

# Interacting with STAX

## - Data Access and Processing

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# STAX Overview



The STAX (Source Term Analysis of Xenon) project is an experiment to better understand the radioxenon background in the environment.



Consists of a stack release monitoring network to measure radioxenon isotopes released from medical isotope production (MIP) facilities.



Data collected at MIP facilities is processed and securely transferred to a central data repository where additional processing is performed.



Five types of STAX data messages are generated and distributed to authorized users.

# STAX Data Products

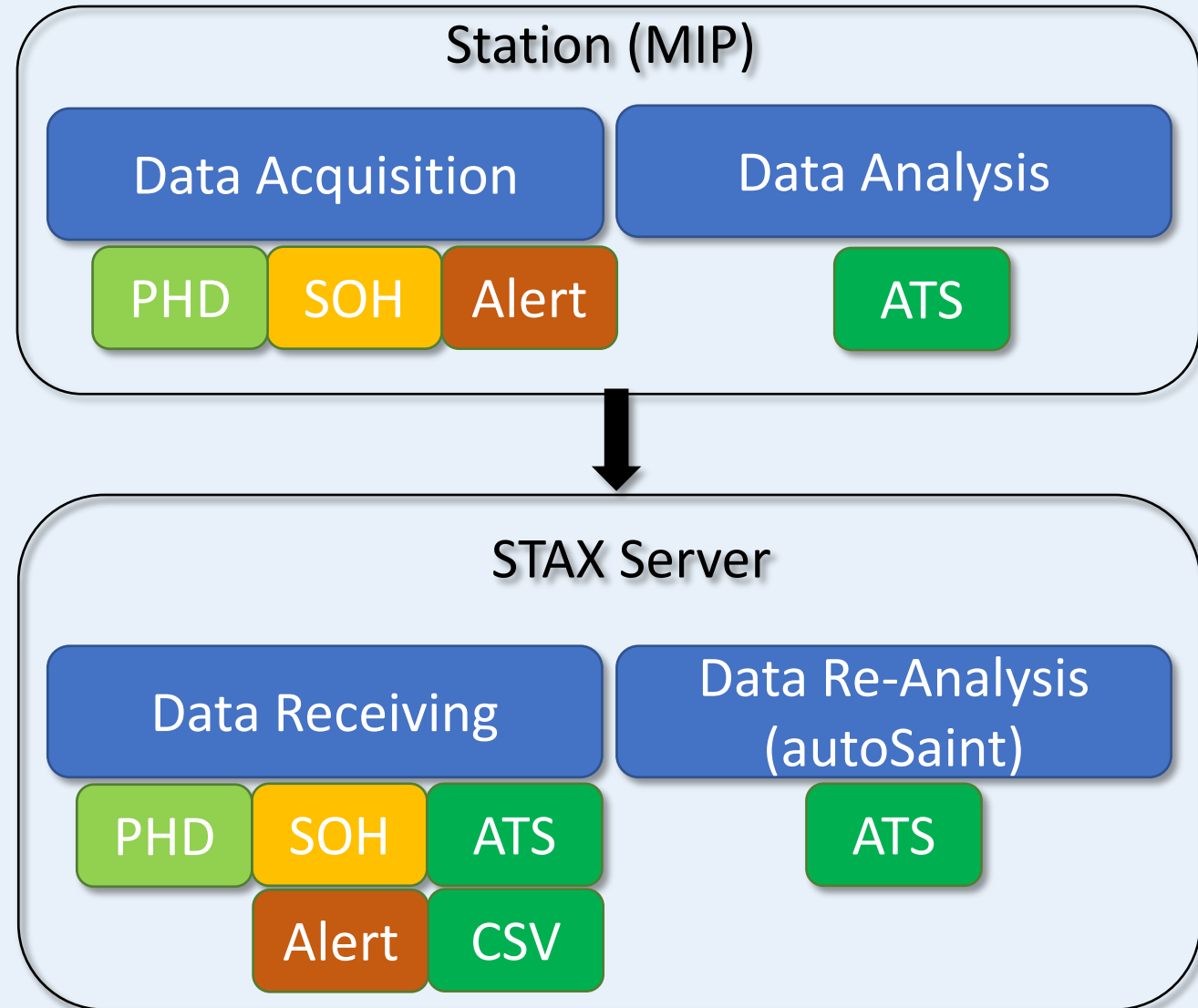
**ATS - Automatic Time Series**, daily results summary

**CSV - Emissions time series** as a comma-separated values file

**SOH - State of health** reports, every 2 hours

**PHD - High-Resolution Gamma Spectra**, every 15 minutes

**Alert** - sent from the Facility or STAX server when customizable alert conditions are met



# ATS - Automatic Time Series

Daily results summary with *sample data*, *measurement* and *analysis* results, in JSON text format

```
STAXX_18713_ATS_2022_05_12T00_00_00.TXT
text tree table
Code : STAXX
  Calibrations : [ 1 item ]
  Samples : [ 96 items ]
    0 : {
      SampleId : SM01202205120000
      Collection : {
        CollectionPeriod : {
          Start : 2022-05-12T00:00:00.000Z
          Stop : 2022-05-12T00:15:00.000Z
        }
        SampleSize : {
          Unit : m3
          Value : 0.0189
        }
        StackFlow : {
          Type : Nominal
          STPCorrected :  false
          UncertaintyB : 8000.0
          Unit : m3/h
          Value : 80000.0
        }
        MarinelliPressure : {
          Unit : hPa
          Value : 968.0
        }
      }
      Measurements : [ 1 item ]
      Releases : [ 7 items ]
    }
  
```

ATS Data File

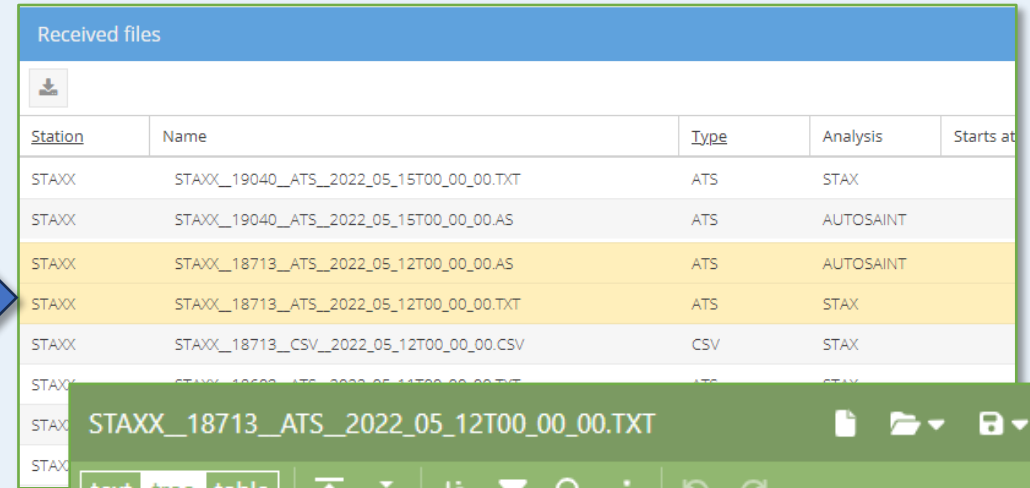
```
STAXX_18713_ATS_2022_05_12T00_00_00.TXT
text tree table
Measurements : [ 1 item ]
  0 : {
    MeasurementId : 13000002-15_minute-20220512000000.n42.gz
    Spectrum : [ 8192 items ]
    Acquisition : { 5 props }
    Analyses : [ 1 item ]
      0 : {
        AnalysisId : 13000002-15_minute-20220512000000.n42.gz
        Tool : Middleware 1.1.84
        Method : NID+Interf v2.6
        Analyst : Automated Analysis
        Comment : Preliminary Analysis
        DateTime : 2022-05-13T00:21:33.861Z
        NuclearDataReference : value
        STPCorrectedActivityConcentration :  true
        Peaks : [ 4 items ]
        Nuclides : [ 7 items ]
      }
    Releases : [ 7 items ]
      3 : {
        Name : XE-133
        Activity : { 4 props }
        Concentration : { 4 props }
        Emission : {
          Value : 18928687.5
          Uncertainty : 2709182.211544946
          MDR : 167144.0
          Unit : kBq/900s
        }
      }
    }
  }
  
```

# STAX and autoSaint ATS

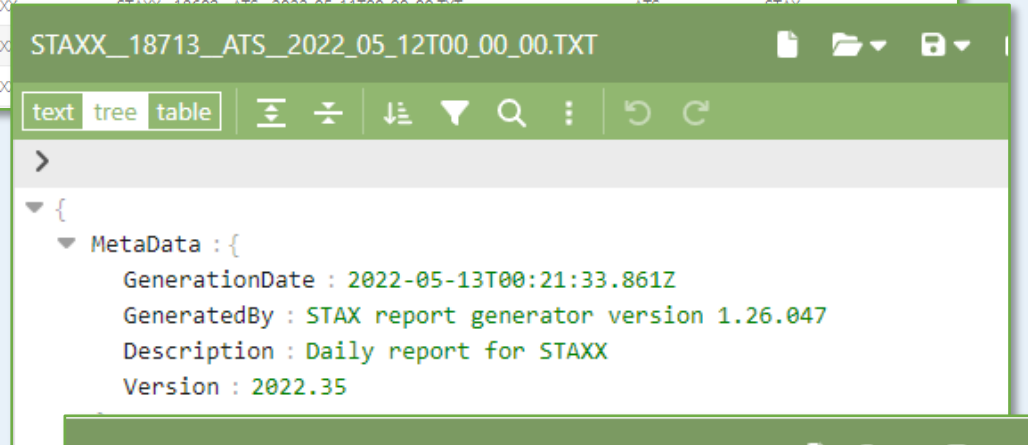
Both STAX Station and autoSaint analysis results are stored on the STAX system as ATS data files

STAX ATS files (.TXT) result from station analysis

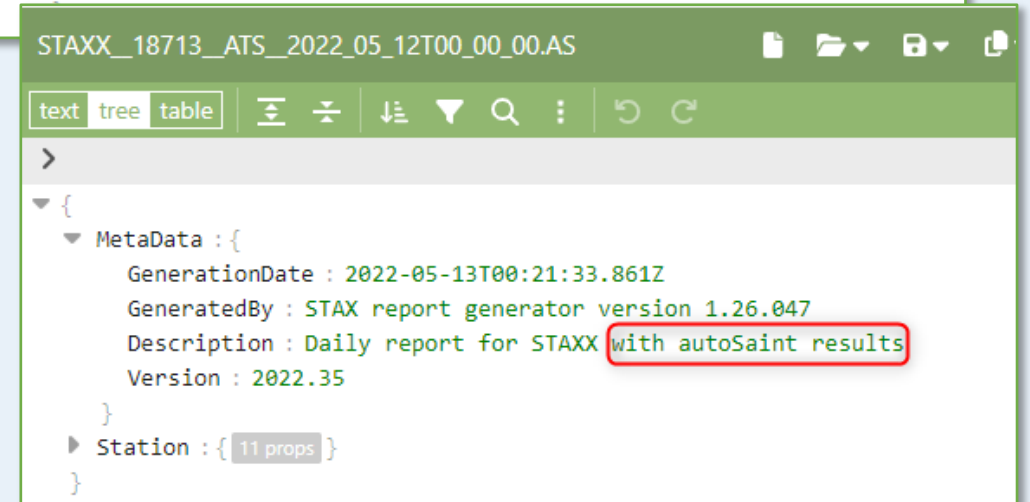
autoSaint ATS files (.AS) result from data re-analysis at the STAX server with CTBTO NDC-in-a-box tools



Station	Name	Type	Analysis	Starts at
STAXX	STAXX_19040_ATS_2022_05_15T00_00_00.TXT	ATS	STAX	
STAXX	STAXX_19040_ATS_2022_05_15T00_00_00.AS	ATS	AUTOSAINT	
STAXX	STAXX_18713_ATS_2022_05_12T00_00_00.AS	ATS	AUTOSAINT	
STAXX	STAXX_18713_ATS_2022_05_12T00_00_00.TXT	ATS	STAX	
STAXX	STAXX_18713_CSV_2022_05_12T00_00_00.CSV	CSV	STAX	
STAXX	STAXX_18713_ATS_2022_05_12T00_00_00.TXT	ATS	STAX	
STAXX	STAXX_18713_ATS_2022_05_12T00_00_00.AS	ATS	AUTOSAINT	



```
STAXX_18713_ATS_2022_05_12T00_00_00.TXT
{
  MetaData : {
    GenerationDate : 2022-05-13T00:21:33.861Z
    GeneratedBy : STAX report generator version 1.26.047
    Description : Daily report for STAXX
    Version : 2022.35
  }
}
```



```
STAXX_18713_ATS_2022_05_12T00_00_00.AS
{
  MetaData : {
    GenerationDate : 2022-05-13T00:21:33.861Z
    GeneratedBy : STAX report generator version 1.26.047
    Description : Daily report for STAXX with autoSaint results
    Version : 2022.35
  }
  Station : { 11 props }
}
```

# CSV - Emissions Time Series

Daily emissions time series  
extracted from the ATS STAX files,  
in Excel comma-separated values  
(CSV) text format

CSV Data File

	A	B	D	H	O	P	R	S	T	V	W	AE
1	Station	Time	I-131 mdr	KR-85M mdr	XE-133 val	XE-133 mdr	XE-133 unc	XE-133M val	XE-133M mdr	XE-133M un	XE-135 val	Unit
2	STAXX	5/15/2022 0:00	3.77E+03	5.55E+03	6.21E+06	7.97E+04	8.94E+05		7.75E+04		9.73E+04	kBq/900s
3	STAXX	5/15/2022 0:15	4.95E+03	4.26E+03	6.22E+06	8.31E+04	8.95E+05		6.94E+04		7.90E+04	kBq/900s
4	STAXX	5/15/2022 0:30	4.09E+03	4.47E+03	6.36E+06	8.32E+04	9.15E+05		7.56E+04		9.10E+04	kBq/900s
5	STAXX	5/15/2022 0:45	4.74E+03	4.71E+03	6.36E+06	7.91E+04	9.14E+05		7.79E+04		9.54E+04	kBq/901s
6	STAXX	5/15/2022 1:00	3.75E+03	4.26E+03	6.22E+06	8.02E+04	8.94E+05	3.20E+05	3.59E+04	6.09E+04	7.47E+04	kBq/900s
7	STAXX	5/15/2022 1:15	4.71E+03	4.28E+03	6.08E+06	8.20E+04	8.75E+05		7.41E+04		8.68E+04	kBq/900s
8	STAXX	5/15/2022 1:30	3.40E+03	5.16E+03	5.96E+06	8.37E+04	8.58E+05		6.91E+04		8.72E+04	kBq/900s
9	STAXX	5/15/2022 1:45	4.13E+03	4.51E+03	5.93E+06	9.03E+04	8.54E+05		6.58E+04		8.44E+04	kBq/900s
10	STAXX	5/15/2022 2:00	3.76E+03	4.49E+03	6.14E+06	8.24E+04	8.83E+05		6.87E+04		8.07E+04	kBq/900s
92	STAXX	5/15/2022 22:30	2.34E+03	5.38E+03	3.25E+07	1.77E+05	4.64E+06	6.80E+05	4.59E+04	1.09E+05		kBq/900s
93	STAXX	5/15/2022 22:45	3.84E+03	5.49E+03	3.22E+07	1.91E+05	4.60E+06	7.14E+05	4.23E+04	1.13E+05		kBq/900s
94	STAXX	5/15/2022 23:00	4.49E+03	4.56E+03	3.23E+07	1.87E+05	4.62E+06	7.87E+05	3.75E+04	1.22E+05		kBq/900s
95	STAXX	5/15/2022 23:15	4.13E+03	4.89E+03	3.19E+07	1.79E+05	4.57E+06	6.79E+05	4.08E+04	1.08E+05		kBq/900s
96	STAXX	5/15/2022 23:30	4.75E+03	5.10E+03	3.16E+07	1.85E+05	4.52E+06	6.46E+05	5.08E+04	1.06E+05		kBq/900s
97	STAXX	5/15/2022 23:45	3.44E+03	4.78E+03	3.20E+07	1.88E+05	4.57E+06	6.26E+05	4.88E+04	1.03E+05		kBq/900s

# SOH – State of Health Data

SOH Data File

SOH data samples collected every 15 minutes, and reported every 2 hours, in text format

SOH reports contain equipment parameters available from the station like air flow, high voltage, status, cooler power, temperature

```
STAXX_53789_SOH_2023_04_22  X  +
BEGIN IMS2.0
MSG_TYPE DATA
MSG_ID 053789 STAXX
DATA_TYPE STAXSOH
#Header 3
STAXX NA
2023/04/22 20:00:00 2023/04/22 22:00:00 2023/04/22 22:30:36
#AirSamplerFlow
3.4000 -9999.999 2023/04/22 20:00:00 900
3.4000 -9999.999 2023/04/22 20:15:00 900
3.4000 -9999.999 2023/04/22 21:45:00 900
#DetEnv
-9.9 CLOSED -9 4187 -185 ON -9.9 -99.99 2023/04/22 20:00:00 900
-9.9 CLOSED -9 4187 -185 ON -9.9 -99.99 2023/04/22 20:15:00 900
-9.9 CLOSED -9 4187 -185 ON -9.9 -99.99 2023/04/22 21:45:00 900
#PowerSupply
MAIN ON AUX OFF UPS OFF 2023/04/22 20:00:00 900
#EquipStatus
C: SM01202304222000 P: SM01202304222000 A: SM01202304222000 2023/04/22 20:00:00 900
#ProcessSensors
CoolerPower CP5Power 103.53 2023/04/22 20:00:00 900
Temp Compressor 43.30 2023/04/22 20:00:00 900
CoolerPower CP5Power 103.82 2023/04/22 20:15:00 900
Temp Compressor 43.30 2023/04/22 20:15:00 900
CoolerPower CP5Power 103.89 2023/04/22 21:45:00 900
Temp Compressor 43.30 2023/04/22 21:45:00 900
STOP
```

# PHD – Spectra Data

PHD Data File

High-resolution gamma spectra collected every 15 minutes

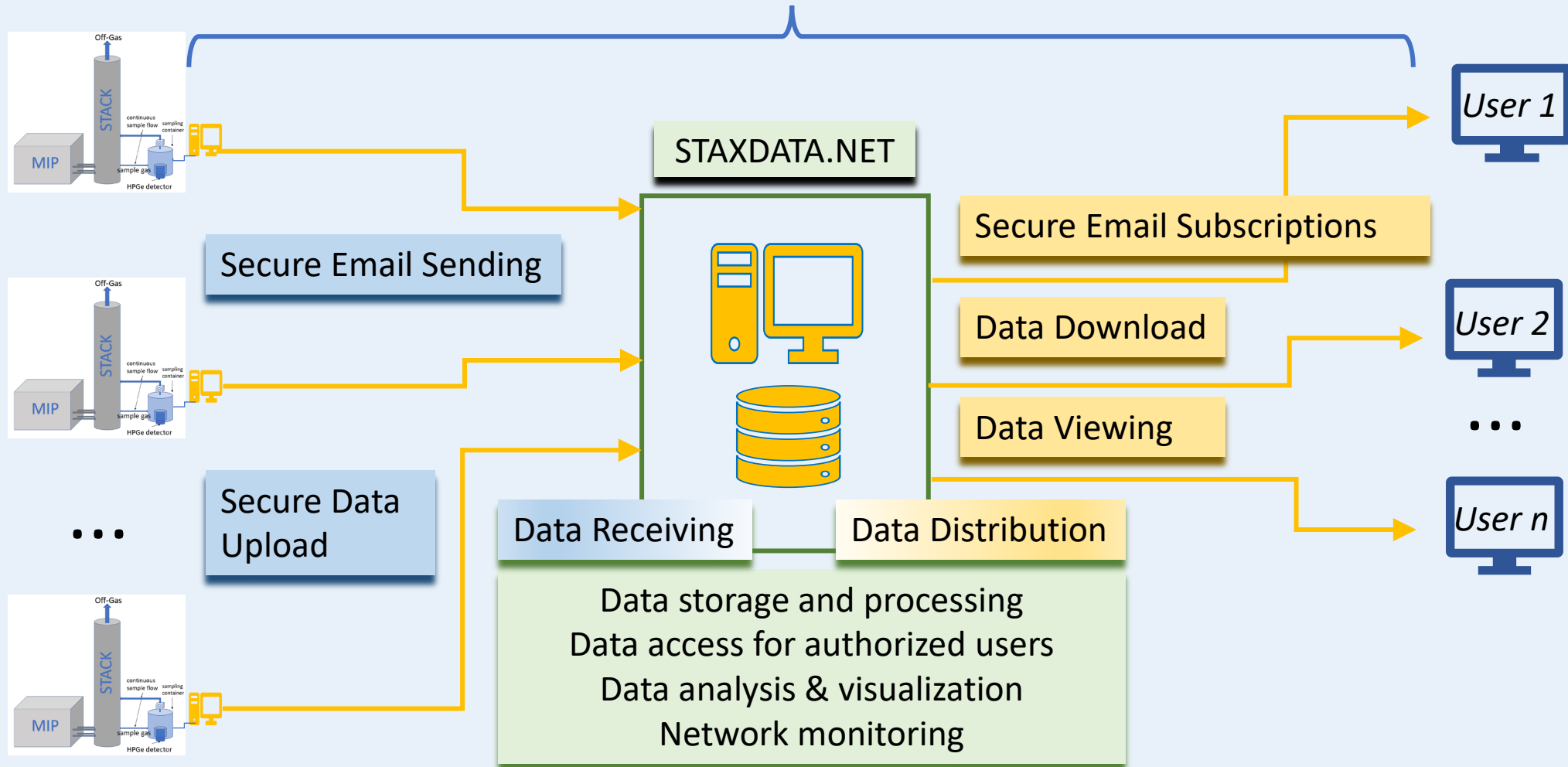
Contains collection information, energy, resolution and efficiency calibration, and spectrum data, in a text format similar with IMS2.0

```
BEGIN STX1.0
MSG_TYPE DATA
MSG_ID 019037 STAXX
DATA_TYPE SAMPLEPHD
#Header 3
STAXX STAXX_001 P Marinelli FULL
SM01202205152345
STAXX_001-2022/05/15-23:45
2022/05/16 00:21:49
#Collection
2022/05/15 23:45:00.0 2022/05/16 00:00:00.0 0.01890 20000.0000 -999.99 965.0000
#Acquisition
2022/05/15 23:45:00.0 900.000 899.556
#Sample
-999 -999
#Calibration
2022/03/28 08:55:09.0
#g_Energy
80.997000 246.157 0.000
1332.490000 4044.520 0.000
#g_Resolution
0.000 0.513189 0.000
269.959 1.105450 0.000
2699.590 2.386120 0.000
#g_Efficiency
45.000 0.000248 0.000037
2800.000 0.000990 0.000040
#g_Spectrum
8192 2700
0 7 45 45 30 87
5 310 115 7 7 1
10 1 12 12 65 300
8185 0 0 0 0 0
8190 0 0
STOP
```



# STAX Monitoring System

## STAX Software

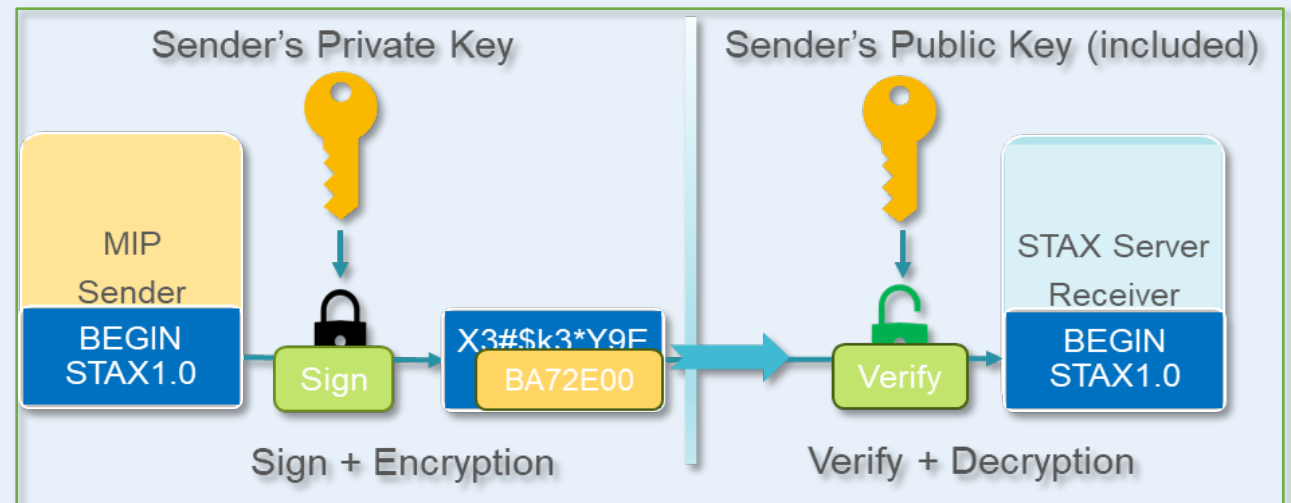
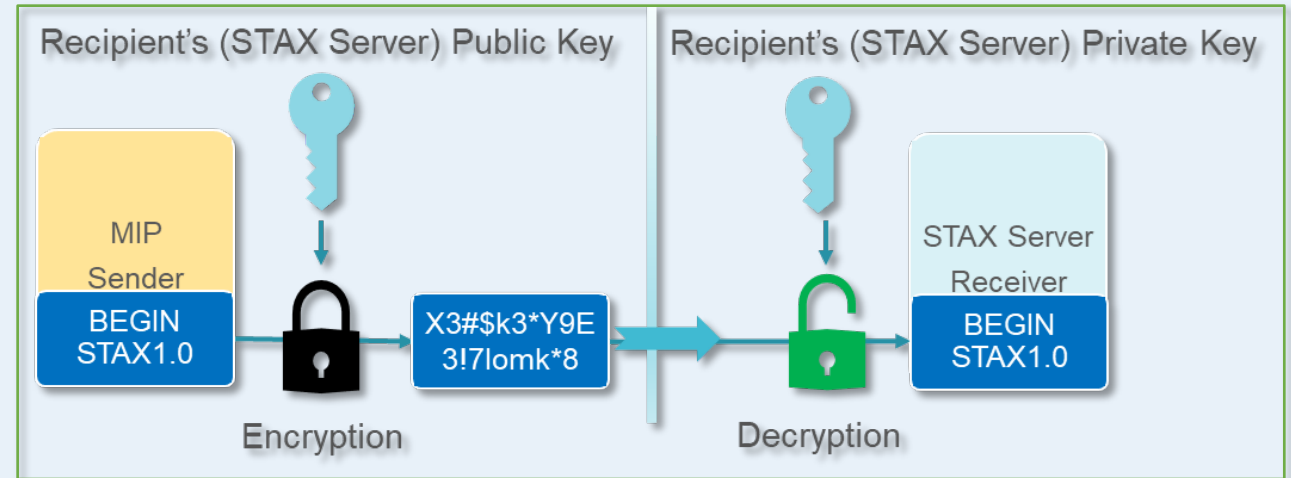


# Secure Station Emails

STAX email messages **privacy** is protected by using **encryption**, where messages are converted from readable plain text into scrambled cipher text for transmission.

STAX software **secures** email messages by using a **digital signature**, including a certificate and public key. Messages signed using the sender's private key are verified at the STAX Server using the public key that is included in the message.

*All data messages transmitted by email are encrypted and digitally signed at the MIP, then decrypted and verified upon receipt at the STAX Server.*



# STAX Web Interface

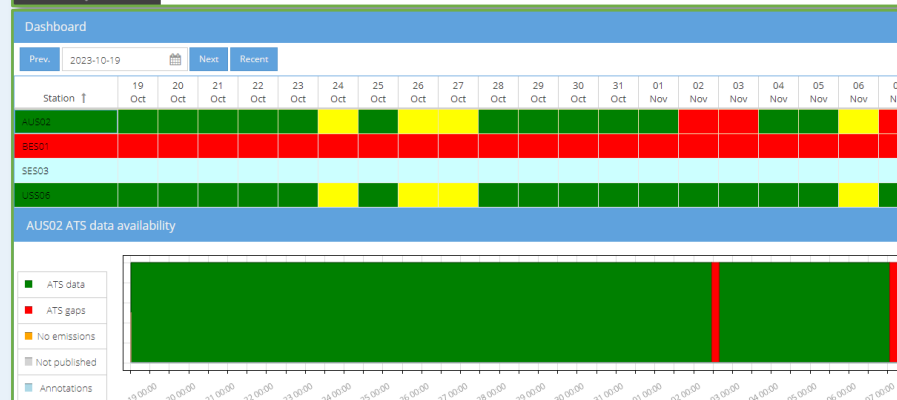
Provides tools for accessing the data received from facilities and for viewing the analysis results.

Access to SOH status, maintenance events, documentation, and other data resources.

## Received Data

Station	Name	Type	Analysis	Starts at
AUS02	AUS02_856022299609035337_PHD_2023_11_17T14_15_	PHD	STAX	2023/11/17 14:15:00
AUS02	AUS02_856022299609035335_PHD_2023_11_17T14_00_	PHD	STAX	2023/11/17 14:00:00
AUS02	AUS02_856022299609035336_SOH_2023_11_17T12_00_	SOH	STAX	2023/11/17 12:00:00
USS06	USS06_79971_PHD_2023_11_17T12_30_00.TXT	PHD	STAX	2023/11/17 12:30:00
USS06	USS06_79970_PHD_2023_11_17T12_15_00.TXT	PHD	STAX	2023/11/17 12:15:00
AUS02	AUS02_856022299609035334_PHD_2023_11_17T13_45_	PHD	STAX	2023/11/17 13:45:00
USS06	USS06_79969_SOH_2023_11_17T10_00_00.TXT	SOH	STAX	2023/11/17 10:00:00
USS06	USS06_79968_PHD_2023_11_17T12_00_00.TXT	PHD	STAX	2023/11/17 12:00:00
AUS02	AUS02_856022299609035333_PHD_2023_11_17T13_30_	PHD	STAX	2023/11/17 13:30:00
USS06	USS06_79967_PHD_2023_11_17T11_45_00.TXT	PHD	STAX	2023/11/17 11:45:00
AUS02	AUS02_856022299609035332_PHD_2023_11_17T13_15_	PHD	STAX	2023/11/17 13:15:00
AUS02	AUS02_856022299609035331_PHD_2023_11_17T13_00_	PHD	STAX	2023/11/17 13:00:00
USS06	USS06_79966_PHD_2023_11_17T11_30_00.TXT	PHD	STAX	2023/11/17 11:30:00
USS06	USS06_79965_PHD_2023_11_17T11_15_00.TXT	PHD	STAX	2023/11/17 11:15:00
AUS02	AUS02_856022299609035330_PHD_2023_11_17T12_45_	PHD	STAX	2023/11/17 12:45:00
USS06	USS06_79964_PHD_2023_11_17T11_00_00.TXT	PHD	STAX	2023/11/17 11:00:00

## Data Charts



## SOH Dashboard

Resources

Documents Data Files Reviewed Data

Documents

Station: STAX

Station or STAX ...	Document Name	Document Description
STAX (general)	get_STAX_data.sh.txt	Bash script for retrieving STAX data
STAX (general)	get_STAX_data.readme.txt	Readme file for get_STAX_data script
STAX (general)	STAX - How to install STAX digital certificates .pdf	
STAX (general)	ATS Format Description.pdf	

## Resources

# STAX Data Access Control

- User data access is set for each facility separately, so that the user has access to the specifically **assigned facilities**.
- Facility owners can set and control **delays** for publishing data, to allow time for data review before distributing.

The 'Users' interface displays a table of user access settings and a grid of facility assignments.

Username	First Name	Last Name	Email	Receive ATS	Receive CSV	Receive PHD	Receive SOH	Receive AL...	Role	Enabled	Created at	Updated at
mihaelar	Mihaela	Rizescu	mrizescu@l...	Yes	No	No	No	No	Simple user	Yes	10/05/2021...	17/11/2023...

Navigation: Page 2 of 3, Displaying 11 - 20 of 28

Facility Grid:

Owned Facilities	Assigned Facilities	Available Facilities
	<p>02-04-2023</p> <p><b>BES01/Stack building</b> BELGIUM (50.45131, 4.53155)</p>	<p>24-10-2023</p> <p><b>AUS02/ANSTO</b> (-34.05087, 150.97886)</p>
		<p>02-10-2023</p> <p><b>SES03/Forsmark F1</b> (60.40265, 18.1752833333333)</p>
		<p>02-10-2023</p> <p><b>SES04/Forsmark F2</b> (60.4038333333333, 18.1734333333333)</p>
		<p>02-10-2023</p> <p><b>SES05/Forsmark F3</b> (60.40535, 18.1608166666667)</p>
		<p>24-10-2023</p> <p><b>USS06/Lower level</b> (42.77241, -84.58269)</p>

The 'Facilities' interface displays a table of facility details with a dropdown menu for 'Publish delay'.

Code	Type	Site	Country	Latitude	Longitude	Publish delay	Emitter Type	Realtime Data	Collection
AUS02	HPGe	ANSTO	AUSTRALIA	-34.05087	150.97886	3 day	MIP	Yes	900

Dropdown menu for 'Publish delay':

- Do not publish
- Immediately
- 1 day
- 3 day
- 7 day

# STAX Data Access

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Data is accessible to *authorized* users using several mechanisms:

- Subscription with secure email messages
- Secured download of the received data files by user interaction from the STAX web interface
- Secured download using an automated, scripted procedure
- Multiple data viewing and saving options from the [staxdata.net](http://staxdata.net) web user interface

# Email Subscriptions

Subscription preferences can be set on the **User** page at [staxdata.net](https://staxdata.net)

Available for each of the five data products: ATS, CSV, PHD, SOH, ALERT

Emails sent for all authorized stations

Data file name is the email subject

STAX v. 4.22.311

Received

Facilities

mihaelar

Logout

User Information

Username:

First Name:

Last Name:

Email:

Receive ATS:

Receive CSV:

Receive PHD:

Receive SOH:

Receive ALERT:

## PHD Email

USS06\_\_80314\_\_PHD\_\_2023\_11\_20T15\_45\_00.TXT

noreply@staxdata.net  
To: Mihaela Rizescu  
Signed By: S=NY, O=ISTI

Mon 11:55 AM

BEGIN STX1.0  
MSG\_TYPE DATA  
MSG\_ID 080314 USS06  
DATA\_TYPE SAMPLEPHD  
#Header 3  
USS06 USS06\_001 P Marinelli FULL  
SM06202311201545  
USS06\_001-2023/11/20-15:45  
2023/11/20 17:53:39  
#Comment  
2023/11/20 17:53:39.8 N42 file last modified  
#Collection  
2023/11/20 15:45:00.0 2023/11/20 16:00:00.0 0.01700 21.2250 -999.99

## ALERT Email

AUS02\_\_856022299609035618\_\_ALERT\_\_2023\_11\_20T17\_34...

noreply@staxdata.net  
To: Mihaela Rizescu  
Signed By: S=NY, O=ISTI

11:59 AM

BEGIN IMS2.0  
MSG\_TYPE DATA  
MSG\_ID 856022299609035618  
DATE\_TYPE ALERT\_SYSTEM  
AUS02 ALERT\_SYSTEM 2023/11/20 17:34:02  
Spectra input data missing  
STOP

## ATS Email

USS06\_\_80353\_\_ATS\_\_2023\_11\_20T00\_00\_00.TXT

noreply@staxdata.net  
To: Mihaela Rizescu  
Signed By: S=NY, O=ISTI

Mon 8:13 PM

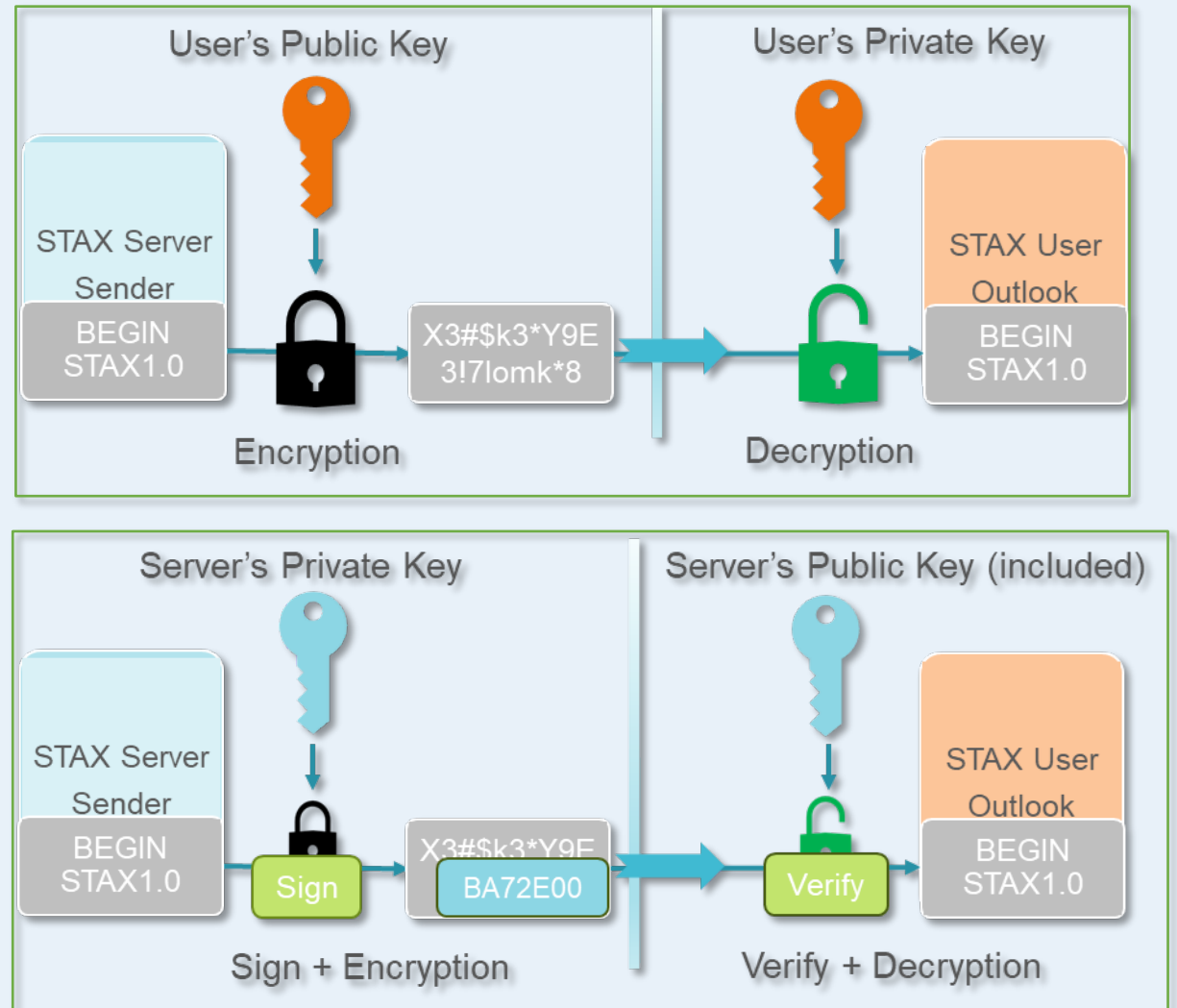
{"MetaData":{"GenerationDate":"2023-11-21T02:08:40.396Z","GeneratedBy":"STAX report generator version 1.32.156","Description":"Daily report for USS06","Version":"2022.143"},"Station":{"Code":"USS06","Site":"Lower

# Secure User Emails

The privacy of the emails distributed from the STAX server to the users is protected by using **S/MIME encryption**, supported by Outlook email client.

From the STAX web interface, users can **generate** their own encryption certificate, and **download** it to use for decryption in Outlook.

STAX user email messages are secured by using a **digital signature** originating from the STAX server's digital ID.



# Received Data Files Download

STAX users can use a web browser to securely access [staxdata.net](https://staxdata.net) and download data files using the application's user interface.

On **Received** page, data files can be filtered by station name, data type, analysis type, or start time.

Multiple files can be selected and retrieved by a single click on the Download button.

The screenshot shows the STAX v. 4.22.311 interface. The main content area is titled 'Received files' and contains a table with the following data:

Station	Name	Type	Analysis	Starts at
USS06	USS06_79915_CSV_2023_11_16T00_00_00.CSV	CSV	Sort Ascending	2023/11/16 00:00:00
USS06	USS06_79915_ATS_2023_11_16T00_00_00.TXT	ATS	Sort Descending	2023/11/16 00:00:00
USS06	USS06_79915_ATS_2023_11_16T00_00_00.AS	ATS	Columns	2023/11/16 00:00:00
AUS02	AUS02_856022299609035273_CSV_2023_11_16T00_00_00.CSV	CSV	Filters	2023/11/16 00:00:00
AUS02	AUS02_856022299609035273_ATS_2023_11_16T00_00_00.AS	ATS	AUTOSAINT	2023/11/16 00:00:00
AUS02	AUS02_856022299609035273_ATS_2023_11_16T00_00_00.TXT	ATS	STAX	2023/11/16 00:00:00
USS06	USS06_79806_ATS_2023_11_15T00_00_00.TXT	ATS	STAX	2023/11/15 00:00:00
USS06	USS06_79806_CSV_2023_11_15T00_00_00.CSV	CSV	STAX	2023/11/15 00:00:00
USS06	USS06_79806_ATS_2023_11_15T00_00_00.AS	ATS	AUTOSAINT	2023/11/15 00:00:00
AUS02	AUS02_856022299609035164_CSV_2023_11_15T00_00_00.CSV	CSV	STAX	2023/11/15 00:00:00
AUS02	AUS02_856022299609035164_ATS_2023_11_15T00_00_00.TXT	ATS	STAX	2023/11/15 00:00:00
AUS02	AUS02_856022299609035164_ATS_2023_11_15T00_00_00.AS	ATS	AUTOSAINT	2023/11/15 00:00:00
USS06	USS06_79695_ATS_2023_11_14T00_00_00.AS	ATS	AUTOSAINT	2023/11/14 00:00:00

The 'Filters' dropdown menu is open, showing the following options:

- ATOS
- PHD
- CSV
- SOH
- ALERT

The page footer shows 'Page 1 of 474' and 'Displaying 1 - 25 of 11839'.



# Automated Data Files Download

Secured download using shell script:

***get\_STAX\_data.sh***

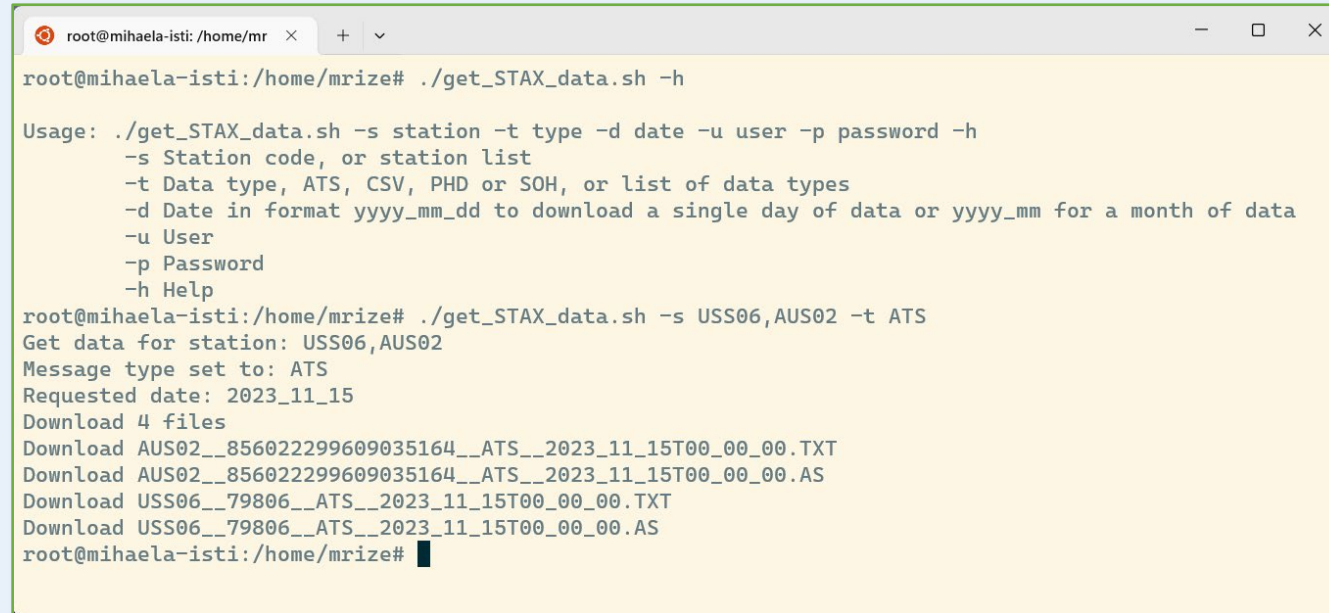
Retrieves data files for selected stations and product types

Single station or multiple stations in one step

One or more data types from ATS, CSV, PHD, SOH, ALERT can be configured

Single day, or one month data download in one run

Shell script runs on Linux, macOS, Ubuntu on Windows, and requires wget, python

A terminal window screenshot showing the execution of the shell script. The prompt is root@mihaela-isti:/home/mrize#. The command ./get\_STAX\_data.sh -h is entered, followed by the usage instructions. Then, the command ./get\_STAX\_data.sh -s USS06,AUS02 -t ATS is entered, resulting in the download of four files for the date 2023\_11\_15.

```
root@mihaela-isti:/home/mrize# ./get_STAX_data.sh -h
Usage: ./get_STAX_data.sh -s station -t type -d date -u user -p password -h
       -s Station code, or station list
       -t Data type, ATS, CSV, PHD or SOH, or list of data types
       -d Date in format yyyy_mm_dd to download a single day of data or yyyy_mm for a month of data
       -u User
       -p Password
       -h Help
root@mihaela-isti:/home/mrize# ./get_STAX_data.sh -s USS06,AUS02 -t ATS
Get data for station: USS06,AUS02
Message type set to: ATS
Requested date: 2023_11_15
Download 4 files
Download AUS02__856022299609035164__ATS__2023_11_15T00_00_00.TXT
Download AUS02__856022299609035164__ATS__2023_11_15T00_00_00.AS
Download USS06__79806__ATS__2023_11_15T00_00_00.TXT
Download USS06__79806__ATS__2023_11_15T00_00_00.AS
root@mihaela-isti:/home/mrize#
```

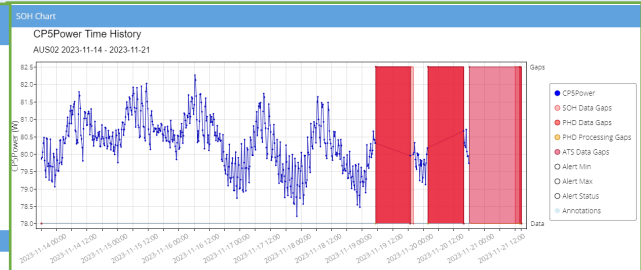
# STAX Data Viewer (separate presentation by Matthias Auer)

STAX web interface provides data charts viewing for:

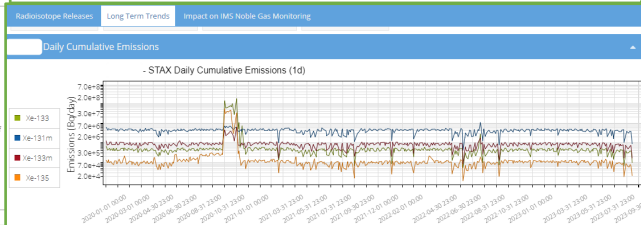
- *emissions time series*
- *isotopic ratios*
- *spectra and peaks*
- *state-of-health data*
- *long term trends*
- *impact on IMS monitoring*

Allows the user to inspect the STAX and autoSaint analysis results

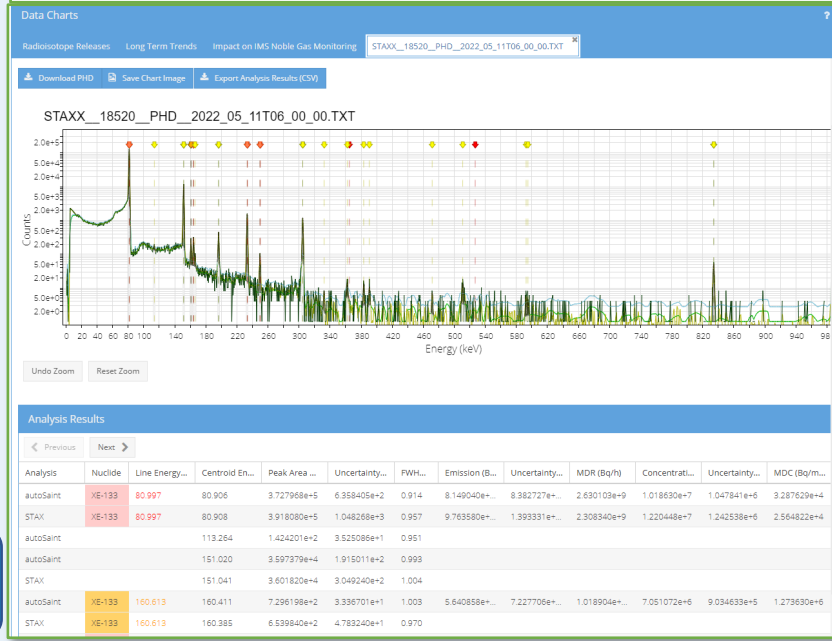
Emissions



SOH



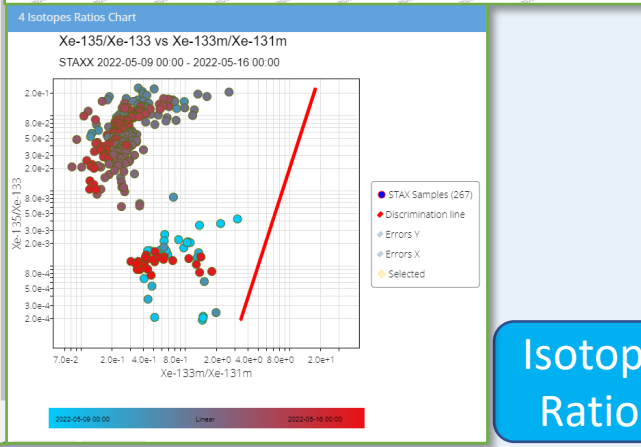
Trends



Spectra & Peaks



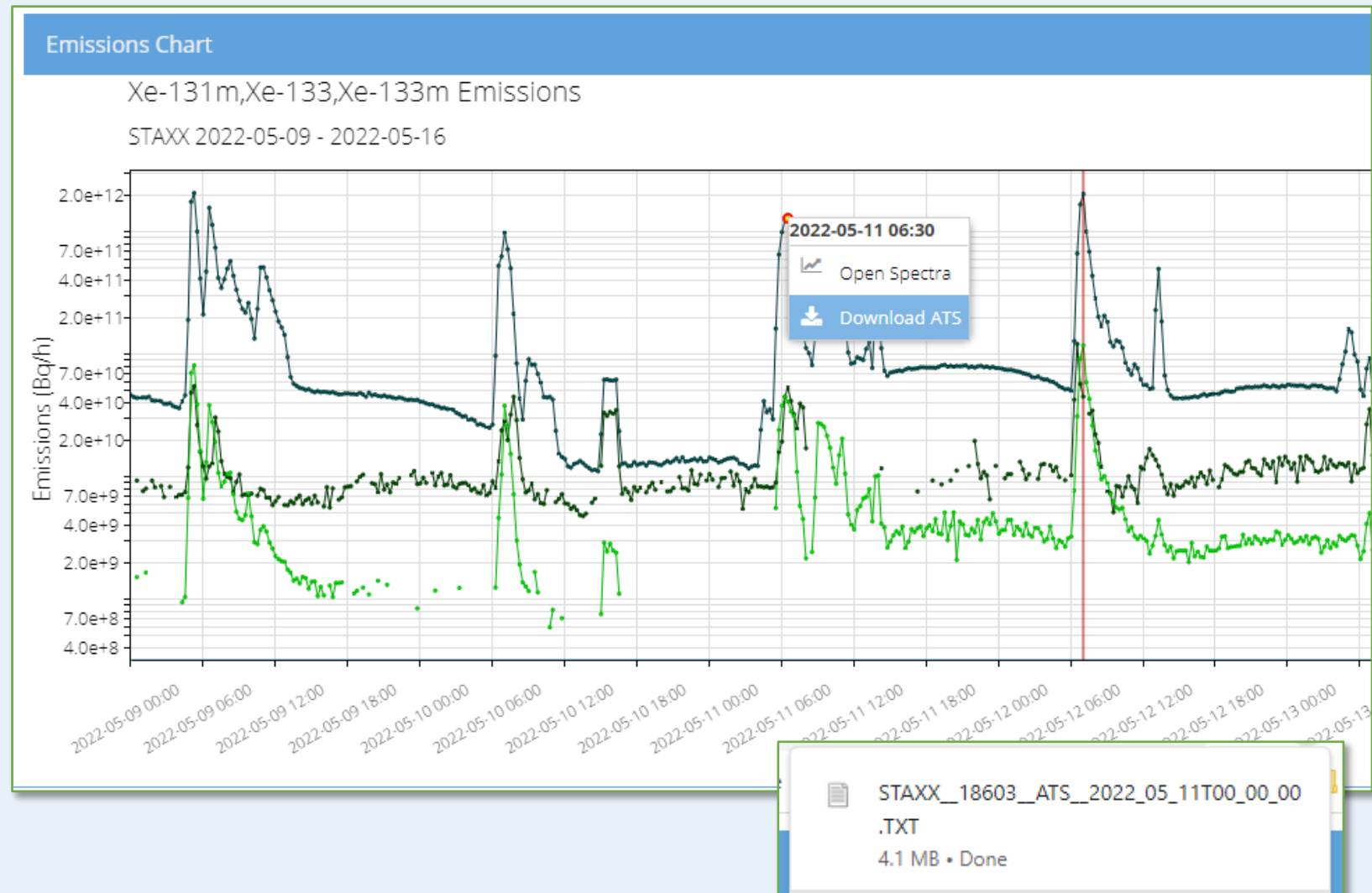
IMS Impact



Isotopic Ratios

# ATS Download from Emissions Chart

From the *Emissions Chart*, the user can select a sample and open a menu to download the STAX ATS file of the day containing the selected data sample

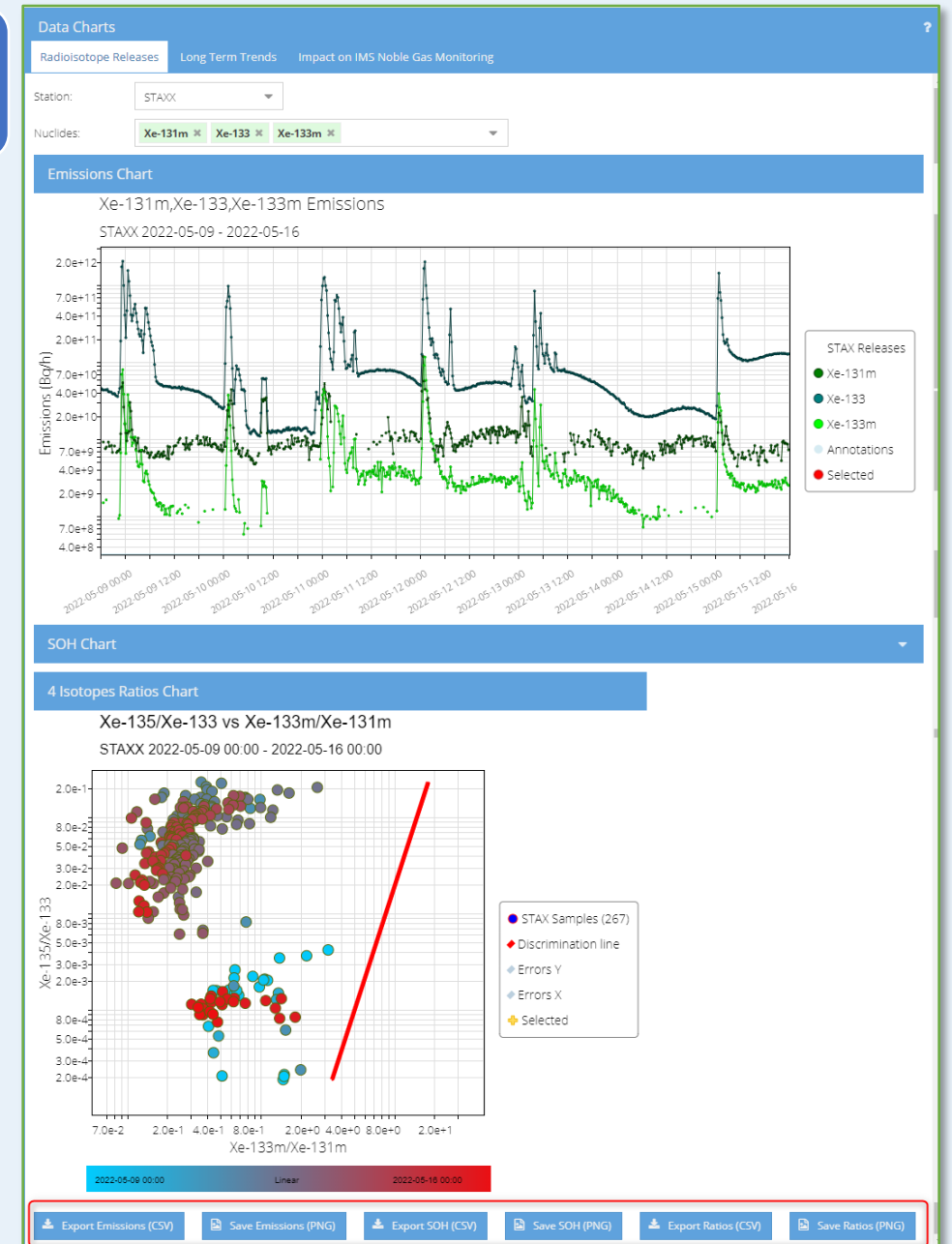
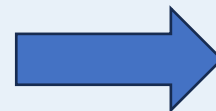


# Charts Data and Results

From each data charts page, the STAX user can export the data used for the plot in CSV format, and the chart image as PNG, and download the files

**Releases** page contains multiple charts and exports – emissions, SOH and isotopic ratios

Data exports for emissions, SOH and isotope ratios charts



# Customized Emissions Time Series

Emissions time series, in units of Bq/h, can be exported from the [Emissions Chart](#) page

Both STAX and autoSaint emissions data for the entire selected time interval (e.g. one week), as Excel comma-separated values file (CSV)

	A	I	J	K	L	M	N	O	P
1	time	Xe-133 STAX	Xe-133 autoSaint	Xe-133 diff	Xe-133 MDR STAX	Xe-133 MDR autoSaint	Xe-133 err STAX	Xe-133m STAX	Xe-133m autoSaint
2	5/9/2022 0:00	4.55768E+10	3.79209E+10	7.65580E+09	4.28439E+08	5.72950E+08	6.53226E+09		1.05971E+09
3	5/9/2022 0:15	4.39512E+10	3.66511E+10	7.30008E+09	4.78233E+08	6.02388E+08	6.30251E+09		1.12023E+09
4	5/9/2022 0:30	4.33013E+10	3.64042E+10	6.89704E+09	4.34919E+08	5.72495E+08	6.20808E+09	1.49335E+09	1.31288E+09
5	5/9/2022 0:45	4.34536E+10	3.69469E+10	6.50669E+09	4.84477E+08	5.67073E+08	6.23165E+09		9.51448E+08
6	5/9/2022 1:00	4.37118E+10	3.65023E+10	7.20950E+09	4.12619E+08	5.79780E+08	6.26554E+09		9.83189E+08
662	5/15/2022 21:00	1.29222E+11	1.07298E+11	2.19244E+10	7.56344E+08	9.57444E+08	1.84664E+10	2.33967E+09	2.23750E+09
663	5/15/2022 21:15	1.28504E+11	1.07681E+11	2.08222E+10	8.13258E+08	9.70364E+08	1.83652E+10	2.81920E+09	2.50699E+09
664	5/15/2022 21:30	1.28969E+11	1.07325E+11	2.16440E+10	7.35660E+08	9.37319E+08	1.84303E+10	2.62093E+09	2.48196E+09
665	5/15/2022 21:45	1.30638E+11	1.09046E+11	2.15928E+10	7.47829E+08	9.48671E+08	1.86690E+10	2.35941E+09	2.13002E+09
666	5/15/2022 22:00	1.29720E+11	1.09253E+11	2.04672E+10	7.78453E+08	9.53490E+08	1.85391E+10	2.22324E+09	2.13160E+09
667	5/15/2022 22:15	1.28675E+11	1.07365E+11	2.13097E+10	7.27364E+08	9.64082E+08	1.83888E+10	2.95460E+09	2.67988E+09
668	5/15/2022 22:30	1.29816E+11	1.09669E+11	2.01465E+10	7.08868E+08	9.64104E+08	1.85514E+10	2.71820E+09	2.45816E+09
669	5/15/2022 22:45	1.28663E+11	1.07859E+11	2.08049E+10	7.65203E+08	9.53096E+08	1.83886E+10	2.85737E+09	2.50398E+09
670	5/15/2022 23:00	1.29318E+11	1.07560E+11	2.17589E+10	7.47056E+08	9.78078E+08	1.84816E+10	3.14728E+09	2.79085E+09
671	5/15/2022 23:15	1.27794E+11	1.06426E+11	2.13678E+10	7.15808E+08	9.46375E+08	1.82635E+10	2.71692E+09	2.46456E+09
672	5/15/2022 23:30	1.26455E+11	1.06124E+11	2.03308E+10	7.38704E+08	9.58163E+08	1.80731E+10	2.58487E+09	2.31485E+09
673	5/15/2022 23:45	1.27991E+11	1.07064E+11	2.09274E+10	7.53244E+08	9.37956E+08	1.82928E+10	2.50583E+09	2.14038E+09
674									



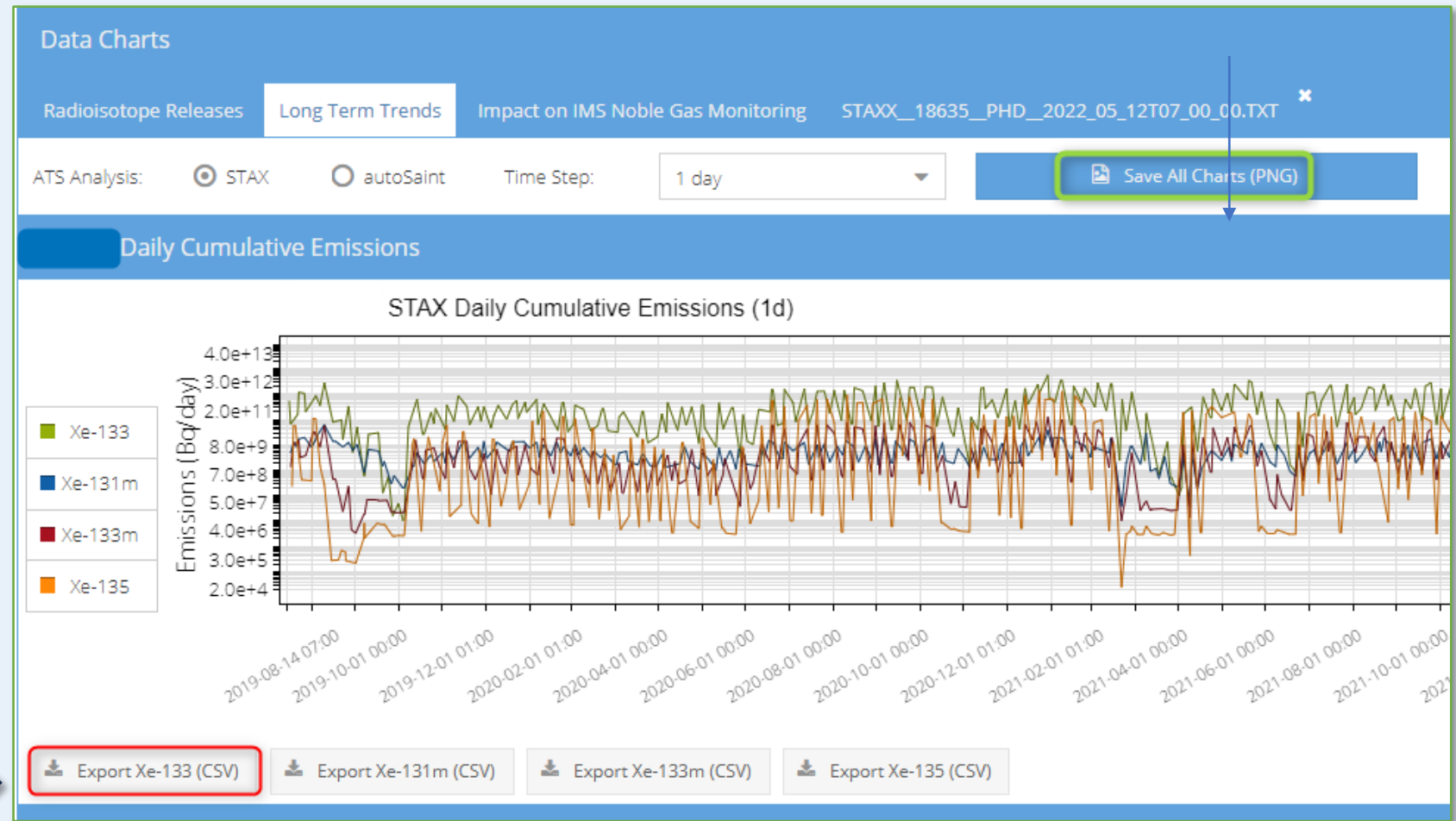


# Long Term Trends Data

All station charts images can be saved from one button

Time history of daily cumulative emissions from STAX or autoSaint analysis can be exported as CSV

- from each station chart
- for each of the four Xenon radionuclides (Xe-133, Xe-131m, Xe-133m, Xe-135) individually

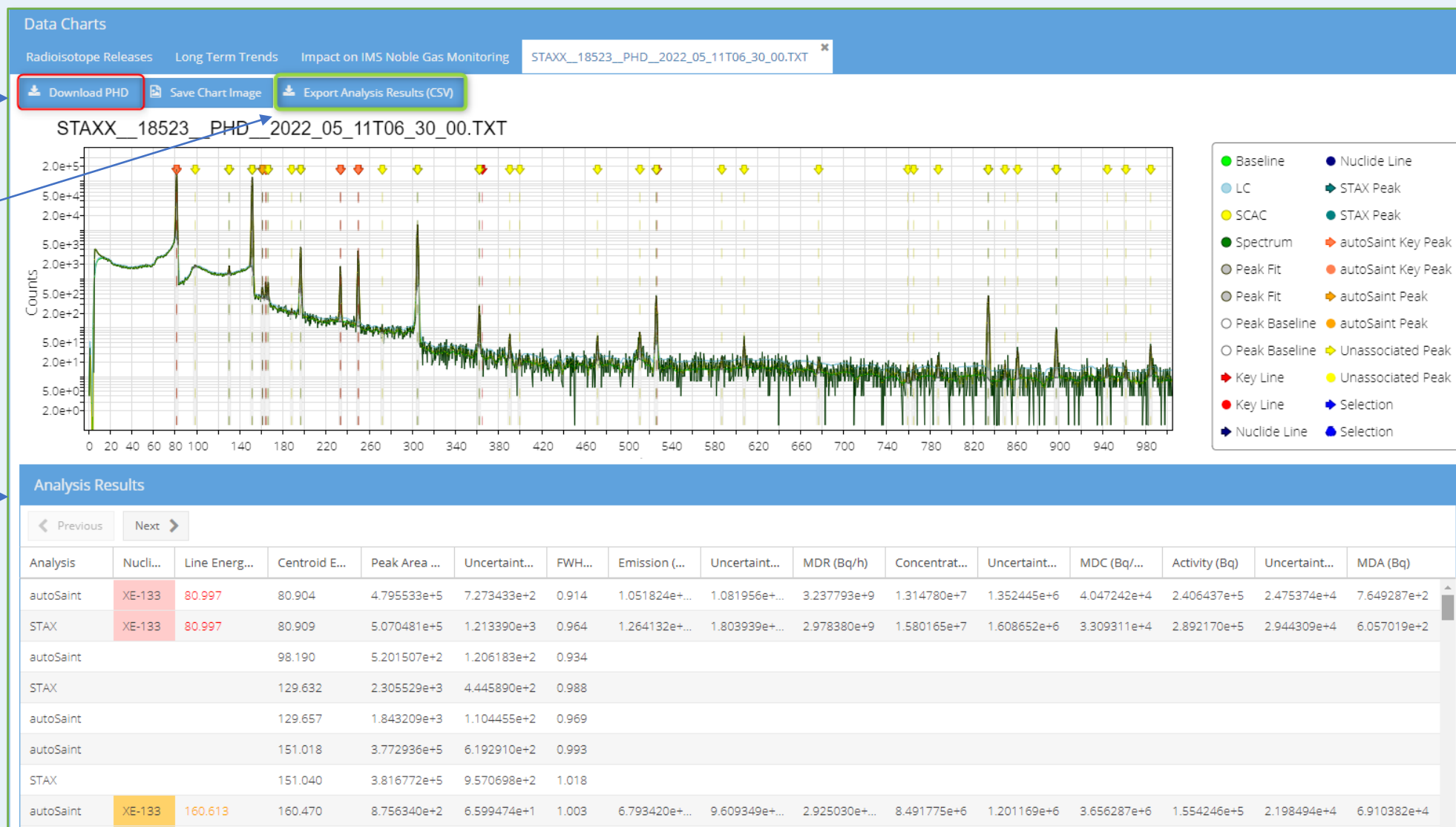


# Spectra Charts Data

PHD file download

Analysis results CSV export

STAX and autoSaint analysis results, including emissions and peaks



# Offline Data Processing



STAX and autoSaint analysis results stored in the ATS files, and emissions time series stored in the CSV files, can both be downloaded from STAX by authorized users and used for further processing with their own tools, e.g. to refine ATM models.



Gamma spectra (PHD) files retrieved from STAX can be easily reprocessed offline using CTBTO's NDC in a box or other analysis software tools, for example if there are quality concerns regarding the STAX/autoSaint results.



# STAX Resources Access

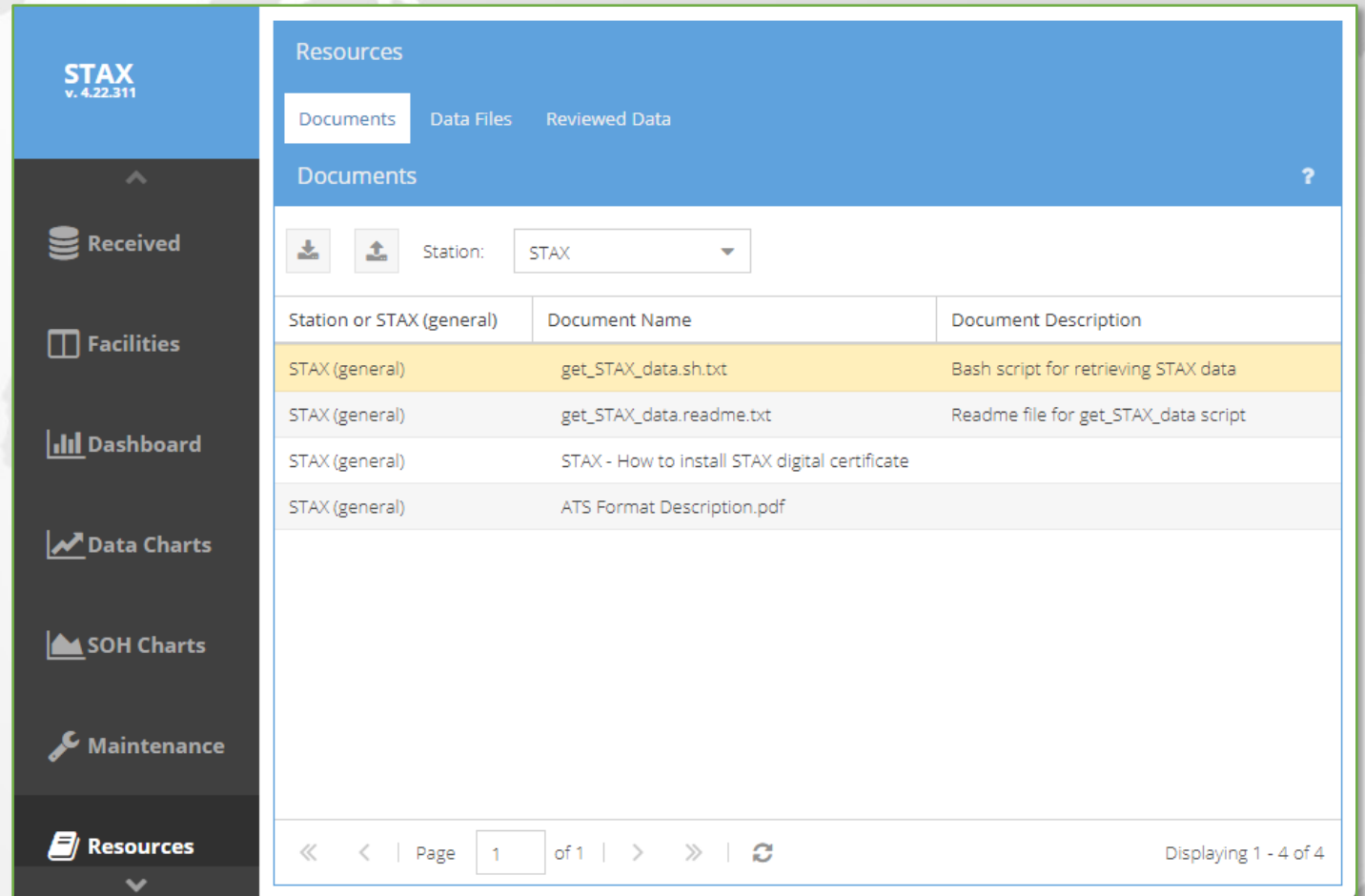
Documents, additional data files, and reviewed data are available for **download** by authorized users from the **Resources** page

Station-specific

*Facility operators can **upload** data for their own stations.*

General STAX resources:

- *documentation and user's manuals*
- ***get\_STAX\_data*** script for automatic download



The screenshot displays the STAX v. 4.22.311 interface. The left sidebar contains navigation options: Received, Facilities, Dashboard, Data Charts, SOH Charts, Maintenance, and Resources (selected). The main content area is titled 'Resources' and has tabs for 'Documents', 'Data Files', and 'Reviewed Data'. Under the 'Documents' tab, there are download and upload icons, a 'Station:' dropdown menu set to 'STAX', and a table of documents.

Station or STAX (general)	Document Name	Document Description
STAX (general)	get_STAX_data.sh.txt	Bash script for retrieving STAX data
STAX (general)	get_STAX_data.readme.txt	Readme file for get_STAX_data script
STAX (general)	STAX - How to install STAX digital certificate	
STAX (general)	ATS Format Description.pdf	

At the bottom of the page, there is a pagination control showing 'Page 1 of 1' and a refresh icon. The text 'Displaying 1 - 4 of 4' is visible in the bottom right corner.



**THANK YOU**

**Questions ?**