



PRISMA Pre-Feasibility Tool User Manual

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1. SCOPE AND PURPOSE

1.1 SCOPE

This document contains the explanation of the usage of the PRISMA Pre-Feasibility Tool.

1.2 PURPOSE

The PRISMA Pre-Feasibility Tool is the results of ASI internal developments made available to the PRISMA user community for analyzing in time the spatial coverage of such a mission. With this tool it is hence possible to determine the time (in the future) at which the satellite geometrically sees an area of interest (represented by his central point) and so plan the acquisitions of PRISMA images.

2. APPLICABLE AND REFERENCE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

[AD1] None

2.2 REFERENCE DOCUMENTS

[RD-1] None

3. ACRONYMS AND DEFINITIONS

3.1 ACRONYMS

Acronym	Meaning
Aoi	Area of Interest
ASI	Italian Space Agency
LoS	Line of Sight

Table 3-1 Acronyms

3.2 DEFINITIONS

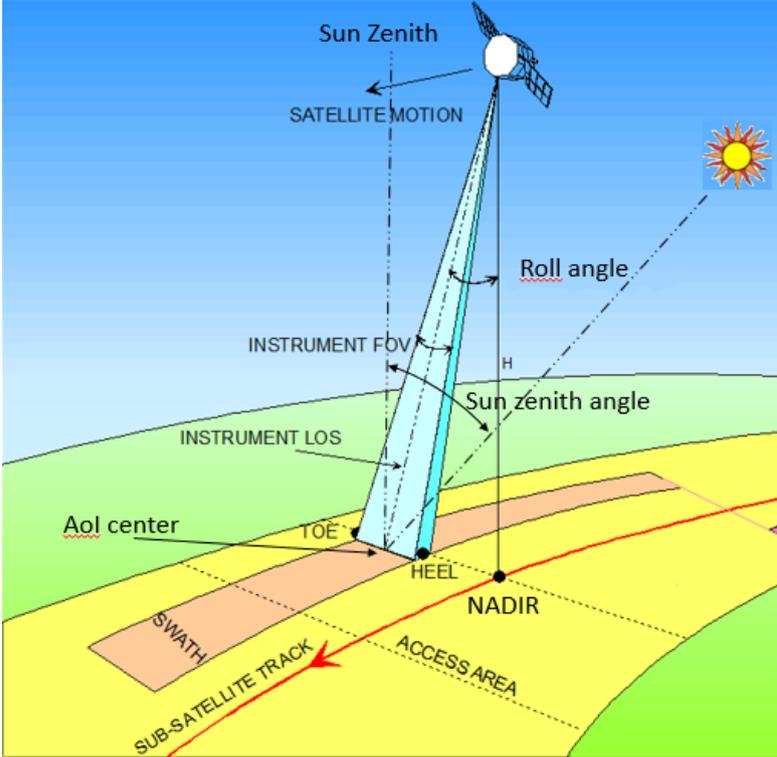
<p>Look angle Roll angle</p>	<p>The angle between the two directions satellite-nadir and the line of sight of the sensor</p> 
<p>Nadir</p>	<p>The subsatellite point, obtained as the intersection of the earth surface with the direction normal to such surface and passing to the satellite</p>
<p>Subsatellite track</p>	<p>The curve described by the nadir during the time. Such curve also represents the along track direction</p>
<p>Sun Zenith</p>	<p>The position of the sun at his highest altitude respect the earth surface at Aoi center</p>
<p>Sun Zenith angle</p>	<p>The angle between the two directions Aoi center-Sun and Aoi center-Sun Zenith</p>

Table 3-2 Definitions

4. USER MANUAL

The tool, which is web-based and freely accessible even without a PRISMA account, performs the analysis on a single or multiple Areas of Interest (Aoi) described as the lat,lon of their central point and gives in output the UTC time at which the satellite have in view the Aoi along with the some characteristic parameters of that view (the roll angle and the solar zenith angle).

The tool can be accessed at <http://90.147.170.162> (next also at <http://prisma-prefeasibility.asi.it>)

For a single Aoi analysis press the button

Single Point

or select a csv file and press the button

Upload CSV

for a multiple Aoi analysis.

4.1 SINGLE POINT ANALYSIS



PRISMA Pre-Feasibility Tool

Version: Update Trajectory R_5.6 - Prefeasibility R_6.3 - For any problems please [Contact Us](#)

Through this page it is possible to check PRISMA feasibility by using a CSV file with a set of POI
If you want to check feasibility for a single point by manual insert Lat and Lon and Params click the following button:

Single Point

The csv file must contains the one entries like the following example for each row:

format: 'Start epoch' * [yyyy-mm-ddThh:mm:ss.ssssss]; 'Stop epoch' * [yyyy-mm-ddThh:mm:ss.ssssss]; 'Strip length' * (1 in case of spot image) [n]; 'Lat' * [deg]; 'Lon' * [deg]; 'LookAngle Min' [deg]; 'LookAngle Max' [deg]; 'MinSunZenithAngle' [deg]; 'MaxSunZenithAngle' [deg]; 'Description' [text]

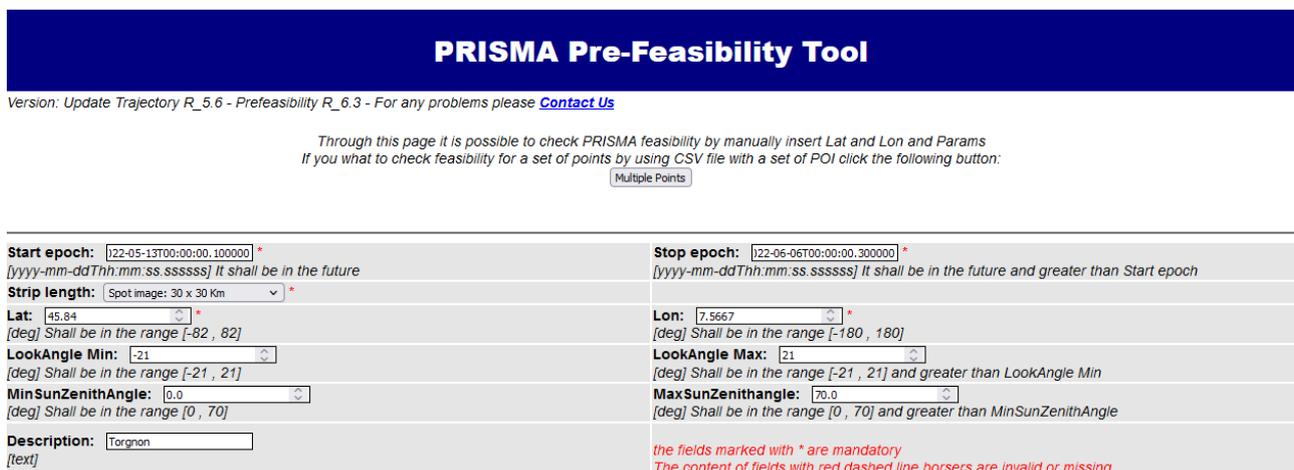
example: "2022-05-13T00:00:00.100000, 2022-06-06T00:00:00.300000, 1, 45.84, 7.5667, -21, 20, 0, 70, Torgnon"

the fields marked with * are mandatory

Select CSV file to upload:

Please wait until the calculation is finished without reloading the page; the completion of the computation could last even many minutes depending by the extent of the time interval and the number of points on which you require the feasibility

Figure 4-1 Single Aoi analysis



PRISMA Pre-Feasibility Tool

Version: Update Trajectory R_5.6 - Prefeasibility R_6.3 - For any problems please [Contact Us](#)

Through this page it is possible to check PRISMA feasibility by manually insert Lat and Lon and Params
If you want to check feasibility for a set of points by using CSV file with a set of POI click the following button:

Multiple Points

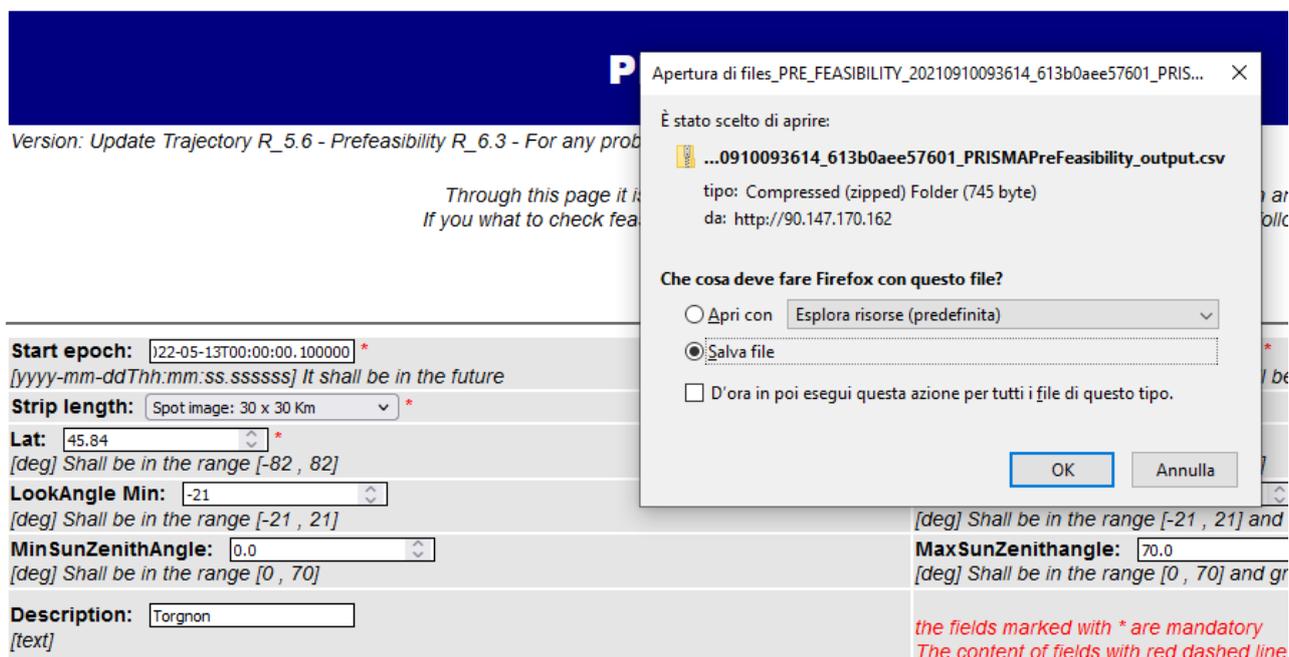
Start epoch: [22-05-13T00:00:00.100000] * [yyyy-mm-ddThh:mm:ss.ssssss] It shall be in the future	Stop epoch: [22-06-06T00:00:00.300000] * [yyyy-mm-ddThh:mm:ss.ssssss] It shall be in the future and greater than Start epoch
Strip length: [Spot image: 30 x 30 Km] *	
Lat: [45.84] * [deg] Shall be in the range [-82, 82]	Lon: [7.5667] * [deg] Shall be in the range [-180, 180]
LookAngle Min: [-21] * [deg] Shall be in the range [-21, 21]	LookAngle Max: [21] * [deg] Shall be in the range [-21, 21] and greater than LookAngle Min
MinSunZenithAngle: [0.0] * [deg] Shall be in the range [0, 70]	MaxSunZenithAngle: [70.0] * [deg] Shall be in the range [0, 70] and greater than MinSunZenithAngle
Description: [Torgnon]	<i>the fields marked with * are mandatory The content of fields with red dashed line borders are invalid or missing</i>

Figure 4-2 Inputs for a single Aol analysis

For making such analysis the user shall specify in input:

- **[mandatory]** The future time window at which the analysis is wanted, by mean of Start and Stop epoch in UTC, in the format *yyyy-mm-ddThh:mm:ss.ssssss* Example: 2022-05-13T00:00:00.100000, 2022-06-06T00:00:00.300000
- **[mandatory]** The geographic position of the Aol, by latitude and longitude of the central point in decimal degrees. The latitude is constrained to be within the area accessible to the satellite sensor, i.e. within ± 82 deg. Example 45.84, 7.5667
- [optional] The length of the Aol in the satellite along track direction, expressed as multiples of the minimum PRISMA length which can be acquired i.e. 30km: Example: 1
- [optional] The range of admissible look angles (the angle between the two directions satellite-nadir and the line of sight of the sensor), in decimal degrees. Such interval is constrained to be within the maximum range allowed by the satellite i.e. [-21, 21] Example -21.0, 21.0
- [optional] The range of admissible sun zenith angles (the angle between the two directions Aol center-zenith and Aol center-sun), in decimal degrees. Such interval is constrained to be within the range allowed by the satellite i.e. [0, 70] Example 0.0, 70.0
- [optional] The name of the Aol in plain text. Example Torgnon

After the ending of the computation (allow at least one minute per Aol without reloading the page), the tool gives in output a text file with one line for each observation opportunity and with values separated by commas (a csv type of file).

The screenshot shows the PRISMA web interface with a file download dialog box open. The dialog box title is "Apertura di files_PRE_FEASIBILITY_20210910093614_613b0aee57601_PRIS...". It shows a file named "...0910093614_613b0aee57601_PRISMAPreFeasibility_output.csv" with a type of "Compressed (zipped) Folder (745 byte)" and a URL "http://90.147.170.162". The dialog asks "Che cosa deve fare Firefox con questo file?" and offers options: "Apri con Esplora risorse (predefinita)", "Salva file" (selected), and "D'ora in poi esegui questa azione per tutti i file di questo tipo." There are "OK" and "Annulla" buttons.

The background interface shows the following input fields:

- Start epoch:** [22-05-13T00:00:00.100000] * (red asterisk)
- Strip length:** [Spot image: 30 x 30 Km] *
- Lat:** [45.84] * (red asterisk)
- LookAngle Min:** [-21] (red dashed line)
- MinSunZenithAngle:** [0.0] (red dashed line)
- Description:** [Torgnon]

Additional fields visible on the right side of the interface:

- MaxSunZenithangle:** [70.0] (red dashed line)

Footnote: *the fields marked with * are mandatory
The content of fields with red dashed line*

Figure 4-3 Output csv containing the results of the analysis

The data in output is:

- The time window at which the acquisition by PRISMA is foreseen, as Start and Stop epoch in UTC
- The geographic position of the acquisition, by latitude and longitude of the central point in decimal degrees (this is the same of the Aol position specified in input)
- The roll angle of the acquisition (it is the same of the look angle mentioned before) in decimal degrees. This value is acquisition time dependent and is checked for consistency with the range of admissible look angles specified in input and the range of admissible look angles for the Aol latitude (the range of allowed

roll angles changes with latitude of the Aol). When the latter condition is not met, a warning message is issued (“Acquisition can be discarded due to roll uncertainties”)

- The sun zenith angle of the acquisition, in decimal degrees
- The name of the Aol in plain text (this is the same of the field specified in input, when used)

```
Start Time,Stop Time,Latitude (deg),Longitude (deg),Roll (deg),SZA (deg),Site,,
2022-05-13 10:28:57.390717558,2022-05-13 10:29:01.500717558,45.84,7.5667,-2.7,29.9,Torgnon,,
2022-05-19 10:32:14.073356585,2022-05-19 10:32:18.183356585,45.84,7.5667,3.1,28.3,Torgnon,,
2022-05-25 10:35:30.426396568,2022-05-25 10:35:34.536396568,45.84,7.5667,8.8,27.0,Torgnon,,
2022-05-30 10:22:13.432778293,2022-05-30 10:22:17.542778293,45.84,7.5667,-14.0,27.5,Torgnon,Acquisition can be discarded due to roll uncertainties,
2022-05-31 10:38:46.304014688,2022-05-31 10:38:50.414014688,45.84,7.5667,14.3,25.9,Torgnon,Acquisition can be discarded due to roll uncertainties,
2022-06-05 10:25:29.829450946,2022-06-05 10:25:33.939450946,45.84,7.5667,-8.4,26.5,Torgnon,,
```

Figure 4-4 Output csv contents

4.2 MULTIPLE POINT ANALYSIS

In case you need the analyze the coverage of more than one Aol in a single round, you have to create a csv file containing the same information previously loaded in the web page, with one test line per Aol.

```
2022-01-10T00:00:00.000000, 2022-02-06T00:00:00.000000, 1, 45.84, 7.5667, -21, 20, 0, 70, Torgnon
2022-01-01T00:00:00.000000, 2022-03-01T00:00:00.000000, 1, 41.9027, 12.4963, -10, 10, 0, 70, Rome
```

Figure 4-5 A csv specifying multiple Aol

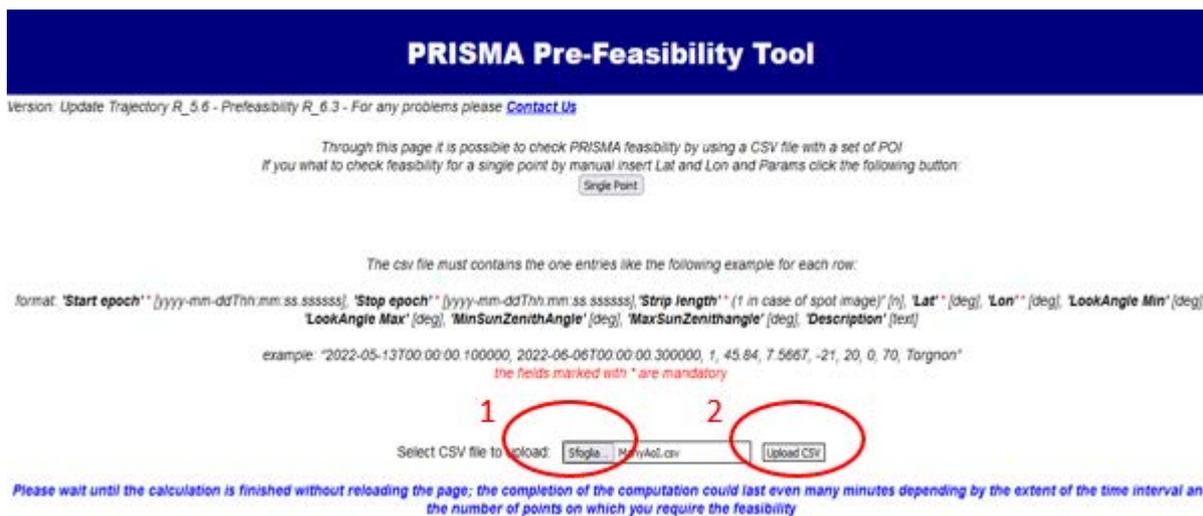


Figure 4-6 Analysis with multiple Aol

```
Start Time,Stop Time,Latitude (deg),Longitude (deg),Roll (deg),SZA (deg),Site,,
2022-01-11 10:26:19.960223960,2022-01-11 10:26:24.070223960,45.84,7.5667,-8.4,69.5, Torgnon,,Acquisition can be discarded due to SZA uncertainties
2022-01-17 10:29:37.495335968,2022-01-17 10:29:41.605335968,45.84,7.5667,-2.7,68.4, Torgnon,,
2022-01-23 10:32:54.177974995,2022-01-23 10:32:58.287974995,45.84,7.5667,3.1,67.1, Torgnon,,
2022-01-29 10:36:10.531014978,2022-01-29 10:36:14.641014978,45.84,7.5667,8.8,65.5, Torgnon,,
2022-02-03 10:22:53.537396705,2022-02-03 10:22:57.647396705,45.84,7.5667,-14.0,64.9, Torgnon,Acquisition can be discarded due to roll uncertainties,
2022-02-04 10:39:26.408633100,2022-02-04 10:39:30.518633100,45.84,7.5667,14.3,63.7, Torgnon,Acquisition can be discarded due to roll uncertainties,
2022-01-04 10:07:18.935547911,2022-01-04 10:07:23.045547911,41.9027,12.4963,-0.2,66.5, Rome,,
2022-01-10 10:10:34.889720539,2022-01-10 10:10:38.999720539,41.9027,12.4963,6.2,65.7, Rome,,
2022-01-27 10:03:52.346057286,2022-01-27 10:03:56.456057286,41.9027,12.4963,-6.2,63.0, Rome,,
2022-02-02 10:07:08.909393309,2022-02-02 10:07:13.019393309,41.9027,12.4963,-0.2,61.3, Rome,,
2022-02-08 10:10:24.863565937,2022-02-08 10:10:28.973565937,41.9027,12.4963,6.2,59.3, Rome,,
2022-02-25 10:03:42.319902684,2022-02-25 10:03:46.429902684,41.9027,12.4963,-6.2,54.1, Rome,,
```

Figure 4-7 results of the multiple Aol analysis

An empty results with only the name of the site signals the absence of geometric conditions for the acquisition of the Aol during the time window and parameters which has been specified.