

SCTBuilder,

a VATSIM Facility Engineer Build Utility by Dr. Chuck Kowalewski (1429208)

Introduction

As a new and naïve facility engineer for Jacksonville ARTCC, I was impressed by the time it takes to develop the sector files every 28 days. Add requests from my ATM and DATM for lists of towered airports and creation of a Euroscope data file, and I was overwhelmed. I simply don't have the time to maintain all the files! As a physician and 30-year programmer, it seemed reasonable to try to automate as much of the work as possible. I was inspired by IvAcBuilder, but for some reason it never updates the AIRAC files for me. Enter SCTBuilder, intended to be "IvAcBuilder on steroids."

Features

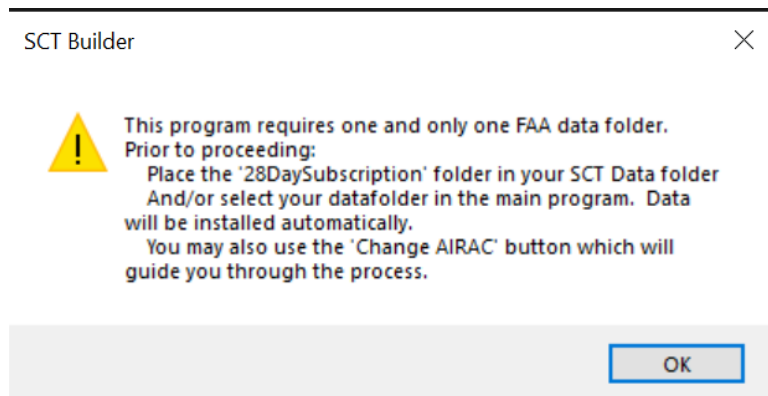
- Automates the download of current, preview, and past AIRAC data from the FAA NASR subscription website. Select your year and cycle and it does this for you.
- Generate the VOR, NDB, FIX, APT, RWY, AWY and SID/STARs for a given "square" of ATC.
 - You can select your NW and SE corners manually, from your AIRAC, or by choosing any NavAid or airport in the database.
- Create a logical "center" to open the screen
 - This can be selected by center of your airspace or any towered airport.
- I hated writing the fixes on the SIDs and STARs, so SCTBuilder will do this for you as it builds the diagrams. It's slow, but faster than manual entries, plus it provides easy to read labels.
- All the SCT areas are individually saved to text files, allowing you to mix-and-match selections.
 - For example, you may want ALL the airports in your selected square, but only runway centerlines for airports sponsored by your ARTCC. Just run the selection and output twice, once with the "restrict to ARTCC" checked, and another unchecked.
- With Euroscope, building SIDs and STARs is a pain, and there is no automated program. In the next version, facilities engineers with NaviGraph subscriptions can automate this process, as well as add altitude and speed restrictions to VRC diagrams.
- Several IvAcBuilder like tools have been developed; more are on the way.

Installation

- Download a release from GitHub (<https://github.com/drchuck59/SCTBuilder>), or DM me on the Jacksonville Discord server to get a link to a DropBox folder. The files are identical.
- Unzip the file to a folder of your choice
- Run the SETUP.exe program – do NOT run the MSI program, as you will lose some installation options as well as uninstall capability.
- After installing the program, double-click the SCTBuilder Icon on your desktop...

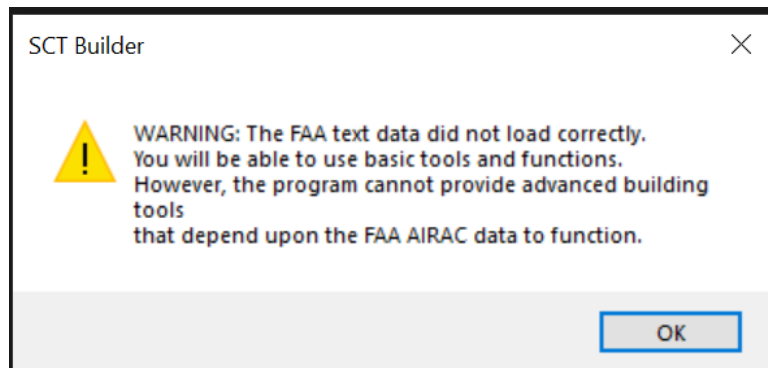
First Time Run

- SCTBuilder does not come with FAA data or default folders – you must set this up first.



This is the first-time dialog you, reminding you that you need to set up your data folder and download FAA data. It appears when you do not have an initialization file.

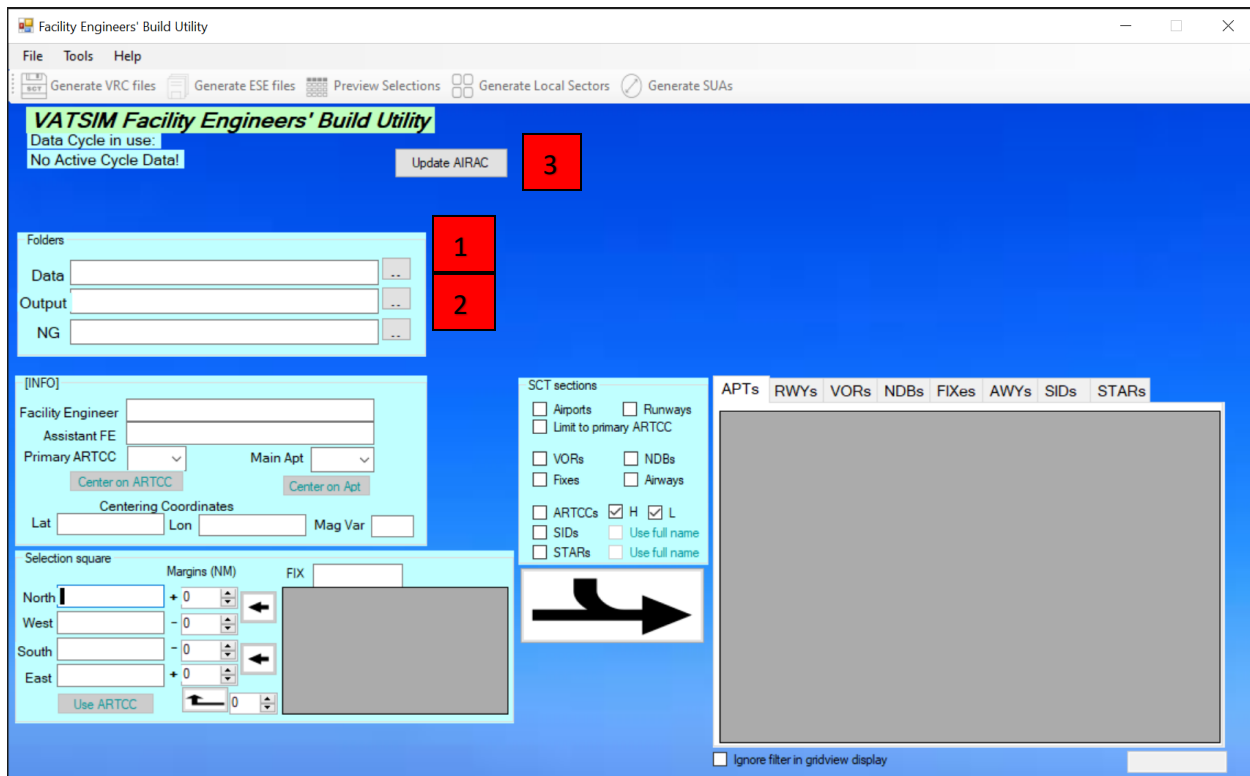
Click OK.



This warning will appear if there is no FAA data, or if the data appears to have been corrupted.

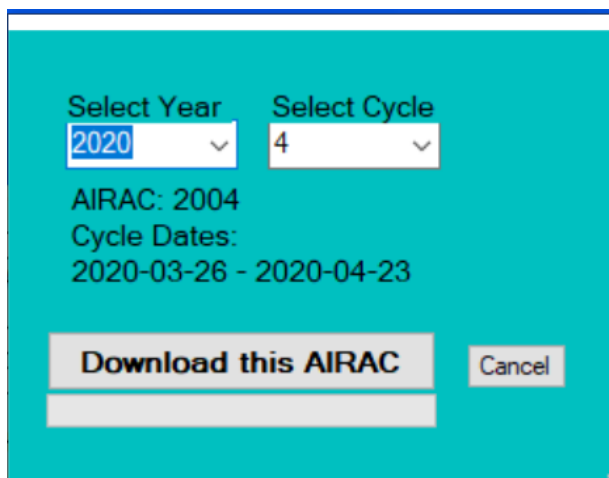
SCTBuilder looks for a folder within your data folder that has the FAA "28DaySubscription" phrase. DO NOT change the name of the downloaded folder, or SCTBuilder will not find the data.

As you can see, you begin with a blank program:



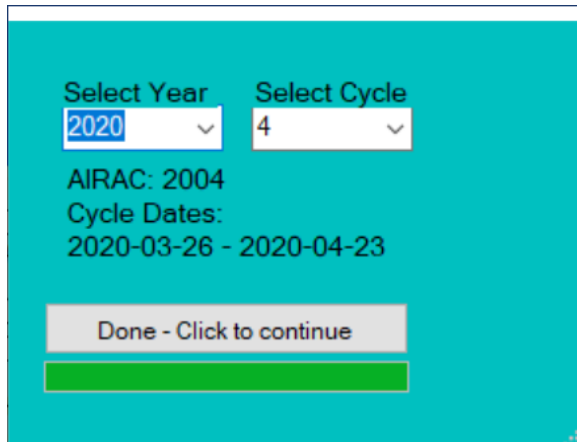
By the numbers...

1. Click the ellipses (...) next to the Data text box to select your data folder. You can create a folder during selection. (It's a standard Windows folder selection dialog.) This will be the folder for ALL data resources, not just FAA text files. (In the next version, you'll put your NaviGraph data in a subfolder of this folder as well.)
2. Repeat the process to choose where the output text files will reside.
3. NOW you can load your first FAA data files! CLICK the "Update AIRAC" button.



This dialog is simple enough (although the code and error checking were not):

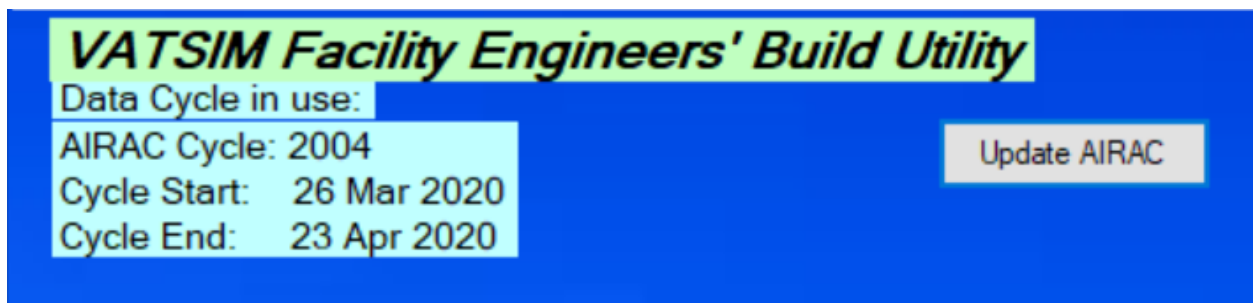
- Clicking Cancel returns you to the main program
- The dialog defaults to the current AIRAC
- A caption tells you the cycle dates for the AIRAC
- Use dropdowns to select the year and cycle – only valid cycles are listed.
- When you are ready, click "Download"
- At this point, you cannot cancel out
- The progress bar will show the download progress



The progress bar is at 100% and the button notifies you that the process is complete.

After you click the “Done” button, the program will use the data to populate a variety of databases that will be used by the program.

As you can see below, the program displays the current FAA data cycle in use:



Operation

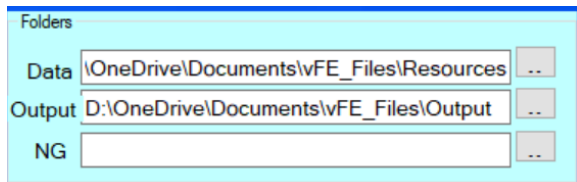
Closing the program

You can use the FILE menu or the Exit square to close the program. Any settings you have created will be saved for the next time you open the program. It is not necessary to download a new AIRAC until you are ready to work with a new data set.

Opening the program (not first-time use)

Assuming you have not corrupted the data file (or deleted it), the program will open where you left it.

Folder Management



Generally, you will not need to update these folders. Note that, if FAA data exists under the data folder, SCTBuilder will attempt to read it and update your data. If the data is missing or corrupted, SCTBuilder will ignore the data and provide a message.

The INFO box

This information populates the mandatory [INFO] section of the SCT file.

[INFO]

Facility Engineer

Assistant FE

Primary ARTCC Main Apt

Centering Coordinates

Lat Lon Mag Var

Enter your name as Facility Engineer, and any assistants in the next text box.
Select your ARTCC from the dropdown
The airports will be listed from Class B to Class D; choose your “main” airport.
Select your “center” screen or insert your own coords.

[INFO]

Facility Engineer

Assistant FE

Primary ARTCC Main Apt

Centering Coordinates

Lat Lon Mag Var

Selection square

Margins (NM)

North

West

South

East

FIX

After populating the [INFO] box, you need to set up your airspace.

- Choose your AIRAC and add “margins” up to 100 NM
- Type the first letters of any NavAid or Airport (do not use ICOA, just the identifier) and click the appropriate arrow to enter the desired corner
- Copy the coordinates from VRC and paste into the text boxes. (SCT Builder will automatically convert them.)

SCT Builder will generate a warning message if you “cross” the NW and SE corners.

SCT Sections

SCT sections

☐ Airports ☐ Runways

☐ Limit to primary ARTCC

☐ VORs ☐ NDBs

☐ Fixes ☐ Airways

☐ ARTCCs ☒ H ☒ L

☐ SIDs ☐ Use full name

☐ STARs ☐ Use full name

Choose the text files that you wish to generate.

You must select airports for many other items, such as Runways, SIDs, and STARS.

Generally, you will use the Airports, Runways, NavAids, and Airways, as these can change with cycles.

You won’t change the bottom three often, so they are blank by default.

NOTE!! SIDs and STARS data files are huge and require complicated selection processes to ensure they are not missed. This takes a few seconds to minutes.

SIDs and STARS will have their Procedure Abbreviation as their “title” line. If you prefer the full name in the title,

check the respective “Use full name” check box.



The PREVIEW button

FINALLY, you can test your work! Click the giant arrow.

If you missed something, a message will pop up to tell you to go back and add the required items.

Don't worry, it doesn't take too long...

The GridView

Selected	Apt	Name	ID
<input checked="" type="checkbox"/>	00AL	EPPS AIRPARK	0037
<input checked="" type="checkbox"/>	00FA	GRASS PATCH	0309
<input checked="" type="checkbox"/>	00FL	RIVER OAK	0339
<input checked="" type="checkbox"/>	00GA	LT WORLD	0387
<input checked="" type="checkbox"/>	00GE	CAFFREY	0383
<input checked="" type="checkbox"/>	00SC	FLYING O	2253
<input checked="" type="checkbox"/>	00TN	RAGSDALE ROAD	2308
<input checked="" type="checkbox"/>	01AL	WARE ISLAND	0023
<input checked="" type="checkbox"/>	01FA	RYBOLT RANCH	0340
<input checked="" type="checkbox"/>	01FD	ADVENT HEALTH ALTAMONTE SPRINGS	0301
<input checked="" type="checkbox"/>	01FL	CEDAR KNOLL FLYING RANCH	0321

After clicking the PREVIEW button, you'll wait up to one minute for the selection process to complete. Note that SIDs and STARS take the longest time to filter.

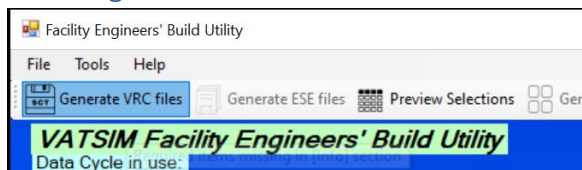
Each grid view shows its respective data. You can select each area by clicking on the tabs.

Each tab has a SELECTED check box. Unselecting the checkbox will remove that item from the output.

*** The next paragraph is for a future version ***

So... how do you add a Selection? Simply click the "Ignore filter" checkbox and find the item you wish to add. This is very convenient for adding airway legs that were missed in the output. Remember that airways are numbered by Latitude then Longitude, so the list goes from south to north. (To add a north leg, select the next airway leg in the list; to add a southerly leg, select a previous airway leg in the list.)

Creating the data files



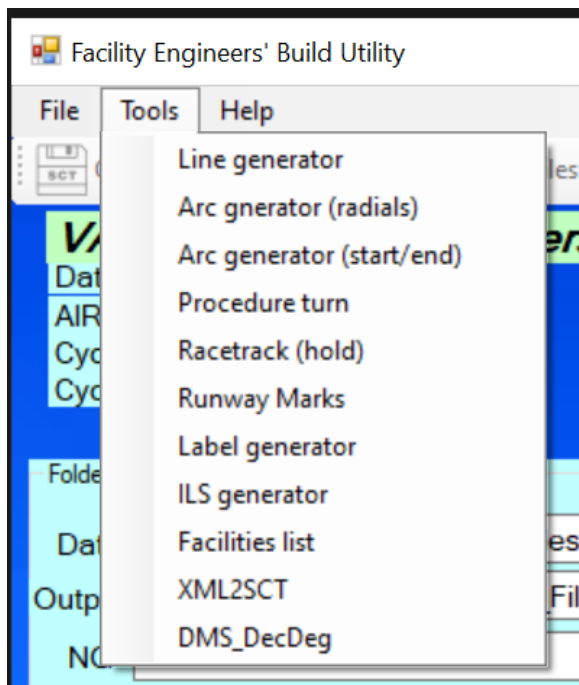
Click the "Generate VRC files"

This box will remain greyed out until the process is complete. Generally, this takes a few seconds, UNLESS you selected SIDs and STARS. If you selected

SIDs and/or STARS, minimize the program and go controlling or flying, because this process will take 15 to 30 minutes. (Manually drawing each fix on the procedure is extremely slow for 100s of labels.)

Additional Tools

Various tools have been built. Many exploit the FAA data downloaded, but most can be used without FAA data. NOTE: Only some of these tools are fully built and tested; others will be added to future versions.



Output Files

Your output folder should look something like this:

Output						
Search Output						
	Name	Status	Date modified	Type	Size	
	ZJX_AirwayHigh.txt	✓	4/11/2020 21:02	TXT File	12 KB	
	ZJX_AirwayLow.txt	✓	4/11/2020 21:02	TXT File	64 KB	
	ZJX_FIX.txt	✓	4/11/2020 21:02	TXT File	332 KB	
	ZJX_RWY.txt	✓	4/11/2020 21:02	TXT File	118 KB	
	ZJX_APT.txt	✓	4/11/2020 21:02	TXT File	150 KB	
	ZJX_Colors.txt	✓	4/11/2020 21:02	TXT File	1 KB	
	ZJX_Header.txt	✓	4/11/2020 21:02	TXT File	1 KB	
	ZJX_Info.txt	✓	4/11/2020 21:02	TXT File	1 KB	

Each file contains everything needed for that section.

- Each NavAid will have a header with the AIRAC data used
- Runways will have a [Labels] section to add the runway numbers to your file
- You probably will not need nor want the Colors.txt file; this is a ZJX color scheme. A future version will add the ability to create your own color scheme (starting with your existing SCT file).

FEEDBACK IS GREATLY APPRECIATED

I am a relatively noob controller (S3) but I'm pretty good at programming in a variety of languages. I've been programming medical and scientific devices for about 30 years, and I've been an "advanced-extra"

HAM (NO5DO) since I was 13 years old (about 47 years), so I'm conversant in a lot of low-level program languages. I chose C# because it's easy to document the code to allow others to see what it's doing. (Sorry, python and other code lovers – LOL.) I'm always interested in a "better way" and new ways to use the application, so feel free to email me at FE@zjxartcc.org. Please do not DM on Discord, as I don't normally answer. And finally – I work about 50 hours/week and go to sleep around 9 pm EST, so don't expect a quick response!

Chuck Kowalewski
VATSIM 1429208