



# API User Guide

## API Basics

The chart below is a beginner’s guide to using an API.

Using the ASF API — Overview		
Build an API command: Program+URL+keywords For more details, see Build API Command		
Command	Selections	Notes
1) Choose a program Table Of Contents	Choose a command-line program to transfer data using a URL Choose cURL or WGET	Construct command at the command line
2) Use the ASF API URL	https://api.daac.asf.alaska.edu/services/search/param?	
3) Choose Keywords	Define your search using keywords such as asfframe, absoluteOrbit, output. Choose keyword output’s value based on intended use. See below.	See the keyword list
Download, search or visualize — by including the appropriate Output keyword value in the API command For more details, see Search and Download.		
Uses	Output Keyword Values	Helpful Software
Search	CSV	Excel
	JSON	Custom script, JSON viewer
	COUNT	
Visualize	KML	Google Earth
	GEOJSON	Custom script, JSON viewer

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Ok

Download ☰	METALINK (default)	aria2 required 🔍 Search
	JSON	Custom script, direct download of URLs
	DOWNLOAD	Custom script, direct download of URLs

*Note: A research agreement is required for access to JERS-1 and RADARSAT-1 data. Please complete the required Research Agreement, or contact user support at the link or number below.*

# Quick Guide for Power Users

**API URL:** `https://api.daac.asf.alaska.edu/services/search/param?keyword=value\&...`

**Keywords:** See here for a full list of keywords.

**Output:** Default output format is METALINK; users can also specify CSV, KML, JSON, COUNT, DOWNLOAD, and GEOJSON.

## Authenticate\* and Download: Linux/Mac Examples

Aria2 — Download Known Granule	
	<code>aria2c --http-auth-challenge=true --http-user=CHANGE_ME --http-passwd='CHANGE_ME' "https://api.daac.asf.alaska.edu/services/search/param?granule_list=S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4&amp;output=metalink"</code>
Table Of Contents 📖 Aria2 — Download Based on Platform and Time-Range Search	
	<code>aria2c --http-auth-challenge=true --http-user=CHANGE_ME --http-passwd='CHANGE_ME' "https://api.daac.asf.alaska.edu/services/search/param?platform=Sentinel-1A&amp;intersectsWith=point(-122.425 37.77)&amp;start=2016-07-01T00:00:00&amp;output=metalink"</code>
Wget — Download Known Metalink	
	<code>wget -c --http-user=CHANGE_ME --http-password='CHANGE_ME' "https://datapool.asf.alaska.edu/GRD_MD/SA/S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4.zip"</code>

*\*Use Earthdata username and password*

# Search, Visualize, Download

The API can be used to search, visualize, or download SAR data from the ASF data pool depending on the choice of ‘output’ keyword value. The default output is METALINK, which is useful for downloading data.

## Search and Visualize

Searches can be done with CSV or JSON output. Note that CSV returns many more fields than JSON. Users may visualize data with KML files and Google Earth. The API will return a maximum of 10,000 results for a given search.

### Search and Visualize via browser

A non-command-line option is to visualize your results by pasting the URL and keywords into a browser. You’ll need to have Google Earth or another program installed. You can also do CSV, JSON, or METALINK searches via the browser and get a file returned. If you do this, use ‘&’ instead of ‘\&’. This is a great option if you are not scripting, or for smaller searches.

Uses	Output Values	Helpful Software
Search	CSV	Excel
	JSON	Custom script, JSON viewer
Count	COUNT	Command line
Visualize	KML	Browser, Google Earth
	GEOJSON	http://geojson.io
Download	METALINK (default)	aria2 required
	DOWNLOAD	Python required

## Download Setup Steps

Do these one-time setup steps prior to using the API Download Tool to download data from the ASF data pool.

### 1) Get an Earthdata Login account

A NASA EOSDIS Earthdata Login account is required for downloading data from ASF. Earthdata Login accounts are easy to register for on the [Earthdata Login — Create Profile](#) page.

After creating your account, you must log into Vertex, accept the Terms of Service, and set your Study Area before downloading data.

### 2) Install a Command-Line Download Tool

ASF's recommended tool for bulk downloads is the ASF Bulk Download Python Script

aria2 can also be used for downloads.

Wget comes installed on most Linux distributions and is also available for Windows, Mac, and other platforms.

## Bulk Download with Aria2

The API Download Tool supports downloading API search results with aria2 in one easy command!

1. Include your Earthdata username and password
2. Include your API search URL and keywords
3. Make sure output=metalink
4. Run it!

Linux/Mac Example — Log in, search, and download results in one command

```
aria2c --http-auth-challenge=true --http-user=CHANGE_ME --http-passwd='CHANGE_ME' "https://api.daac.asf.alaska.edu/services/search/
```

Windows Example — Log in, search, and download results in one command

```
aria2c --check-certificate=false --http-auth-challenge=true --http-user=CHANGE_ME --http-passwd="CHANGE_ME" "https://api.daac.asf.alaska.edu/services/search/
```

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Ok

Additional aria2 options at sourceforge.net.

## Download Without Installing Aria2

Users without access to aria2 can still download files, but it takes a few more steps:

- 1. Run your API search with output=CSV
- 2. Review your search results for the download URL(s) of the file(s) you want
- 3. Download those files one at a time using Wget

```
Linux/Mac Example – Download a datapool file using Wget

wget -c --http-user=CHANGE_ME --http-password='CHANGE_ME' "https://datapool.asf.alaska.edu/GRD_MD/SA/S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4.zip"
```

```
Windows Example – Download a datapool file using Wget

wget --check-certificate=off -c --http-user=CHANGE_ME --http-password="CHANGE_ME" "https://datapool.asf.alaska.edu/GRD_MD/SA/S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4.zip"
```

Having trouble? See the Troubleshooting page for resolutions to common issues.

Additional wget options at the GNU Wget Manual

## A Note About Passwords

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You can store your Earthdata username and password in a configuration file instead of including them in every download command. This can make downloads more convenient, and hides your credentials from other users that have access to see commands being run on your system. If you save your password in a file, make sure to set the file's permissions so other users can't read it!

```
Linux/Mac Example – Create and use a configuration file with aria2

echo 'http-user=CHANGE_ME' >> aria2.conf
echo 'http-passwd=CHANGE_ME' >> aria2.conf
chmod 600 aria2.conf

aria2c --conf-path=aria2.conf --http-auth-challenge=true "https://api.daac.asf.alaska.edu/services/search/param?granule_list=S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4.zip"
```

```
Linux/Mac Example – Create and use a configuration file with Wget

echo 'http_user=CHANGE_ME' >> wget.conf
echo 'http_password=CHANGE_ME' >> wget.conf
chmod 600 wget.conf

export WGETRC="wget.conf"
wget -c "https://datapool.asf.alaska.edu/GRD_MD/SA/S1A_EW_GRDM_1SDH_20151003T040339_20151003T040443_007983_00B2A6_DDE4.zip"
```

You can store other default options in your configuration files as well. Refer to the complete documentation on configuration files for aria2 and Wget.

# Build API Command

API commands can be incorporated into scripts or used at the command line via the Mac terminal window, Command Prompt window on Windows, or on Linux systems.

1. File-transfer program (cURL or WGET)
2. Base URL
3. Keywords and values

Program	Base URL	Keywords and Values
curl	https://api.daac.asf.alaska.edu/services/search/param?	platform=R1\&absoluteOrbit=25234\&output=CSV

Windows Example

```
curl "https://api.daac.asf.alaska.edu/services/search/param?platform=R1&absoluteOrbit=25234&output=CSV" > myfilename.csv
```

**Hint:** Copying and pasting quotation marks causes errors for Windows users. Delete and re-type the quotes after pasting.

## 1) Choose a File Transfer Program and options

Both **WGET** and **cURL** are often installed on Linux systems. cURL is part of the Mac OS, and WGET can be installed. MS-Windows OS does not come with either installed, but both can be downloaded. cURL is easier to set up on a Windows machine.

### Browser Option

Searches can be done in the browser. Paste just the URL and keywords into a browser to search, visualize, or get a metalink file for downloading data. Connect keywords with “&” when using the browser. A file is returned, or you can open results in Google Earth to visualize.

### Send all search results to a file

WGET option ‘-O *myfilename*’ or cURL ‘https://.... > *myfilename*’ will send all search results into a file. To download data from ASF, use the **.metalink** extension on your filename. The metalink output is default for ASF searches, but can be explicitly called with keyword output=METALINK.

Example – query results sent to a metalink file:

```
wget -O myfilename.metalink https://api.daac.asf.alaska.edu/services/search/param?intersectsWith=point%28-119.543+37.925%29\&platform=R1\&granuleList=ALPSRP074606580,ALPSRP021910740,ALPSRP085800750
```

```
curl https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP021910740,ALPSRP085800750 >myfilename.metalink
```

**Hint:** Copy/pastes of examples that span multiple lines introduce error for Mac/Linux users. Copy and paste one line at a time.

Windows Example

```
curl "https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP021910740,ALPSRP085800750" > myfilename.metalink
```

## 2) Use the Base URL

The ASF API URL is https://api.daac.asf.alaska.edu/services/search/param?

3) Choose Keywords

Keywords are used to find the desired data. Use as many or as few keywords as needed.

Sample Keywords	
Keyword	Description and Values
asfframe	<p>This is an ASF / JAXA frame reference. See also 'frame'.</p> <p><b>Values:</b> Any number, series of numbers, or number range from 1 to 900 for ERS, RADARSAT, JERS. 0-7200 for ALOS PALSAR.</p>
output	<p>Format of the API search results returned. If not specified, default return is METALINK for ASF API.</p> <p><b>Example:</b> output=CSV</p> <p><b>Values:</b> CSV, JSON, KML, METALINK, COUNT, DOWNLOAD, GEOJSON</p>
platform	<p>Remote sensing platform that acquired the data.</p> <p><b>Example:</b> platform=ALOS</p> <p><b>Values:</b> A3, AI, AS, E1, E2, J1, ERS-1, ERS-2, JERS-1, R1, UA, AIRSAR, ALOS, ERS-1, ERS-2, JERS-1, RADARSAT-1, SEASAT, Sentinel-1A, UAVSAR</p>

Syntax hints:

- "A"?" separates the URL from the keywords.
- The keywords are defined by "&" for command line in Mac/Linux or "&" in browser and Windows.
- The base URL and keywords **may not** have any spaces.
- Some keywords contain characters that must be encoded.
- Keywords are case sensitive.

Keyword Character Encoding:

URLs **may not** contain spaces, or parentheses. Some keywords, such as intersectsWith, have parentheses and spaces. Those characters must be encoded as shown in the table below.

Character Encoding	
URL Symbol	Replace with ASCII
space	remove spaces in URL or use '%20'. Use '+' in keyword values
(	%28
)	%29

For a complete list of URL codes, please see URL Encoding Reference.

Example – encoding

intersectsWith=point(-119.543 37.925) --> intersectsWith=point%28-119.543+37.925%29

**Keywords** may contain a single value or a range of values, depending on the requirements of the particular keyword. For example, "frame=300,310-350" contains both a single value and a range. The geographic area to be searched can be defined using either the older *polygon* keyword, or the newer *intersects* keyword. *Intersects* has the advantage of allowing a line, a point, or a multi-area search in

addition to a single polygon.

Put it All Together — Examples

Mac/Linux Examples

```
Search
curl https://api.daac.asf.alaska.edu/services/search/param?platform=r1\&asfframe=300\&output=CSV > myfilename.csv

Visualize
wget -O myfilename.kml https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP077086550\&output=kml

Visualize — in browser and Google Earth
https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP077086550&output=KML

Download
wget -c -O myfilename.metalink https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP077086550\&output=metalink
```

Windows examples

```
Search
curl "https://api.daac.asf.alaska.edu/services/search/param?platform=r1&asfframe=300&output=CSV" > myfilename.csv

Visualize
curl "https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP077086550&output=KML" >myfilename.kml

Download
curl -L "https://api.daac.asf.alaska.edu/services/search/param?granule_list=ALPSRP074606580,ALPSRP077086550&output=METALINK" >myfilename.metalink
```

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Keywords

Keywords are used to find the desired data. Use as many or as few keywords as needed.

Sample Keyword	
Keyword	Description and Values
asfframe	This is an ASF / JAXA frame reference. See also 'frame'. <b>Values:</b> Any number, series of numbers, or number range from 1 to 900 for ERS, RADARSAT, JERS. 0-7200 for ALOS PALSAR.

Available keywords and descriptions are listed to the right. Click the keyword to expand.

Syntax hints:

- "A"?" separates the URL from the keywords.
- The keywords are joined by "\&" for command line, or "&" in the browser.

Active Keywords

absoluteOrbit
asfframe
maxBaselinePerp
minBaselinePerp
bbox
beamMode
beamSwath
collectionName
maxDoppler
minDoppler

- The base URL and keywords **may not** have any spaces.
- Some keywords contain characters that must be encoded.
- Keywords are case sensitive.

**Keyword Character Encoding:**

For searches to be successful, URLs may not contain spaces, or parentheses. Some keywords, such as intersectsWith, have parentheses and spaces. Therefore those characters must be encoded as shown in the table below.

Character Encoding	
URL Symbol	Replace with ASCII
space	remove spaces in URL or use '%20'. Use '+' in keyword values
(	%28
)	%29
+	%2B

Deprecated Keywords

Keyword	Note
beam	See beamMode
direction	See flightDirection
format	See output
limit	See maxResults
lookAngle	See offNadirAngle
minPercentCoherence	Deprecated
minPercentTroposphere	Deprecated
minPercentUnwrapped	Deprecated
orbit	See absoluteOrbit

offnadir	See offNadirAngle
path	See relativeOrbit
processing	See processingLevel

maxFaradayRotation

minFaradayRotation
flightDirection
flightLine
frame
granule_list
maxInsarStackSize
minInsarStackSize
intersectsWith
lookDirection
offNadirAngle
output
Format of the API search results returned. If not specified, default return is metalink for ASF API or JSON for SSARA Federated API. MAP setting valid only for SSARA Federated API.
Example: output=JSON
Values: CSV, JSON, KML, METALINK, COUNT, DOWNLOAD, GEOJSON
NEW values! COUNT returns the number of search results GEOJSON returns the search results in a GeoJSON format DOWNLOAD returns a bulk download script that includes the scenes returned by the search. A full description and guide on using the bulk download script itself can be found here
Note: JSON returns more fields than CSV for the same query.
platform
polarization
polygon
processingLevel
relativeOrbit
maxResults
processingDate
start and/or end acquisition time



<div><div></div><div></div><div></div></div> slaveStart/SlaveEnd	Deprecated	season	<div><div></div><div></div><div></div></div>
varianceTroposphere	Deprecated		

# Troubleshooting

Trouble Area	Reason	Remedy
Windows cURL “unrecognized protocol”	Invisible double quotes involuntarily inserted when copy/pasting example from web page	Delete the visible quotes, which will delete the invisible quotes. Then retype quotes.
Download fails with “401 Unauthorized” or “Authorization failed”	Missing or invalid Earthdata username/password	Check that you are correctly including your Earthdata username and password in your download command. See search for examples.
Download fails with “401 Unauthorized” or “Authorization failed”	Special characters in Earthdata password	Passwords with special characters need single quotes on Linux/Mac and double-quotes on Windows. See search for examples.
Cookie request to /services/authentication/ fails with “410 Gone” Table Of Contents	Cookie URL has been retired	It’s not longer necessary to request an authorization cookie before downloading data. See search
Can’t authenticate	You must agree to the new Terms of Service and set your Study area	Log on to Vertex, accept the TOS, and set your Study Area
Wget or cURL command copied from the webpage doesn’t work	Copy/paste over multiple lines introduces error	Copy and paste one line, then the next line
Wget or cURL command copied from the webpage doesn’t work	Quotes look the same but are interpreted differently	Where single quotes are present, delete and retype them in the terminal window
API request with ‘+’ in it fails	Some keywords are stored in the database as two words with a space between them, some as two words joined with a ‘+’.	Try your API request with a ‘+’. if that doesn’t work, replace the ‘+’ with ‘%2B’. One of them will work.
Download using Aria fails	Bug in ASF code	Fix delivered
API request fails	https is now required	Make sure you are using https, not http

<div>Can't download PALSAR data</div> <div></div>	<div>You must agree to the PALSAR EULA in order to download PALSAR data</div>	<div>Log in to Vertex and agree to the End User License Agreement, then retry downloading</div> <div></div>
<div>API request hangs, fails, or returns an error</div>	<div>Your URL may include spaces or special characters, especially if you are using the 'intersectsWith' keyword</div>	<div>Remove spaces or replace with %20 or +</div> <div>See URL Character Encoding below</div>
<div>API request hangs or fails</div>	<div>Search may exceed 10,000 results</div>	<div>Narrow search using more keywords to return fewer results or use keyword "maxResults"</div>
<div>API request returns process ID (PID) numbers but does not return query results</div>	<div>URLs at the command line may require the "&amp;" to be escaped</div>	<div>Replace ampersand "&amp;" with backslash ampersand "\&amp;" in the URL. OR use double quotes " " around the URL; URLs submitted via the browser use ampersand "&amp;" without the backslash.</div>
<div>Keyword not respected</div>	<div>Keywords are case sensitive</div>	<div>Ensure that your keywords are capitalized (or not) just as in the Keyword List</div>
<div>Keyword not respected</div>	<div>Keyword is deprecated</div>	<div>See the bottom of the keyword list for a list of deprecated keywords</div>
<div>Certificate rejected</div> <div>Table Of Contents</div> <div></div>	<div>Third-party certificates out of date, a problem for https searches</div>	<div>Use http OR disable certificate checks</div> <div>curl -insecure</div> <div>wget --no-check-certificate</div>
<div>CSV vs JSON</div>	<div>The JSON output returns more fields than CSV</div>	<div>It's a feature. ASF may expand CSV output in the future. Meanwhile, use JSON to get the most information returned</div>