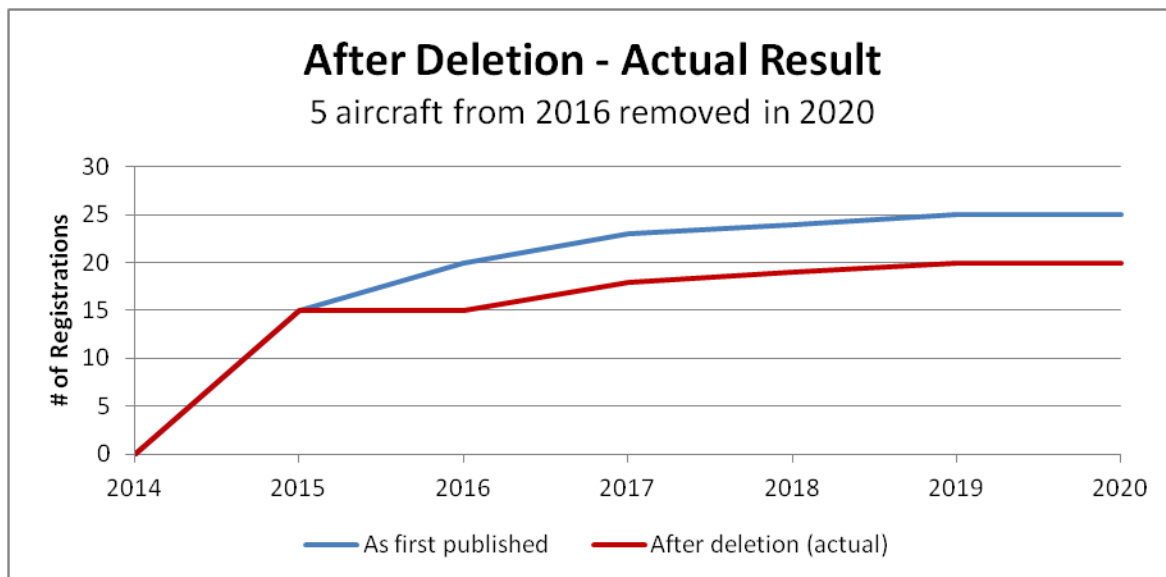


Let's say that in 2020, five of these aircraft disappear from the FAA database. Perhaps they were destroyed or exported. As it happens, these five were all manufactured in 2016. You'd expect the result to look like this:



That is, all 25 were on the rolls in 2019, and now there are only 20.

Instead, what you see is this:



In other words, the five are removed not only from 2020, but also from the historical data going back to their year of manufacture, 2016 in this example. It's as if they never existed.

This result is not what I would prefer. But it's the best possible given that all the data on the site comes from the latest FAA download. I create the historical data using the year of manufacture of each aircraft. But it all comes from the latest download. Thus, if airplane N-42AT is not in the latest download, then it's gone from every year. I have no way to tell that it used to be on the rolls in 2016, 2017, and so on.

I tried to get around this problem. That would entail keeping historical copies of the database. If I worked from historical databases, I could see that N-42AT was indeed there in 2016 and 2017. The FAA publishes historical copies online, so getting the data would be easy. But I couldn't solve the *identity* problem. N-numbers are re-used. Serial numbers are duplicated, especially on experimental aircraft. I could find no way to be sure that N-42AT in today's database is the same aircraft as the N-42AT that



appears in an old copy of the database. To my surprise, the FAA itself has no unique and perpetual identifier for aircraft like the VIN number on your car.

So, even though today's website says there were only 15 Blitzwing 600s in 2016, there might have been more at that time.

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## 6. About Me and This Project

I'm Steve Beste, a retired software developer, data lover, and trike pilot in Springfield, VA. I'm also president of [Flying Club 1](#), the center for light flying in Northern Virginia. I created the site to support Dan Johnson's work.

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The website is hosted by Tableau Public, the superb tool for presenting – interactively and online – the stories that lurk in data.