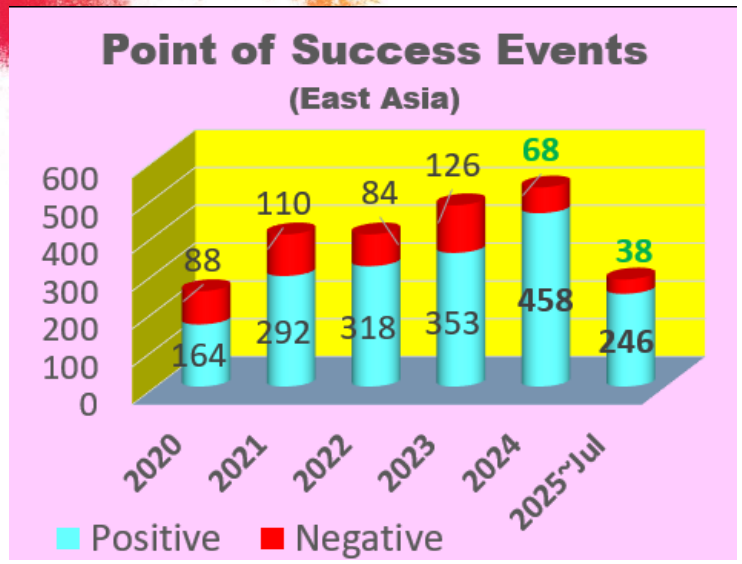
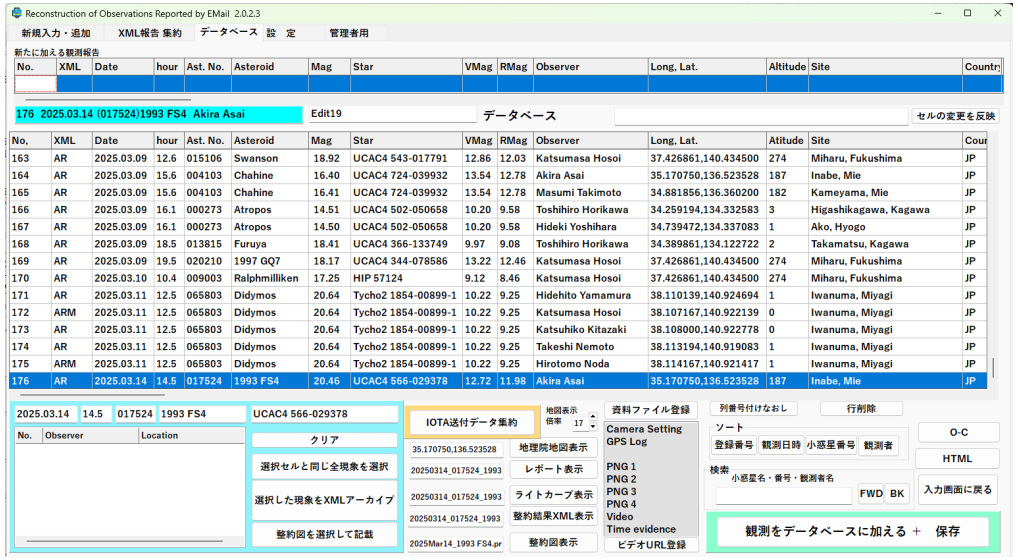
Report and data collection system on asteroidal occultation reporting

ROREM with Limovie





Kazuhisa Miyashita

Collection issue

In JAPAN, until a few years ago...

Most of report from observer is email-Text wih a somewhat flexible format.

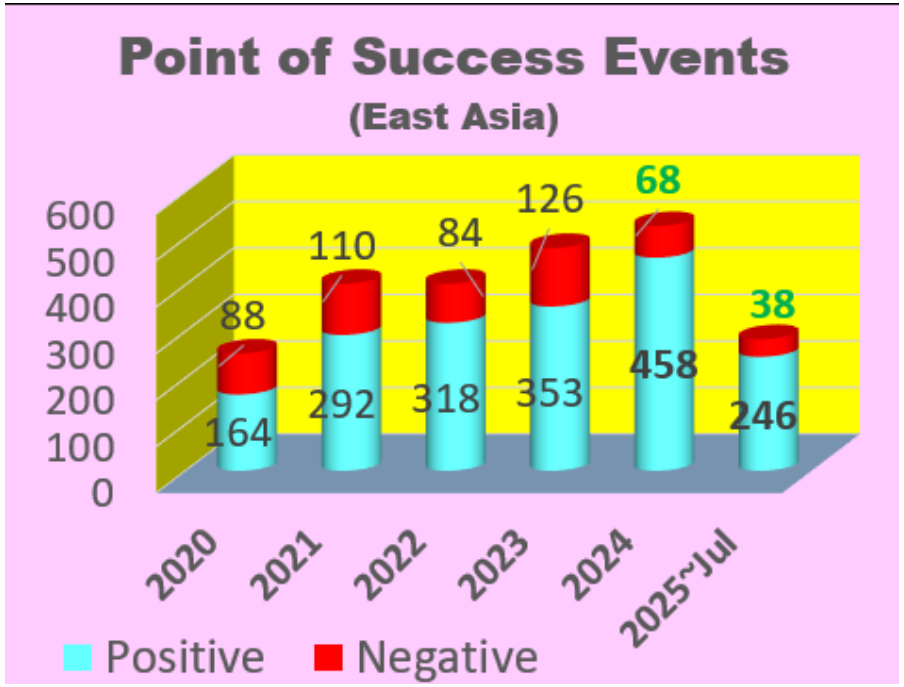
Regional coordinator manually transcribed from report emails to OCCULT4.

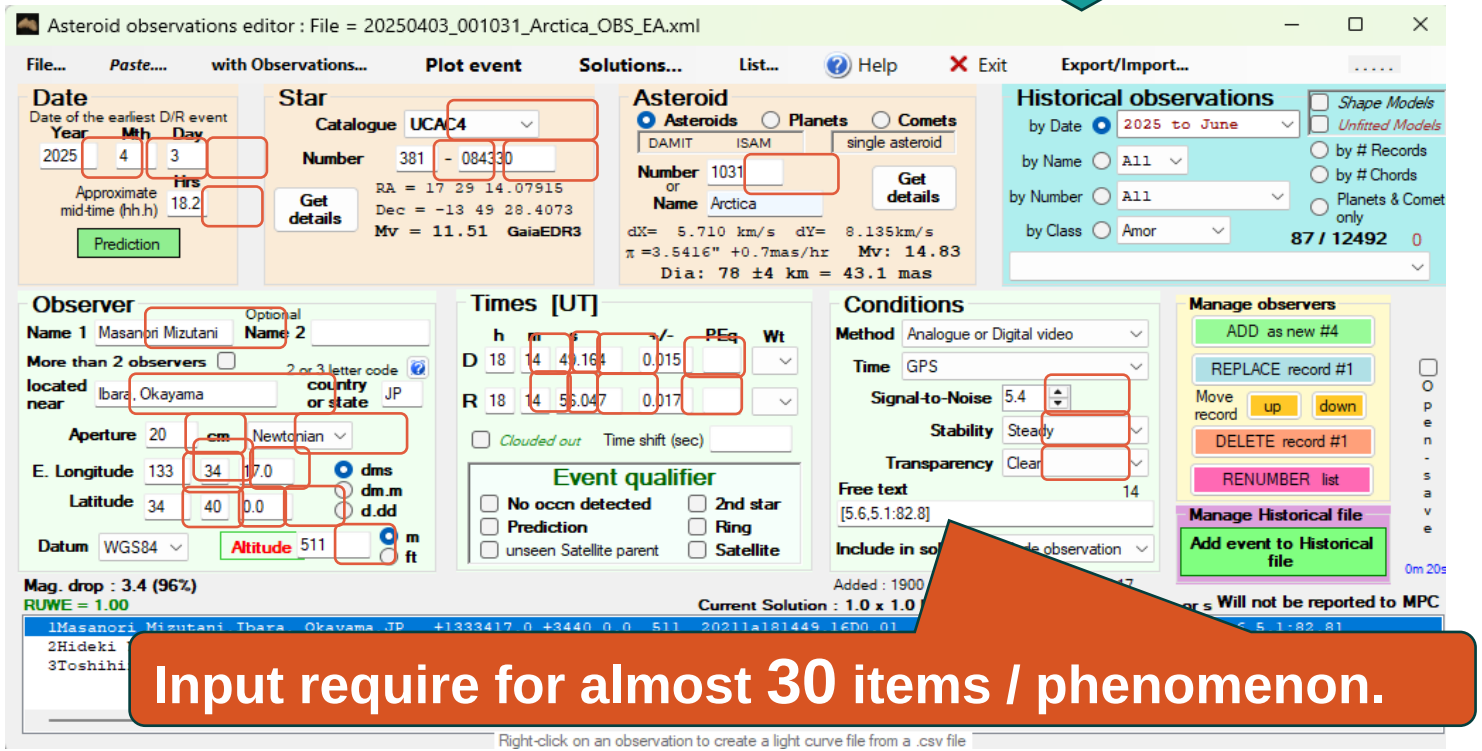
Email from observer

```
<報告>----------
■2025.8.24  27h52m JST
星:UCAC4 494-144363   12.27(合
経:23h 13m 29s.1523    赤緯: +
ｶﾞ双座    高度:42° WSW
星:(67619) 2000 SJ171    19.3等    直径: 6.4 ± 0.6km
光等級: 6.90等    継続時間:最長0.5 s
掩蔽帯:関東、中部、近畿、中国、
■観測地 (WGS84)
滋賀県東近江市川合町　蒲生あかね古墳公園
東経:136;10;01.6    北緯:35;04;25.9    標高:118m
■現象時刻 (UT)
減光:18h52m27.624s  ± 0.018s  S/N=14.65  9.75  Mag.
復光:18h52m28.112s  ± 0.019s  S/N=13.06  9.78  Mag.
継続時間:△T=0.488s
■観測機材、保時
D=20cm×F3.3Rd 、  STC経緯台(半自動)、  ASI290MM
SarpCap4.0.9571   frame1520x708
Exp:0.165s    Gain:494/600
PC同期、LED1pps発光：ｺﾊﾞﾝｻﾞﾒ+HACSTIP
117時報確認、movie記録
```

The number of observations continues to increase steadily.

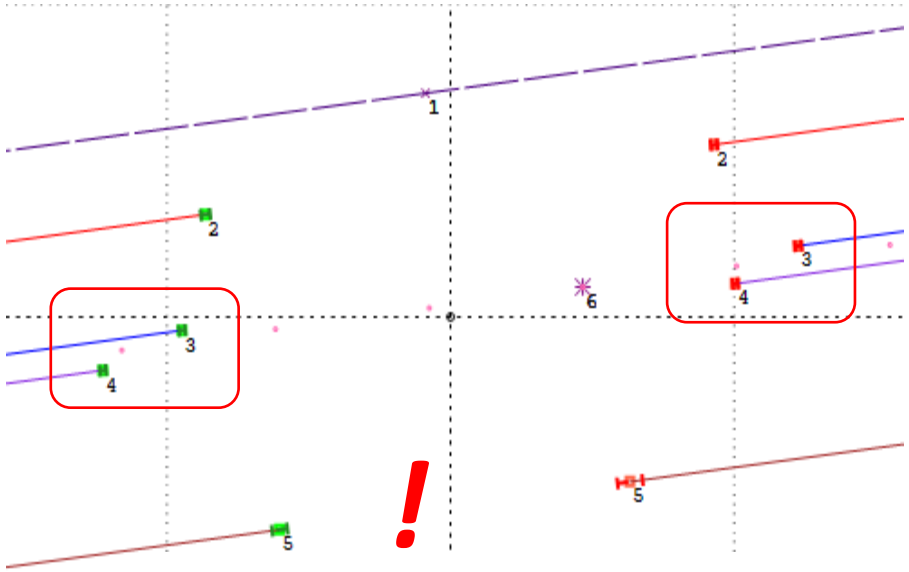
⇒ Collection process became increasingly difficult.

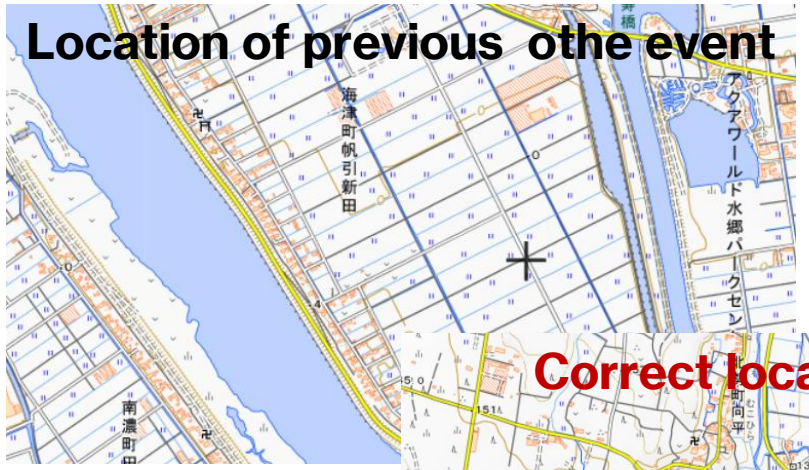


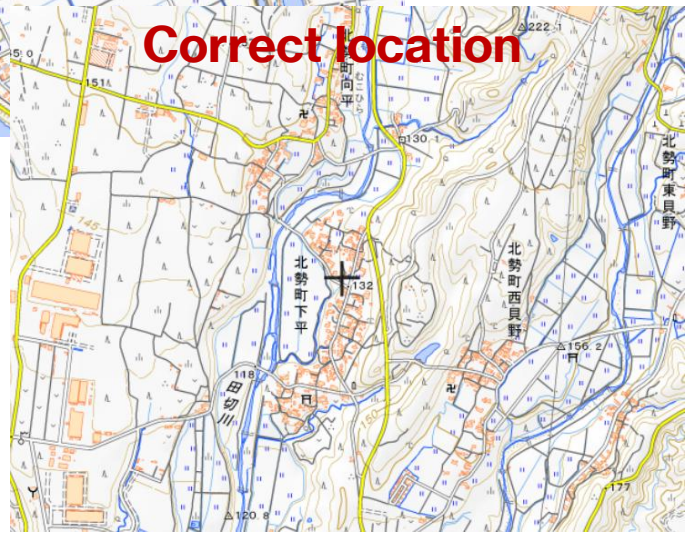


Input require for almost 30 items / phenomenon.

Common mistakes... as an example ...







Regional coordinator

Would you please check your time base or location?

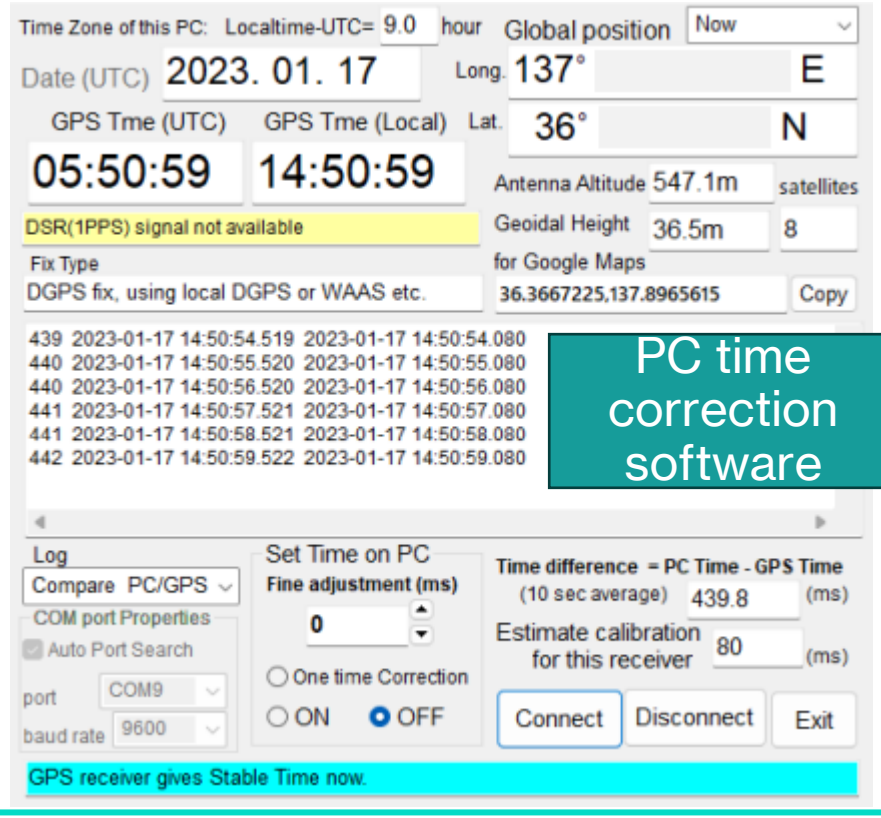
Sorry, I'd used former email as a template. Previous report remained location data of another observation. Correct location is ...

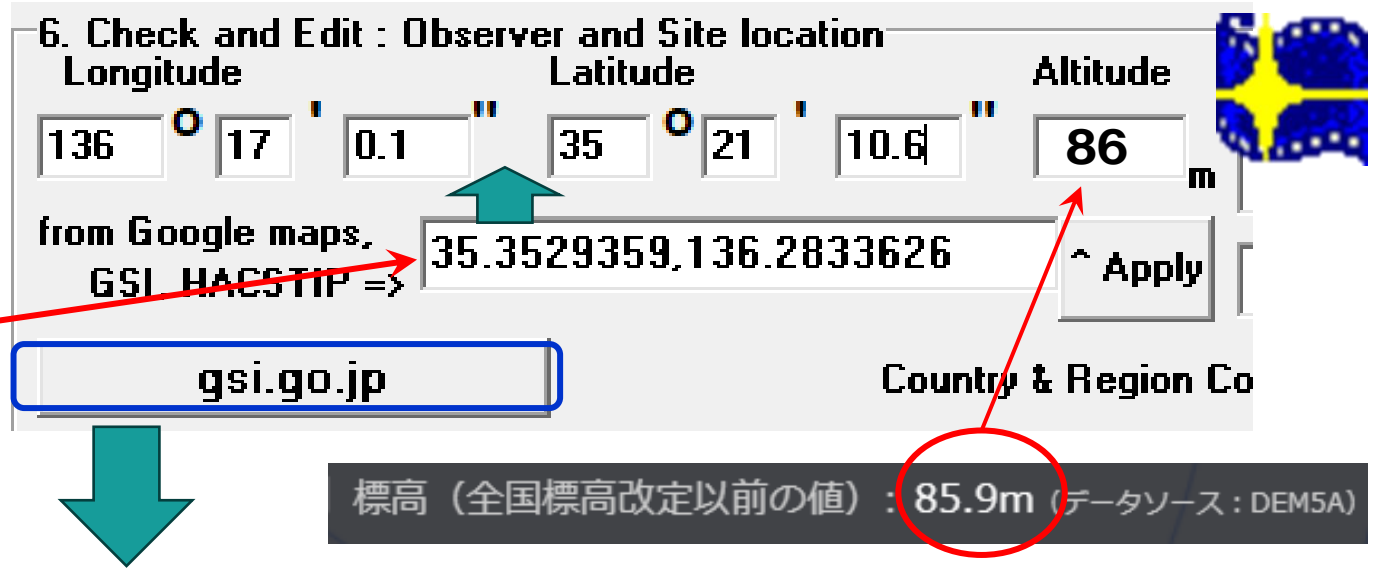
Observer

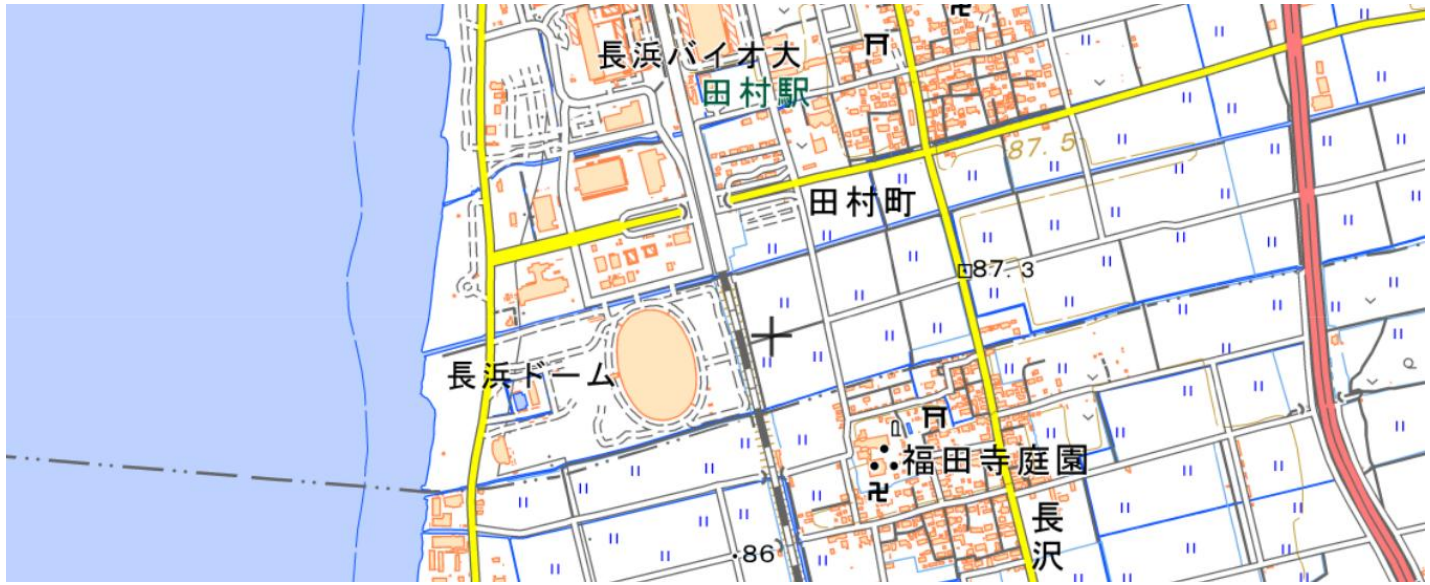
HACSTIP Ver. 2.0.0.6
Date : 2025. 04. 30

GPS-Log

Global Position :
Long. = 136° 17' 0.105" E
Lat = 35° 21' 10.569" N
Long(deg),Lat(deg)= 35.3529359,136.2833626
Antenna Altitude = 102.5m
Geoidal Height = 34.8m
Waves received from 12 Satellites







AsteroidIdentification

1. Load from XML file | or | Paste | Clear | Search: Theobalda | ^ Back | v Forward

2. Select (click) observed Event

```
2025 Aug 17 16.3h UT ,  (16769)1996 UN1 occults UCAC4 451-120626
2025 Aug 17 16.3h UT ,  (0)2016 TA189 occults UCAC4 400-139047
2025 Aug 17 16.3h UT ,  (15765)1992 WU1 occults UCAC4 419-142656
2025 Aug 17 16.3h UT ,  (5829)Ishidagoro occults UCAC4 326-201539
2025 Aug 17 16.3h UT ,  (17520)Hisayukiyoshio occults UCAC4 570-003673
2025 Aug 17 16.3h UT ,  (7697)1989 AE occults UCAC4 445-136526
2025 Aug 17 16.4h UT ,  (666066)2009 WY139 occults UCAC4 309-263567
2025 Aug 17 16.4h UT ,  (609004)2004 RV204 occults UCAC4 433-116244
2025 Aug 17 16.4h UT ,  (339767)2005 SE99 occults TYC 5717-00586-1
2025 Aug 17 16.4h UT ,  (21927)Sarahpierz occults UCAC4 367-174812
2025 Aug 17 16.4h UT ,  (778)Theobalda occults UCAC4 348-191089
2025 Aug 17 16.4h UT ,  (708741 ...12 HX117 occults TYC 5807-00423-1
2025 Aug 17 16.4h UT ,  (97520 ...0 DA18 occults UCAC4 427-125795
2025 Aug 17 16.4h UT ,  (1818 ...9 RD106 occults UCAC4 414-137144
2025 Aug 17 16.4h UT ,  (57404 ...009 VW26 occults UCAC4 283-199462
```

3. Occultation Elements of observed Event

Sourece: JPL#64+INTG:2024-Dec-12

Date / Time: 2025 Aug 17 | 16.4 | UT | Combined(Asteroid + Star) Mag. 13.60 | Mag drop 1.7

Object: (778)Theobalda | Mag 15.34 | Contact angle 0.0 deg.

Target star: UCAC4 348-191089 | B 14.27 | V 13.85 | R 13.25 | B-V 0.42 | Spectrum Type -- | Diameter 0.0 mas

Shadow's Vwlocity: 15555.8 m/sec | Uncertainty (Asteroid + Star) | Max duration | Fresnel number

Distance of Object: 411783098.9 km | 0.0020 arcsec | 3993 m | 3.9 sec | 3777

Diameter of Object: 61.1 km | Semi major | Semi minor | Uncertainty for observaton

RUWE: 4.30 | Error ellipse: 0.0022 | 0.0009 | 0.257 sec | Observation simulation

5. Check and E... | ini file

Automatically set to memory on Limovie

6. Check and Edit : Observer and Site location

Longitude: 136 ° 17 ' 0.3 "

Latitude: 35 ° 21 ' 10.7 "

Altitude: 518 m

observation Site: City Town Village: Nagahama | Prefecture: Shiga

from Google maps, GSI, HACSTIP => 35.352972,136.283415 | ^ Apply | Nagahama, Shiga

gsi.go.jp | Country & Region Code: JP | Japan [JPN]

```
<Occultations>
  <Event>
    <Elements>JPL#1+E
    <Earth>159.2960,-
    <Star>UCAC4 332-0
    <Object>0,2015 VF
    <Orbit>0,227.9402
    <Errors>266.084,0
    <ID>20250801_081596,60820
  </Event>
```

Prediction for whole Japan Aug_2025.xml

20250817_000778_Theobalda_OBS_EA.xml

```
<Observations>
  <FileVersion>2.14</FileVersion>
  <Event>
    <Date>2025|8|17|16.4</Date>
    <Details>
      <Star>UCAC4|348-191089|3|6857164984579417088|2
        <StarIssues>4.30|0|0|0|1.20|10|0.00|0.00|0.0
      <Asteroid>778|Theobalda|-8.77113854|-0.4029192
      <EventFits>
        <SolveFlags>1|1|0|0|1|0|0|0|0</SolveFlags>
        <EllipticFit>-6.5|2.5|73.0|50.1|85.9|3|0|0|0
        <EllipseUncertainty>1.8|2.6|||9.3</EllipseUn
      </EventFits>
    </Details>
    <Observations>
      <Observer>
        <ID>1|Hiroyuki Watanabe||0|Tarui, Gifu|JP|+1
        <Conditions>1|1|5.7||[4.5,6.8:124.0]</Condit
        <D>16 19 21.81|D|0.04||| </D>
        <R>16 19 25.69|R|0.03||| </R>
      </Observer>
      <Observer>
        <ID>2|Miyoshi Ida||0|Higashiomi, Shiga|JP|+1
        <Conditions>1|3|1.5||[1.3,1.6:490.0]</Condit
        <D>16 19 21.9|D|1.5||| </D>
        <R>16 19 27.5|R|1.0||| </R>
      </Observer>
```

Data flow of parameter for making diffraction simulation.

Prediction xml file

OcElmnt20230925.xml

```
Occultations>
<Event>
<Elements>JPL#138:INTG:2023-Aug-22,8.80,2022,2,10,17.656560,0.215801,0.334791,-3.970021,2.566743,-0.003881,0.001150,0.000001,-0.000001</Elements>
<Earth>140.4785,4.1376,-81.30,-14.19,False</Earth>
<Star>TYC 285-00908-1,12.38811596,4.2607798,11.33,10.94,10.40,0.0,0,,12.40697574,4.1375549,2.73,2.82,0,0,0</Star>
<Object>245,Vera,13.59,73.674,2.7141,0,0,-0.860,8.31,,3.8,0</Object>
<Orbit>0,123.4948,2022,2,10,331.6784,61.0483,5.1779,0.19716,3.09802,2.48720,8.01,5.0,0.15</Orbit>
<Errors>1.022,0.0053,0.0006,117,0.0053,Known errors,1.20,0,0,0</Errors>
<ID>20220210_0908-1,60212.47</ID>
</Event>
</Occultations>
```

Distance to asteroid
Shadows velocity
Star's spectrum type
Star's angular diameter

Position of time stamp

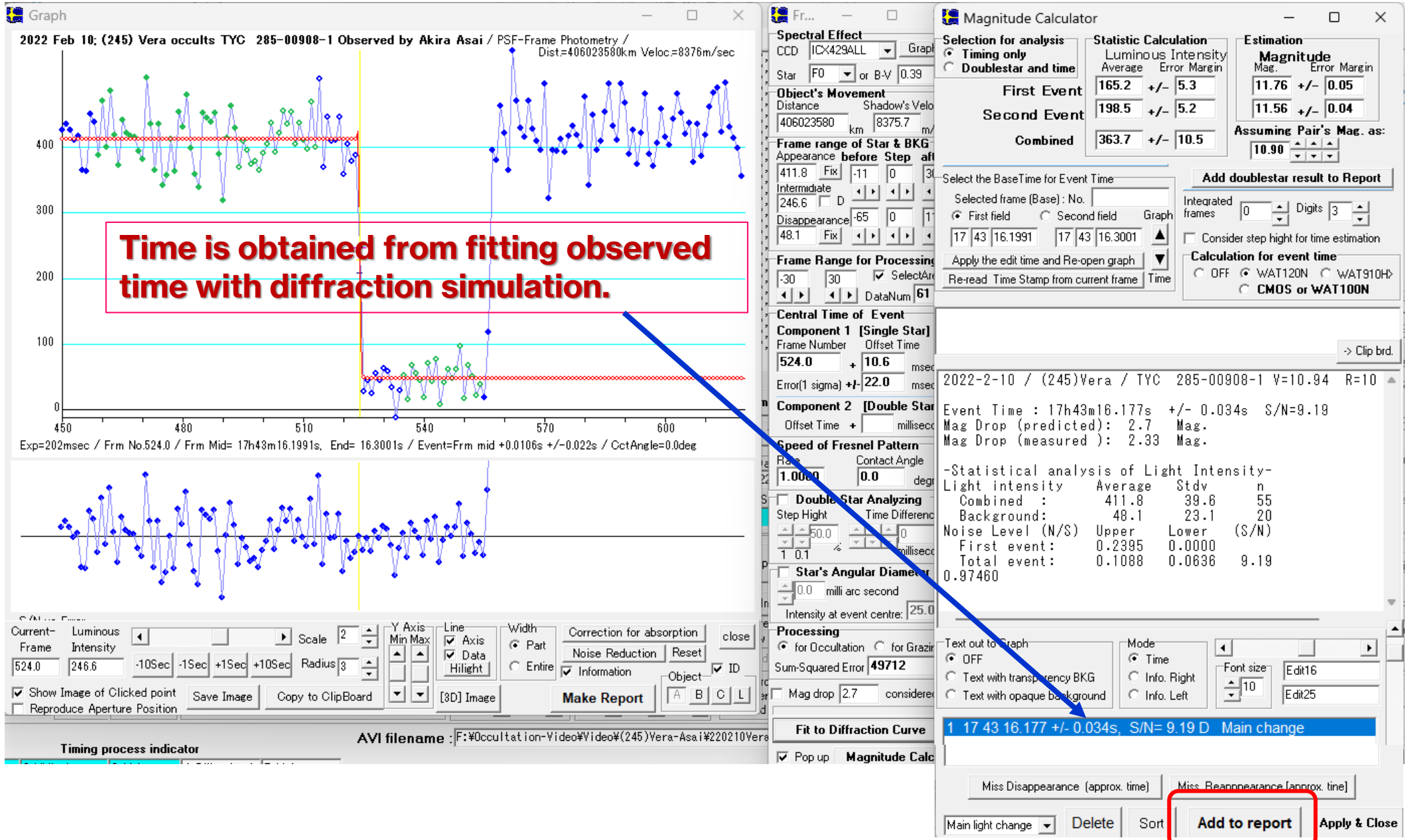
Make simulation

10_25_26Z_.CameraSettings.txt

Camera setting file

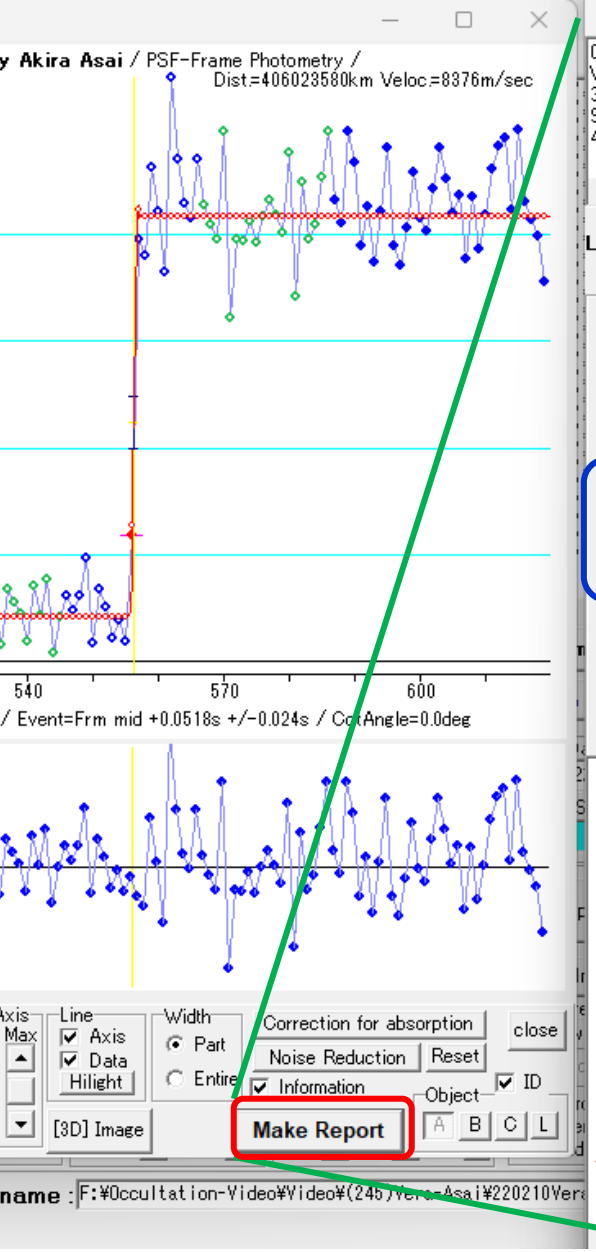
```
ASI462MM]
Binning=2
Capture Area=968x324
Colour Space=MONO8
High Speed Mode=Off
Gain=410
Exposure=8.7000ms
Timestamp Frames=On
Brightness=113
SharpCapVersion=4.0.9538.0
StartCapture=2025-04-04T10:25:26.3016055Z
MidCapture=2025-04-04T10:27:09.1386055Z
EndCapture=2025-04-04T10:28:51.9748957Z
Duration=205.673s
FrameCount=23609
ActualFrameRate=114.7888fps
```

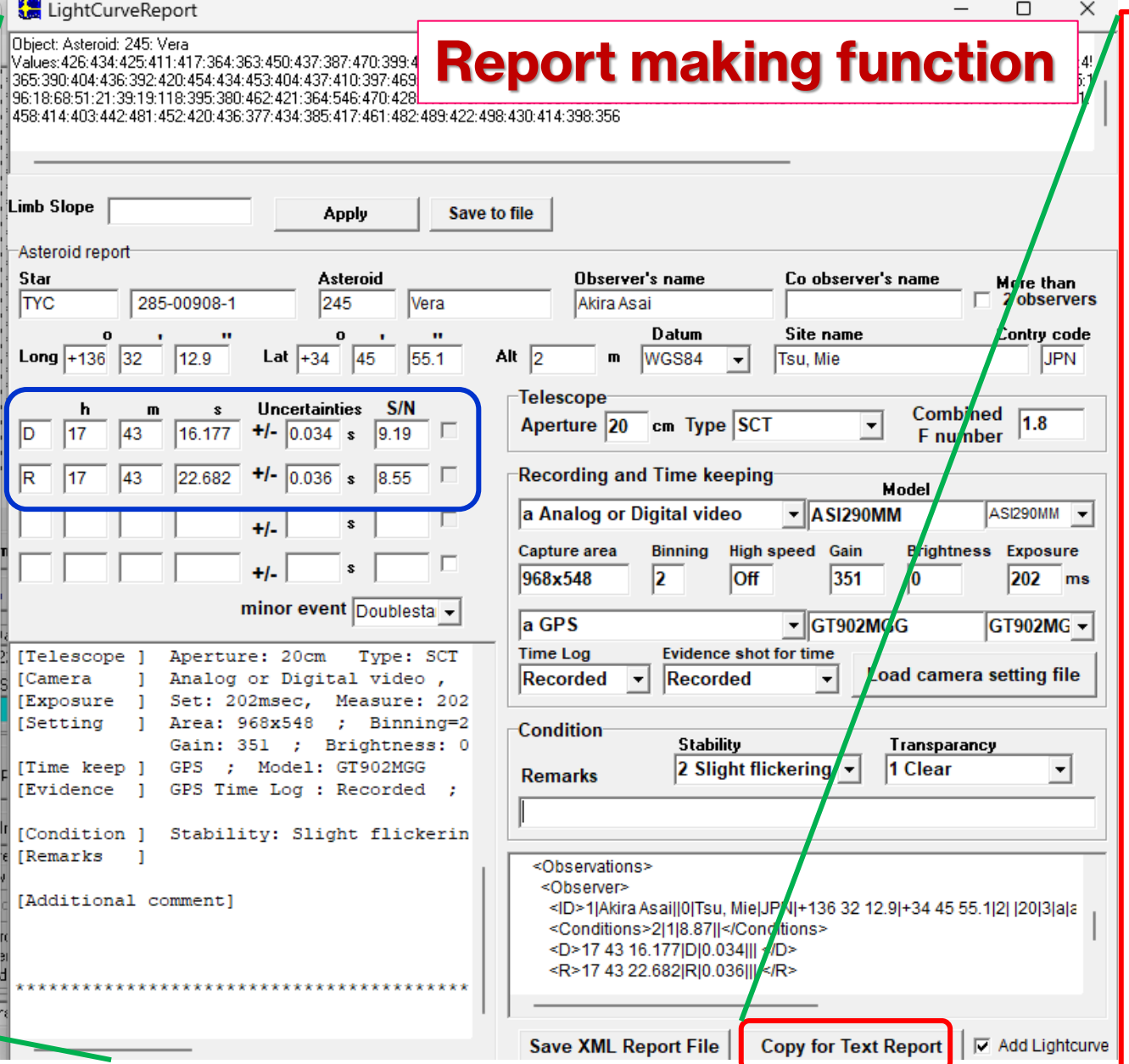
Diffraction simulation curve



with clicking this button...

Limovie remembers measured event time





Report making function

Whole data is copied to clipboard

Report email

<Observations>
<Event>
<Date>2025|3|9|11.9
<Details>
<Star>UCAC4|505-046551|0||0.0000000000|0.000000000|0.00|0.00|0|0.00000000|0.0000000|25.00|25.00|25.00|0</Star>
<Asteroid>1095|Tulipa|0.00000000|0.00000000|0.000|0.0000000|0.0000000|0.0000000|1.00000|0.000.0|1.0|20.00</Asteroid>
</Details>
<Observations>
<Observer>
<ID>1|Hidehito Yamamura||0|Maibara, Shiga|JPN|+136 17 40.4|+35 19 41.8|93| |20|3|a|a</ID>
<Conditions>2|1|6.88||</Conditions>
<D>11 58 34.138|D|0.030||| </D>
<R>11 58 38.536|R|0.048||| </R>
</Observer>
</Observations>
<LastEdited>2023|7|17</LastEdited>
</Event>
</Observations>
****

Text-based Light curve (1095)_20250309_115829_Hidehito_Yamamura.dat

Date: 2025-3-9 11:58:29.80: 16.97: 85
Star: 0: 0: 0: 0: 0-0-0: 505-046551
Observer: +136:17:40.4: +35:19:41.8: 93: Hidehito Yamamura
Object: Asteroid: 1095: Tulipa
Values:580:606:692:559:716:633:729:632:722:775:616:676:546:671:729:581:800:676:654:723:885:154:7163:227:175:202:213:220:150:103:47:174:165:83:78164:227:191:145:262:508:618:650:774:666:773:681:714:757:720:722:638:819:668:649:528:608:638:671:610:666:659:648:595:606:640:626:628:584:572:729:624:573:633:669:678:811:750:536

OBS.xml format report and .dat lightcurve data made by Limovie automatically

Report email

#Automatically, TYPO reduction, A set of data

JOINのみなさま
IOTA/EA惑星・小惑星部局さま

山村です。
遅くなりましたが3/9にありました
((1095)Tulipa によるUCAC4 505-046551
の掩蔽を観測しましたので報告します。

復光部に複数frameあり、forGrazingによりfit、ContactAngle:75.5° になりました。
下記フォルダ中のReportファイルの
(1095)Tulipa25030911_119-Hidehito_Yamamura.xml
については、Limovieの解析中から保存時に、保存がうまく行かなかったので、下記、Textのxmlファイル部分をxml拡張子で保存しました。
うまく、表示されない等の問題がありましたら、再解析等したいと
思います。

☆観測 Report（PDF）を下記にUPしました。
https://u.pcloud.link/publink/show?code=XZSl345ZK7GK7nmRrqpSpDHUKTL8E8iyHDx7

☆aviファイル、観測記録関連ファイルは以下に置きます。
https://u
=kZIx34
2lYrWV

＜報告
＞----------
■2025.3.9 20h58m JST
恒星:UCAC4 505-046551 13.8(合成:13.6)等
赤経:8 h 6m 44.670s 赤緯:10° 53'51.22"(2000)
ｶﾆ座 高度:66° S
小惑星:(1095)Tulipa 15.4等 直径:29km
減光等級:1.8等 継続時間:最長4.6s
掩蔽帯:中部、近畿、
■観測地（WGS84）
滋賀県米原市岩脇 Home
東経:136;17;40.4 北緯:35;19;41.8
標高:93m
■現象時刻（UT）
減光:11h58m34.138s +/- 0.030s
S/N=6.70 1.71 Mag.
復光:11h58m38.536s +/- 0.048s
S/N=7.06 1.61 Mag.
継続時間:ΔT=4.398s
■観測機材、保時
D=20㎝×F3.3Rd 、 STC経緯台(半自動)、 ASI290MM
SarpCap4.0.9571 frame1520x708
Exp:0.202s Gain:430/600
PC同期、LED1pps発光：ｺﾊﾞﾝｻﾞﾒ+HACSTIP
117時報確認、movie記録

Observer can add free text to explain more detail situation etc if necessary.

Configuration data

occultation
Report **********
[Date] 2025 3 9 [Approx hour] 11.9
[Star] UCAC4 505-046551 VMag 13.78 RMag=13.30
[Asteroid] (1095)Tulipa 15.38 mag.
[Observer] 1: Hidehito Yamamura 2:
[Location] Maibara, Shiga, JPN
[Longitude] 136o17'40.4" E
[Latitude] 35o19'41.8" N
[Altitude] 93m
[Datum] WGS84
[Event time] D: 11h58m34.138s +/- 0.030s (UTC) S/N=6.70
R: 11h58m38.536s +/- 0.048s (UTC) S/N=7.06 Ctt=75.5
[Predicted Time error] 0.432 sec [RUWE] 1.00
[Recorded] From 11h57m1s
To 12h0m16s
[Mag. drop] D: Measured: Mag Drop (measured): 1.71 Mag. ; Predicted: Mag Drop (predicted): 1.8 Mag. [for fitting]
R: Measured: Mag Drop (measured): 1.61 Mag. ; Predicted: Mag Drop (predicted): 1.8 Mag. [for fitting]
[Telescope] Aperture: 20cm Type: SCT F=3.3
[Camera] Analog or Digital video , Model= ASI290MM
[Exposure] Set: 202.0msec, Measure: 202msec
[Setting] Area: 1520x708 ; Binning=2 Gain: 430 ; Brightness: 0 ; High Speed Mode: Off
[Time keep] GPS ; Model: GT902MGG
[Evidence] GPS Time Log : Recorded ; Screen shot: Recorded
[Condition] Stability: Slight flickering Transparency: Clear
[Remarks]
[Additional comment] MagDrop,forGrazing(R,only)

OBS xml format

```
<Observations>
  <Event>
    <Date>2025|3|9|11.9</Date>
    <Details>
 <Star>UCAC4|505-046551|0||0.0000000000|0.000000000|0.00|0.00|0.00|0|0.00000000|0.0000000|25.00|25.00|25.00|0</Star>
<Asteroid>1095|Tulipa|0.00000000|0.00000000|0.0000000|0.0000000|0.0000000|0.0000000|1.00000|0.00000|0.0|1.0|20.00</Asteroid>
    </Details>
    <Observations>
      <Observer>
        <ID>1|Hidehito Yamamura||0|Maibara, Shiga|JPN|+136 17 40.4|+35 19 41.8|93| |20|3|a|a</ID>
        <Conditions>2|1|6.88||</Conditions>
        <D>11 58 34.138|D|0.030||| </D>
        <R>11 58 38.536|R|0.048||| </R>
      </Observer>
    </Observations>
    <LastEdited>2023|7|17</LastEdited>
  </Event>
</Observations>
```

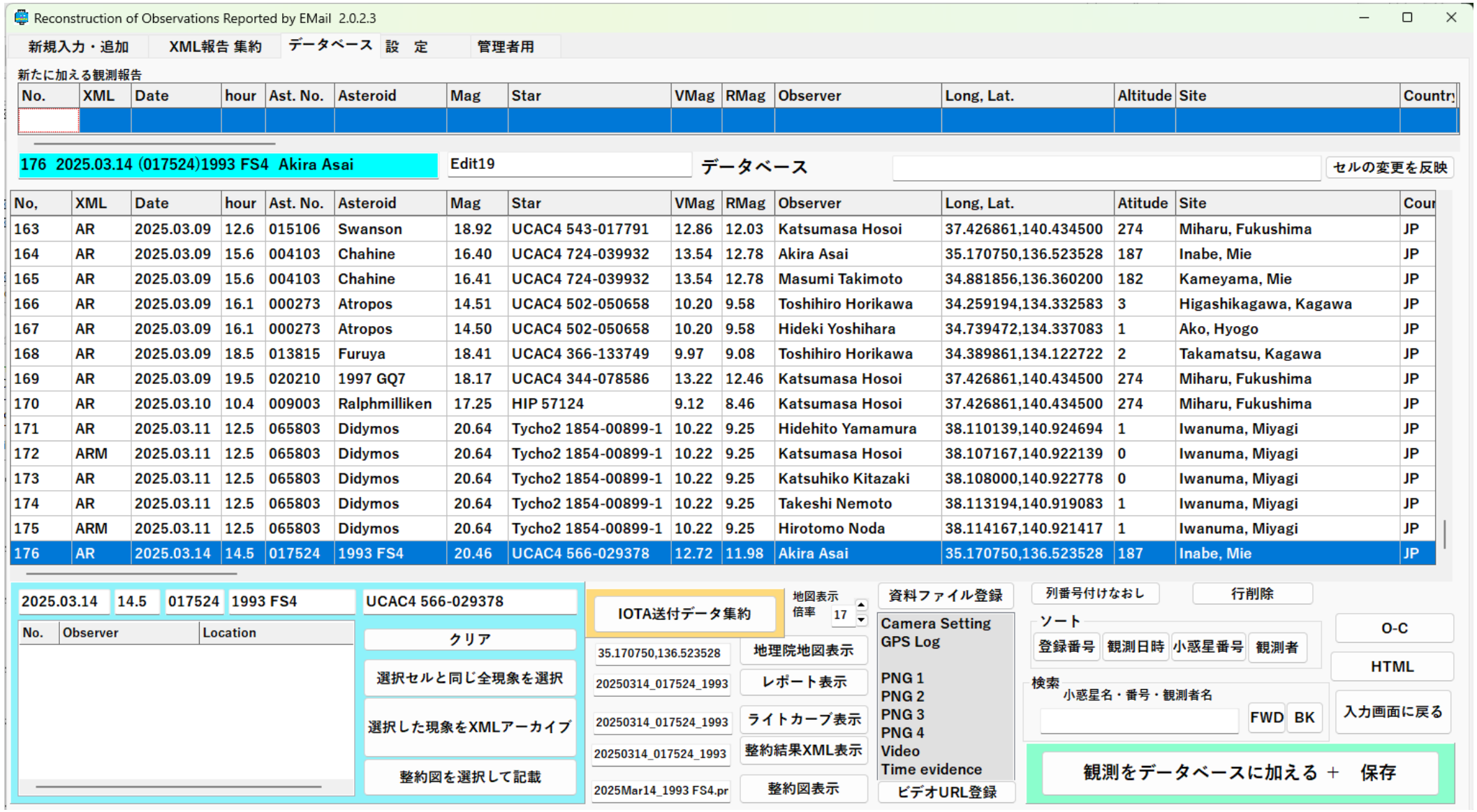
****

.dat format lightcrve

Text-based Light curve
(1095)_20250309_115829_Hidehito_Yamamura.dat

Date: 2025-3-9 11:58:29.80: 16.97: 85
Star: 0: 0: 0: 0: 0-0-0: 505-046551
Observer: +136:17:40.4: +35:19:41.8: 93: Hidehito Yamamura
Object: Asteroid: 1095: Tulipa
Values:580:606:692:559:716:633:729:632:722:775:692:816:676:546:671:729:581:800:676:654:723:885:154:78:30:163:227:175:202:213:220:150:103:47:174:165:83:78:129:164:227:191:145:262:508:618:650:774:666:773:681:714:757:720:722:638:819:668:649:528:608:705:638:671:610:666:659:648:595:606:640:626:628:584:559:572:729:624:573:633:669:678:811:750:536

ROREM as Second Steps to Efficiency



ROREM: Reconstruction of Obesrvation Report via EMail text.

OBS.xml and .dat lightcurve data are extracted from Email from observer.

新規入力・追加 | XML報告 集約 | データベース | 設　定 | 管理者用

Observer List

Extract .dat lightcurve

処理・アーカイブ用データに追加

Text Light curve data　保 存　コピー

先頭フレームの中央時刻　11h 58m 29.800S

Duration（最初のフレームの中央時刻から最後のフレームの中央時刻までの時間）　16.97

フレーム数　85

```
Date: 2025-3-9 11:58:29.80: 16
Star: 0: 0: 0: 0: 0-0-0: 505-0
Observer: +136:17:40.4: +35:19
Object: Asteroid: 1095: Tulipa
Values:580:606:692:559:716:633
```

グラフ表示・保存

Remarks

Can be verified on the GSI map as needed

変更（入力）内容をXMLに反映

国土地理院地図　標高 93 m

緯度'd), 経度(d)　35.328278,136.294556

初期倍率 15　国土地理院地図で確認

メール文を保存するときフォルダとファイル名を確認する　コピー

Copy & paste

```
<Observations>
  <Event>
    <Date>2025|3|9|11.9</Date>
    <Details>

<Star>UCAC4|505-046551|0||0.0000000000|0.000000000|0.00|0.00|0.00|0|0.00000000

<Asteroid>1095|Tulipa|0.00000000|0.00000000|0.0000000|0.0000000|0.0000000|0.00
    </Details>
    <Observations>
      <Observer>
        <ID>1|Hidehito Yamamura||0|Maibara, Shiga|JP|+136 17 40.4|+35
19 41.8|93| |20|3|a|a</ID>
        <Conditions>2|1|6.88||</Conditions>
```

IOTA/EAデータアーカイブ用　推定誤差＝1σ (simulated))　※一般のデータの扱いでは、この形で誤差データが伝達される　コピー

Extract OBS.xml

```
<Observations>
  <Event>
   <Date>2025|3|9|11.9</Date>
   <Details>
     <Star>UCAC4|505-046551|0||0.0000000000|0.000000000|0.00|0.00|0.00|0|0.000
     <Asteroid>1095|Tulipa|0.00000000|0.00000000|0.0000000|0.0000000|0.0000000
   </Details>
   <Observations>
     <Observer>
       <ID>1|Hidehito Yamamura||0|Maibara, Shiga|JP|+136 17 40.4|+35 19 41.8|9
       <Conditions>2|1|6.9||[6.7,7.1:202.0]</Conditions>
       <D>11 58 34.138|D|0.030||| </D>
       <R>11 58 38.536|R|0.048||| </R>
     </Observer>
```

IOTA中央への報告用　(推定誤差＝3.0σ)　※一般のデータの扱いでは、通常は使われない　コピー

```
<Observations>
  <Event>
   <Date>2025|3|9|11.9</Date>
   <Details>
```

Next process

S/N
D1: 6.7
R1: 7.1

アーカイブ
- [x] IOTA/EA向け（常時）
- [ ] IOTAデータCentre向け

このタブ内のデータを「読み込み・保存」タブのデータに追加します。

Uncertainty
from Orbit uncertainty [1σ] 0.432 sec

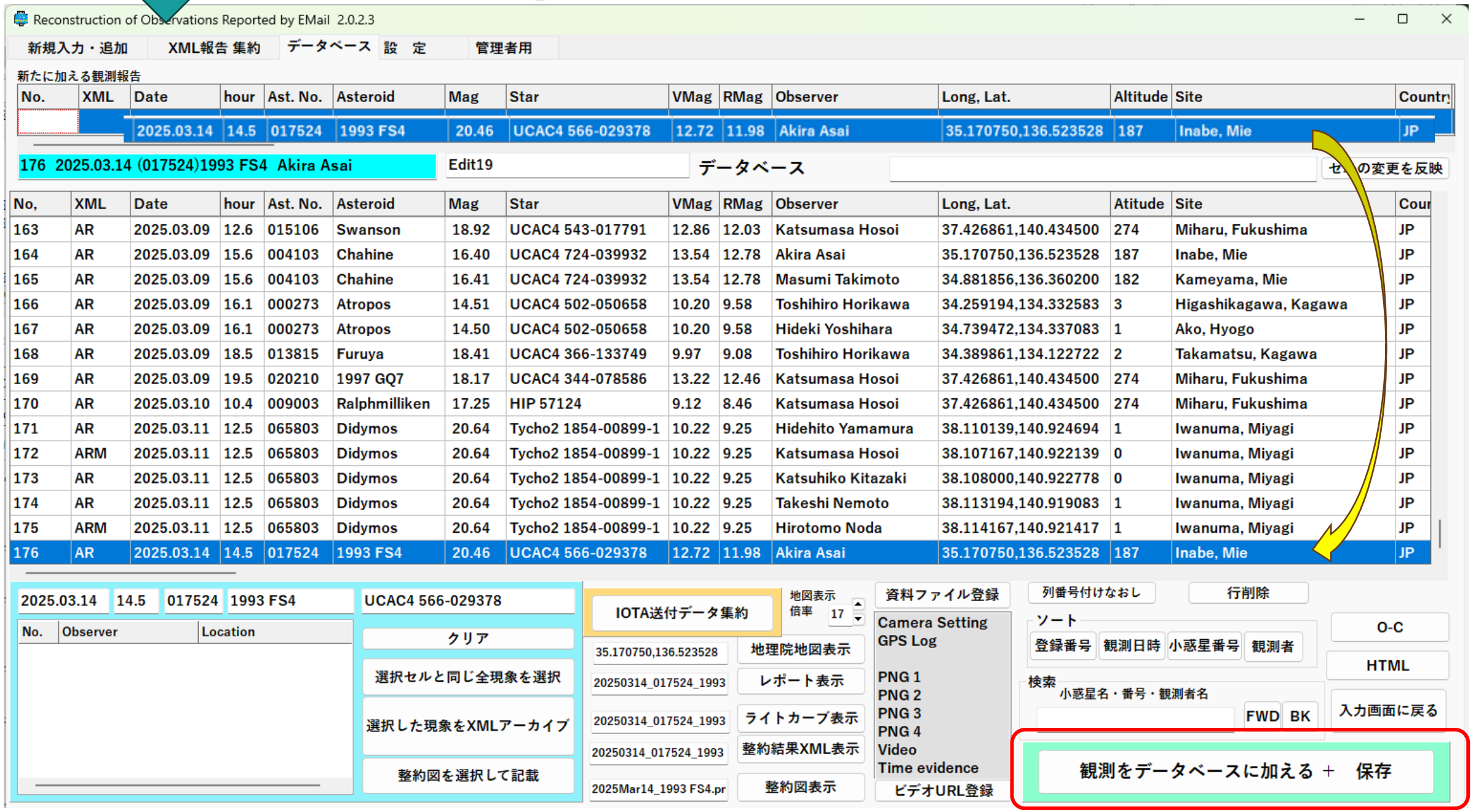
IOTA 3σ	EA simulated 1σ
D1: 0.086sec	D1: 0.030sec
R1: 0.090sec	R1: 0.048sec

観測者 Hidehito Yamamura
観測地 Maibara, Shiga
国記号 JP　修正
現象　日時 2025. 3. 9 11.9h
(1095)Tulipa 15.38 mag.
UCAC4 505-046551 VMag=13.78 RMag=13.30
予報減光量 1.8 mag
フレーム露光時間 202.0 msec

O-C Edit53 sec　Check event time

操作　0. クリア（必要に応じて）
1. メール本文を「すべて選択」
2. 貼り付け・処　理
3. データベースに保存

Save a report as a line of record on database



Automatically consolidate multiple observations into a single XML file.

TextViewer

```
      <MPC>||</MPC>
    </Astrometry>
  </Details>
  <Observations>
    <Observer>
      <ID>1|Hiroyuki Watanabe||0|Tarui, Gifu|JP|+136 29 43.6|+35
      <Conditions>1|1|5.7|||[4.5,6.8:124.0]</Conditions>
      <D>16 19 21.81|D|0.04||| </D>
      <R>16 19 25.69|R|0.03||| </R>
    </Observer>
    <Observer>
      <ID>2|Miyoshi Ida||0|Higashiomi, Shiga|JP|+136  6 54.1|+35
      <Conditions>1|3|1.5|||[1.3,1.6:490.0]</Conditions>
      <D>16 19 21.9|D|1.5||| </D>
      <R>16 19 27.5|R|1.0||| </R>
    </Observer>
    <Observer>
      <ID>3|Akira Asai||0|Inabe, Mie|JP|+136 31 24.7|+35 10 14.7|
      <Conditions>2|1|5.9|||[5.6,6.2:253.0]</Conditions>
      <D>16 19 21.02|D|0.07||| </D>
      <R>16 19 25.44|R|0.06||| </R>
    </Observer>
    <Observer>
      <ID>4|Masumi Takimoto||0|Kameyama, Mie|JP|+136 21 36.7|+34
      <Conditions>|||3.7|||[3.6,3.8:338.0]</Conditions>
      <D>16 19 21.45|D|0.12||| </D>
      <R>16 19 24.82|R|0.11||| </R>
    </Observer>
    <Observer>
      <ID>5|Toshihiro Horikawa||0|Takamatsu, Kagawa|JP|+133 57 26
```

Predicted Mag drop | Set | XML緯度並べ替え | コピー

Edit3 | 保　存 | VirtBarCont

P:¥ROREMDB¥04EA-XML¥20250817_000778_Theobalda_OBS_EA.xml

338	ARC	2025.08.17	16.4	000778	Theobalda	15.33	UCAC4 348-191089	13.85	13.25	Toshihiro Horikawa
339	ARC	2025.08.17	16.4	000778	Theobalda	15.33	UCAC4 348-191089	13.85	13.25	Hiroyuki Watanabe
340	ARC	2025.08.17	16.4	000778	Theobalda	15.34	UCAC4 348-191089	13.85	13.25	Akira Asai
341	ARC	2025.08.17	16.4	000778	Theobalda	15.34	UCAC4 348-191089	13.85	13.25	Masumi Takimoto
342	ARC	2025.08.17	16.4	000778	Theobalda	15.34	UCAC4 348-191089	13.85	13.25	Miyoshi Ida
343	A	2025.08.18	11.6	003885	Bogorodskij	17.65	UCAC4 362-079428	12.97	12.05	Toshihiro Horikawa

Email from observer

Email from observer

Email from observer

Email from observer

Recorded on ROREM's Database

2025.08.17 | 16.4 | 000778 | Theobalda

No.	Observer	Location
338	Toshihiro Horikawa	Takamatsu, Kagawa
339	Hiroyuki Watanabe	Tarui, Gifu
340	Akira Asai	Inabe, Mie
341	Masumi Takimoto	Kameyama, Mie
342	Miyoshi Ida	Higashiomi, Shiga

UCAC4 348-191089

クリア

Correct event same as selected record

Marge and archive xml data from selected event

整約図を選択して記載

Reduction by OCCULT4

ROREM

							Tycho2 1271-00679-1	8.30	7.92	Toshihiro Horikawa		34.065417,134.178583	45	Mima, Tokushima
						.04	Tycho2 0619-00394-1	10.38	10.14	Hiroyuki Tomioka		36.602278,140.649056		
						.33	UCAC4 348-191089	13.85	13.25	Toshihiro Horikawa		34.286111,133.957361		
339	ARC	2025.08.17	16.4	000778	Theobalda	15.33	UCAC4 348-191089	13.85	13.25	Hiroyuki Watanabe		35.394806,136.495444	105	Tarui, Gifu
340	ARC	2025.08.17	16.4	000778	Theobalda	15.34	UCAC4 348-191089	13.85	13.25	Akira Asai		35.170750,136.523528	187	Inabe, Mie
341	ARC	2025.08.17	16.4	000778	Theobalda	15.34	UCAC4 348-191089	13.85	13.25	Masumi Takimoto		34.881856,136.360200	182	Kameyama, Mie

2025.08.17 | 16.4 | 000778 | Theobalda | UCAC4 348-191089 | IOTA送付データ集約 | 地図表示 倍率 17 | 資料ファイル登録 | 列番号付けなおし | 行削除 | 返信定型文 | ソート

The key word of xml file is copied to clipboard automatically.

When open xml file by OCCULT4, search the file by Windows system.

Specify file to READ asteroidal observations from

検索場所: 04EA_XML

Theobalda

整理

Dropbox

20250817_000778_Theobalda_OBS_EA.xml

```
<Observations>
 <FileVersion>2.14</FileVersion>
 <Event>
  <Date>2025/8/17 16.4</Date>
```

OCCULT4

This function makes minimized the number of steps required to load into OCCULT.

Asteroid observations editor : File = 20250817_000778_Theobalda_OBS_EA.xml

Plot event | Solutions... | List... | Help

Year 2025 | Mth 8 | Day 17 | Approximate mid-time (hh.h) Hrs 16.4 | Prediction

Catalogue UCAC4 | Number 348 - 191089 | Get details | RA = 20 49 43.07068 | Dec = -20 25 9.3763 | Mv = 13.85 GaiaEDR3

Asteroid: Asteroids / Planets / Comets | DAMIT ISAM | single asteroid | Number 778 or Name Theobalda | Get details | dX= -15.540 km/s dY= -0.714km/s | π =3.1949" -0.1mas/hr Mv: 15.11 | Dia: 61 ±3 km = 30.6 mas

Observer: Name 1 Hiroyuki Watanabe | Optional Name 2 | More than 2 observers | located near Tarui, Gifu | 2 or 3 letter country or state JP | Aperture 35 cm SCT | E. Longitude 136 29 43.6 dms | Latitude 35 23 41.3 dm.m | d.dd | Datum WGS84 | Altitude 105 m / ft

Times [UT]:

	h	m	s	+/-	PEq	Wt
D	16	19	21.81	0.04		
R	16	19	25.69	0.03		

Clouded out | Time shift (sec)

Event qualifier: No occn detected | Companion (2nd) star | unseen Satellite parent | Prediction | Ring | Satellite

Conditions: Method Analogue | Time GPS | Signal-to-No | Stab | Transpare | Free text [4.5,6.8:124.0] | Include in soluti

Added : 2025 Aug 2

Mag. drop : 1.6 (76%)

RUWE = 4.30

Current Solution : 79.4 x 47.5 km, PA 82.2 : Reli

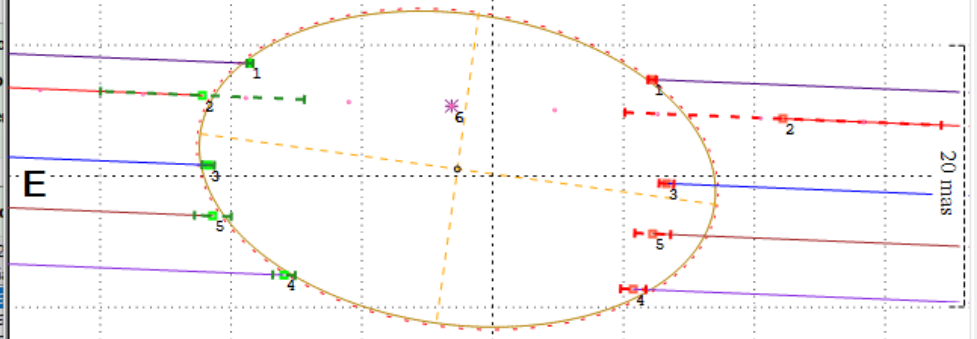
```
1Hiroyuki Watanabe,Tarui, Gifu,JP      +1362943.6 +352341.3  105  35311a161921.81D0.04   16
2Miyoshi Ida,Higashiomi, Shiga,JP      +136 654.1 +3512 6.1   85  20313a161921.9 D1.5    16
3Akira Asai,Inabe, Mie,JP              +1363124.7 +351014.7  187  35321a161921.02D0.07   16
4Masumi Takimoto,Kameyama, Mie,JP      +1362136.7 +345254.7  182  406  a161921.45D0.12   16
5Toshihiro Horikawa,Takamatsu, Kagawa,J+1335726.5 +341710.0   36  30613a161931.55D0.17   16
6Predicted,,                           +156 0 0.  +421439.          161828.56P          16
```

Plot event observations : Occult v.4.2025.8.23

with Plot... | Plot options... | Help

(778) Theobalda 2025 Aug 17 79.4 ±5

Geocentric X 2942.3 ±2.1 Y 4912.5 ±



Major axis (km) 79.4 | -3.1 | dia = 61.4 km

Minor axis (km) 47.5 | 5.4 | a/b: 1.67, dMag: 0.56

Orientation 82.2 | 8.0 | Motion: 15.85 km/s

Circular | Use assumed dia (61.1 km) | Include Miss events

Double stars - show: Both / Primary / Secondary

Quality of the fit: Reliable size. Can fit to shape models

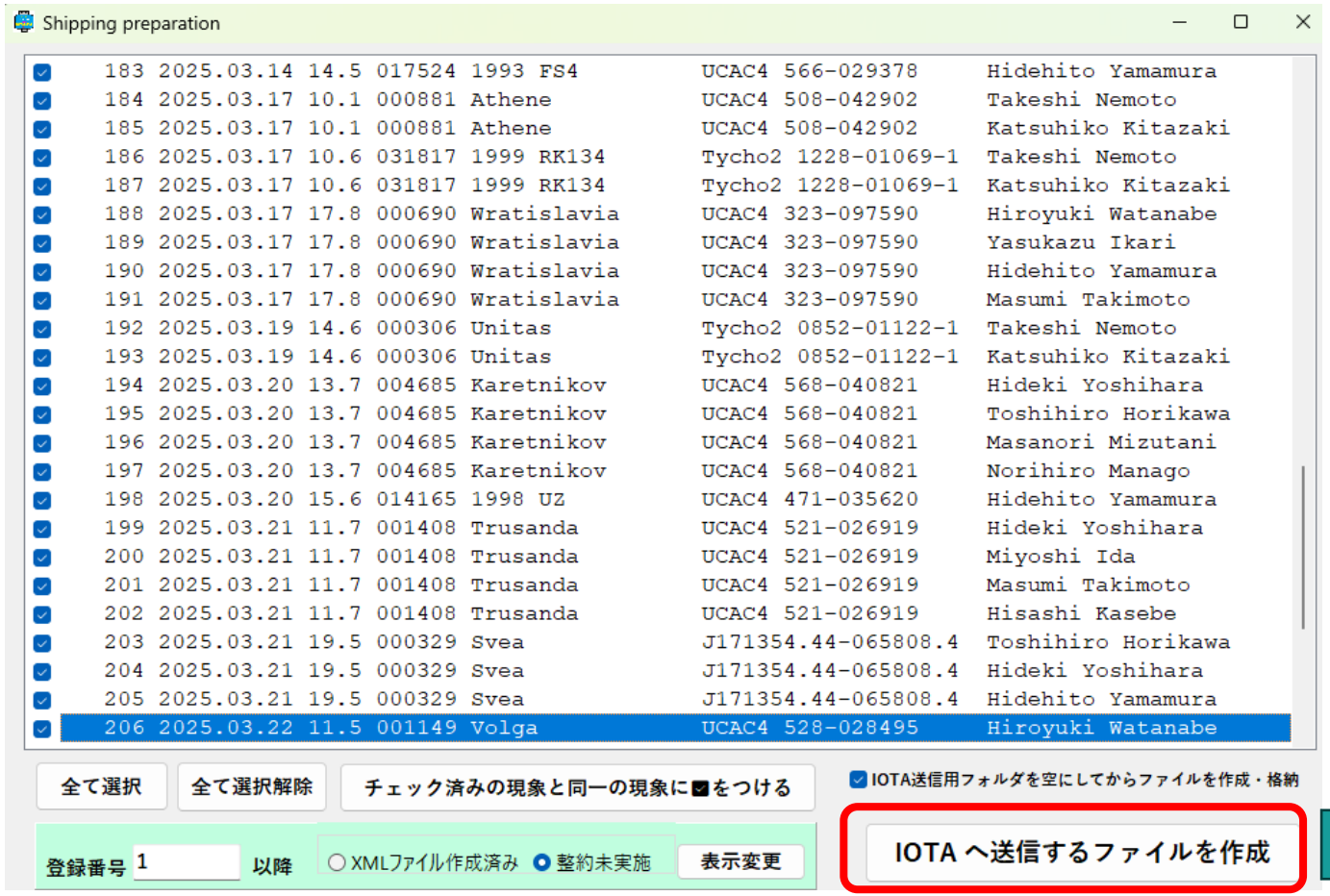
Flag for future review

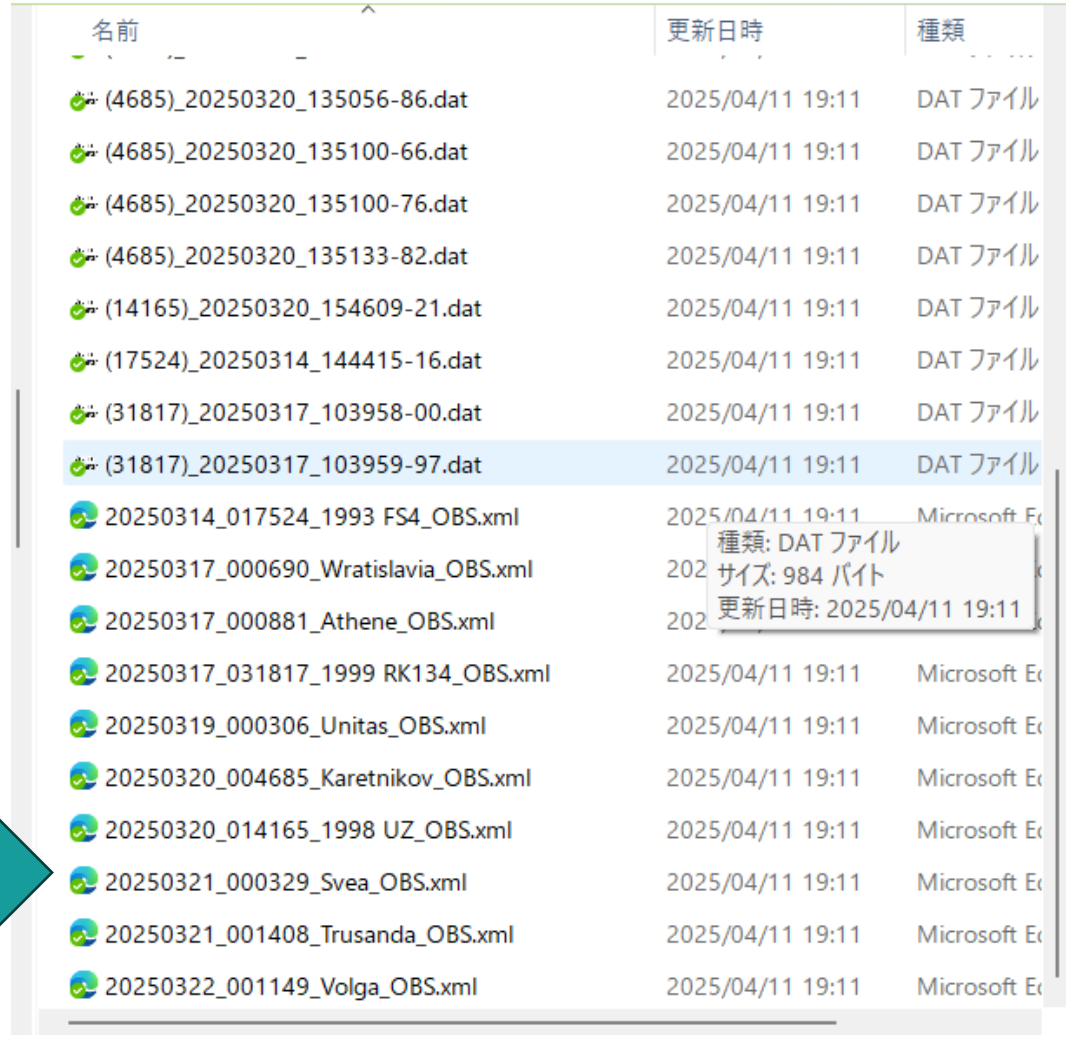
PLOT: Scale | Size normal / x 2 / x 5 | Form opacity | Scroll range x1.25

RMS fit 0.0 ±5.4 km

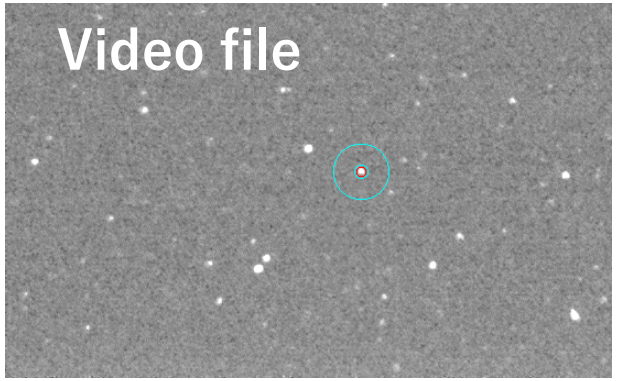
1 Hiroyuki Watanabe, near
2 Miyoshi Ida, near Higas
3 Akira Asai, near Inabe,
4 Masumi Takimoto, near K
5 Toshihiro Horikawa, nea
6(P) Predicted

Make a monthly report files for IOTA center automatically





Processing for above usually requires less than 0.2 seconds.



Camera setting

[ZWO ASI290MM]
#Output Format=AVI files (*.avi)
#Binning=2
#Capture Area=1520x708
#Colour Space=MONO8
#Temperature=32.8
#High Speed Mode=Off
#Frame Rate Limit=Maximum
#Gain=494
#Exposure=165.0000ms
#Timestamp Frames=On
#Brightness=171
#Notes

GPS Log.

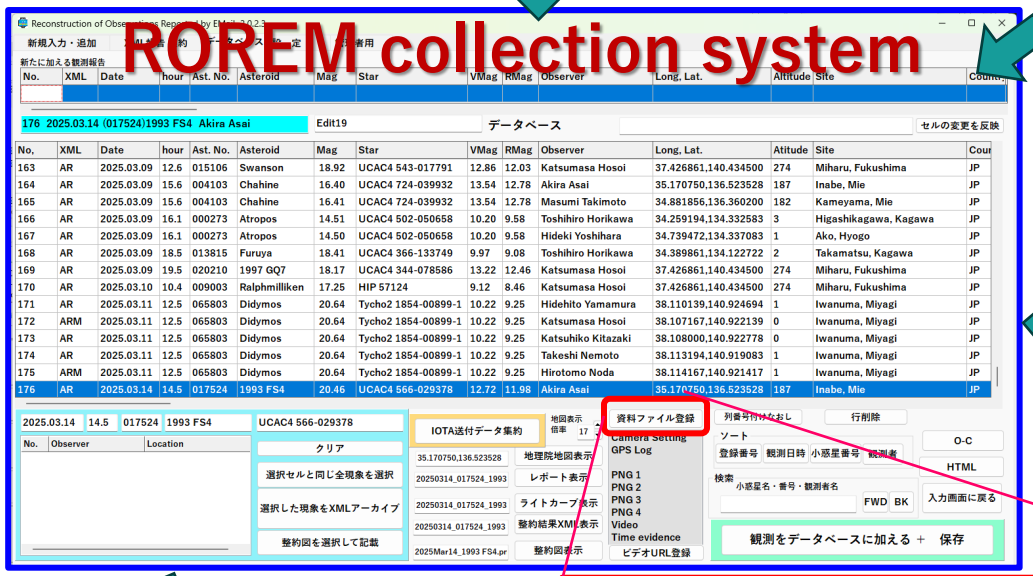
HACSTIP Ver. 2.0.0.6
Date : 2025. 08. 24
Global Position :
Long. = 136° 10' 1.629" E
Lat = 35° 4' 25.812" N
Long(deg),Lat(deg)=
35.0738367,136.1671192Antenna
Altitude = 116.3m
Geoidal Height = 34.8m
Waves received from 12 Satellites
GPS Time Log :[Time difference (ms)] = [PC Time] - [GPS Time]
0.00 2025-08-25 02:36:59.000 2025-08-25 02:36:59.000 Set_PC_Time
- 0.00 2025-08-25 02:36:59.999 2025-08-25 02:37:00.000 Set_PC_Time
- -0.01 2025-08-25 02:37:00.999 2025-08-25 02:37:01.000 Set_PC_Time

0.00 2025-08-25 02:37:01.999 2025-08-25 02:37:02.000 Set_PC_Time

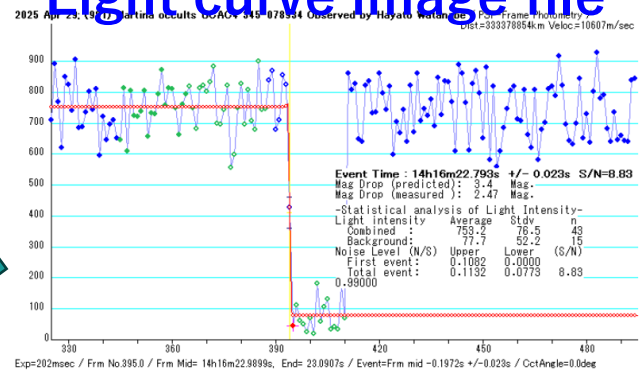
CSV measurement result

No.	Time Detect Signal1	Si	H	M	S	Center of Frame	End of Frame	S/N /F	Measu Object	##### Object	Result Object	FWHM/HFD Object	Object	Object
1	41.6		14	22	30.3346	30.3733		792.4	492.9	-30.5	5.675	6.052	6.523	
2	42.1		14	22	30.4119	30.4506		594.6	751.9	-16.4	5.675	6.052	6.523	
3	41.7		14	22	30.4892	30.5279		594.5	698.2	59.5	5.675	6.052	6.523	
4	42.7		14	22	30.5665	30.6052		588.2	733.9	114	5.675	6.052	6.523	
5	42.4		14	22	30.6438	30.6825		575.6	586.8	-8.5	5.675	6.052	6.523	

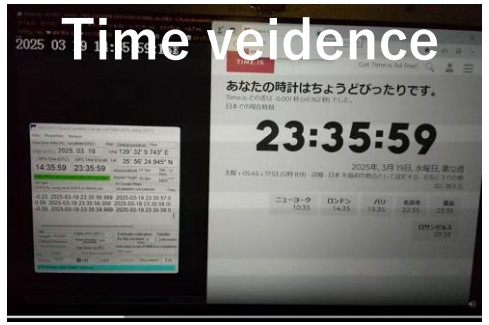
OREM collection system

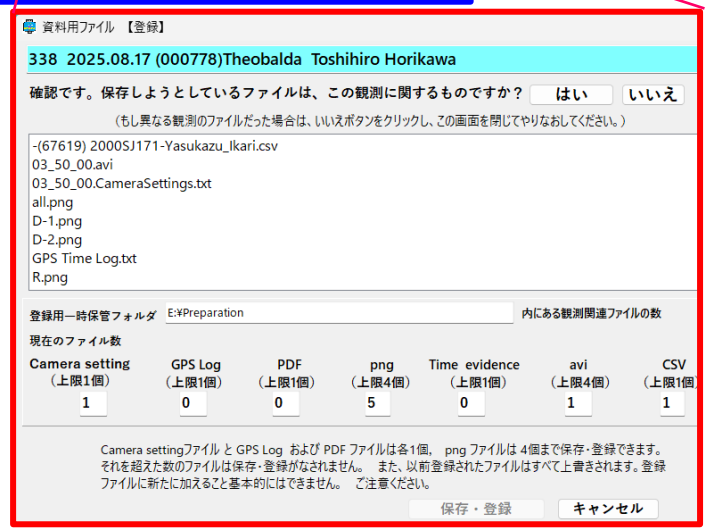


Light curve image file



Time veidence





Database Structure of a record (Improvements are currently ongoing)

0	Number	
1	Indicator	☆
2	Date	☆
3	Hour	☆
4	Asteroid Number	☆
5	Asteroid Name	☆
6	Asteroid Magnitude	☆
7	Star catalogue number	☆
8	Star Vmag	☆
9	Star RMag	
10	Observer Name	☆
11	Co observer	☆
12	Lat Long	☆
13	Altitude	☆
14	Location	☆
15	Country code	☆
16	Exposure	
17	Prediction orbit uncertainty	
18	Pred Drop	
19	O-C	
20	D1 Time	☆
21	D1 Error	☆
22	D1 S/N	☆
23	D1 Ctt	
24	R1 Time	☆
25	R1 Error	☆
26	R1 S/N	☆
27	R1 Ctt	
28	D2 Time	+
29	D2 Error	+
30	D2 S/N	+
31	D2 Ctt	
32	R2 Time	+
33	R2 Error	+
34	R2 S/N	+
35	R2 Ctt	
36	D3 Time	+
37	D3 Error	+
38	D3 S/N	+
39	D3 Ctt	
40	R3 Time	+
41	R3 Error	+
42	R3 S/N	+
43	R3 Ctt	
44	D4 Time	+
45	D4 Error	+
46	D4 S/N	+
47	D4 Ctt	
48	R4 Time	+
49	R4 Error	+
50	R4 S/N	+
51	R4 Ctt	
52	D5 Time	+
53	D5 Error	+
54	D5 S/N	+
55	D5Ctt	
56	R5 Time	+
57	R5 Error	+
58	R5 S/N	+
59	R5 Ctt	
60	D6 Time	+
61	D6 Error	+
62	D6 S/N	+
63	D6 Ctt	
64	R6 Time	+
65	R6 Error	+
66	R6 S/N	+
67	R6 Ctt	
68	D7 Time	+
69	D7 Error	+
70	D7 S/N	+
71	D7Ctt	
72	R7 Time	+
73	R7 Error	+
74	R7 S/N	+
75	R7 Ctt	
76	D8 Time	+
77	D8 Error	+
78	D8 S/N	+
79	D8 Ctt	
80	R8 Time	+
81	R8 Error	+
82	R8 S/N	+
83	R8 Ctt	
84	Telescope Aperture	☆
85	FRatio	
86	Telescope Type	☆
87	Camera	
88	Bit	
89	Area	
90	Binning	
91	Gain	
92	Brightness	
93	High speed mode	
94	GPS Model	
95	Time Log	
96	Screen shot	
97	Stability	☆
98	Trasparency	☆
99	Remarks	☆
100	Report file	
101	Light curve file	★
102	xml file for IOTA/EA	★
103	Sky plane plot (result of reduction)	
104	Camera setting	
105	GPS Log	
106	PDF	
107	png1	
108	png2	
109	png3	
110	png4	
111	Video file	
112	avi url	
113	Time confirmation video	
114	CSV	
115	Sent	
116	Message	
117		
118		
119		
120		

It is important hat the sharing data with many people and encourage its use

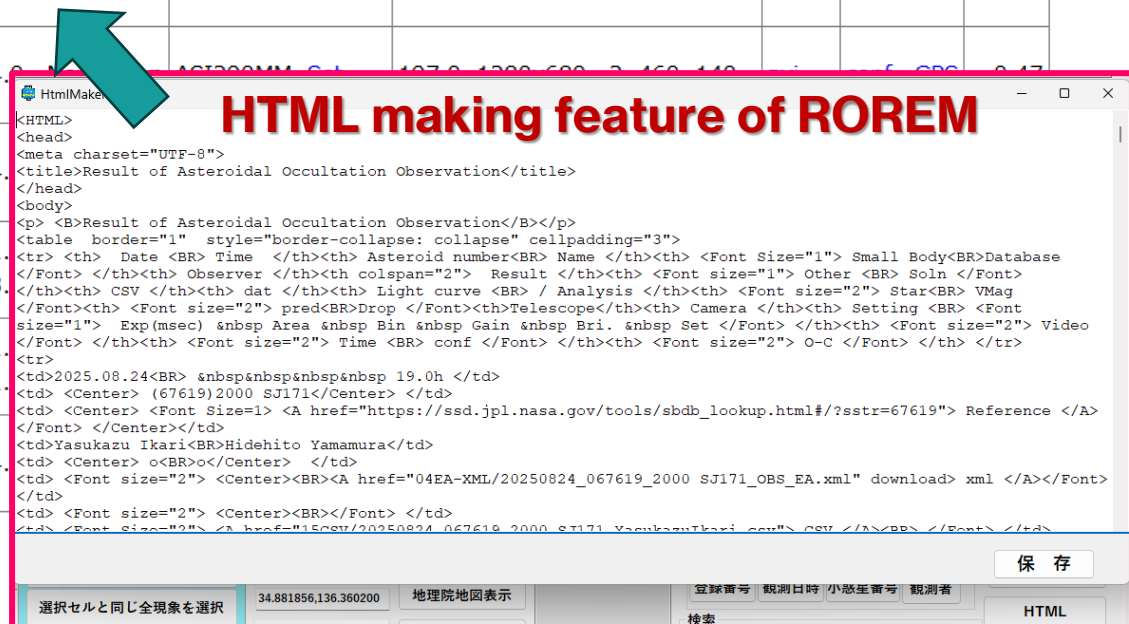
ROREM has HTM making feature instantaneously and automatically.

Processing requires only one click and time less than 0.5 seconds.

Result of Asteroidal Occultation Observation

Date Time	Asteroid number Name	Observer	Result		Light curve / Analysis	Star VMag	pred Drop	Telescope	Camera	Setting Exp(msec) Area Bin Gain Bri. Set	Video	Time conf	O-C
2025.03.14 14.5h	(017524)1993 FS4	Hidehito Yamamura Hayato Watanabe Akira Asai	o o o	Plot xml	PDF 1 2 3 4 1 2 3 4	12.72	7.7	20cm F3.3 SCT 20cm F4.0 SCT 35cm F1.7 SCT	ASI290MM ASI290MM Set ASI290MM Set	86.5 1504x660 2 436 122 124.0 1280x400 2 470 100 112.0 640x480 2 406 31	avi avi	conf GPS GPS conf GPS	0.97 0.92
2025.03.11 12.5h	(065803)Didymos	Takeshi Nemoto Katsuhiko Kitazaki Katsumasa Hosoi Hidehito Yamamura	o o - o	Plot xml	PDF 1 2 3 4 PDF 1 2 3 4 PDF 1 PDF 1 2 3 4	10.22	10.4	25cm F2.5 Newtonian 28cm F2.1 SCT 25cm F4.0 Newtonian 20cm F3.3 SCT	ASI290MM Set ASI290MM Set ASI290MM Set ASI290MM Set	14.3 800x480 2 440 140 13.0 1936x600 2 440 153 13.0 1280x512 2 400 90 15.4 1800x420 2 532 75	avi avi avi avi	conf GPS conf GPS conf GPS conf GPS	-0.02 -0.02 -0.02
2025.03.10 10.4h	(009003)Ralphmilliken	Katsumasa Hosoi	o	Plot xml	PDF 1 2 3	9.12	8.1	25cm F4.0 Newtonian	ASI290MM Set	34.4 1600x600 2 380 90	avi	conf GPS	0.51
2025.03.09 19.5h	(020210)1997 GQ7	Katsumasa Hosoi	o	Plot xml	PDF 1 2 3 4	13.22	5.0	25cm F4.					
2025.03.09 18.5h	(013815)Furuya	Toshihiro Horikawa	o	Plot xml	1 2 3 4	9.97	8.4	20cm F4.					
2025.03.09 16.1h	(000273)Atropos	Hideki Yoshihara Toshihiro Horikawa	o o	Plot xml	1 2 3 4 1 2 3 4	10.20	4.3	20cm F1. 20cm F3.					
2025.03.09 15.6h	(004103)Chahine	Masumi Takimoto Akira Asai	o o	Plot xml	1 2 3 4 1 2 3 4	13.54	2.9	40cm F1. 35cm F1.					
2025.03.09 12.6h	(015106)Swanson	Katsumasa Hosoi	o	Plot xml	PDF 1 2 3	12.86	6.1	25cm F4.					

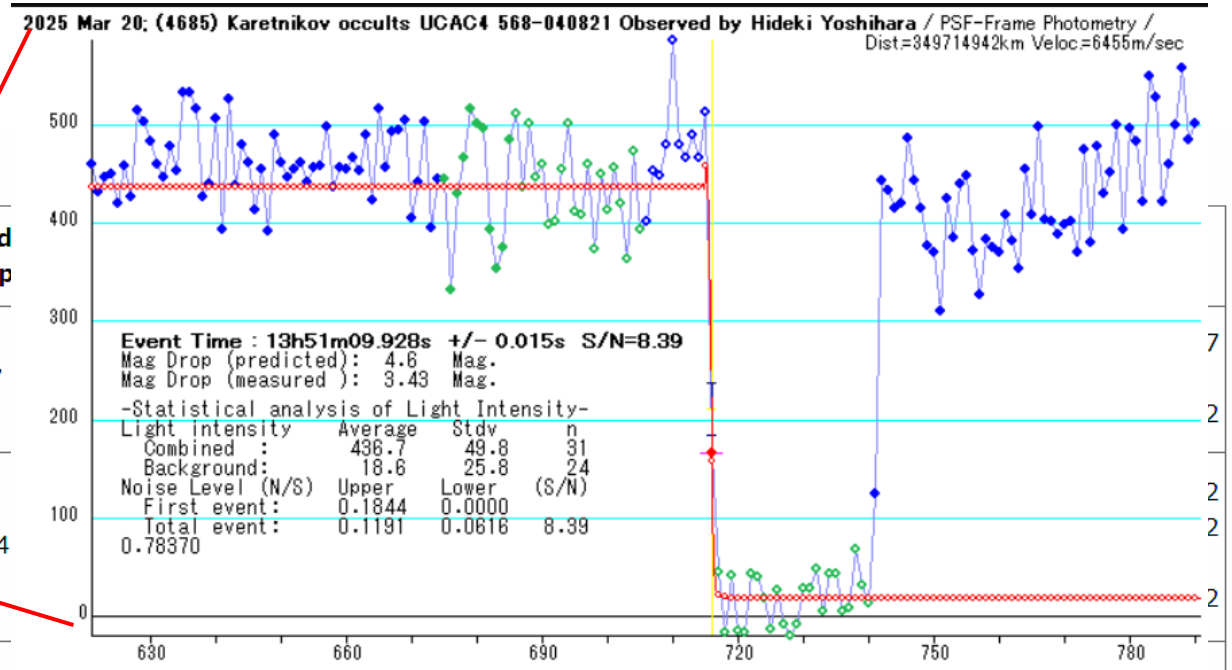
HTML making feature of ROREM



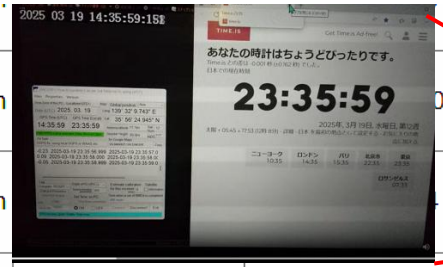
On this web site, you can see various data (image, numerous data etc.) .

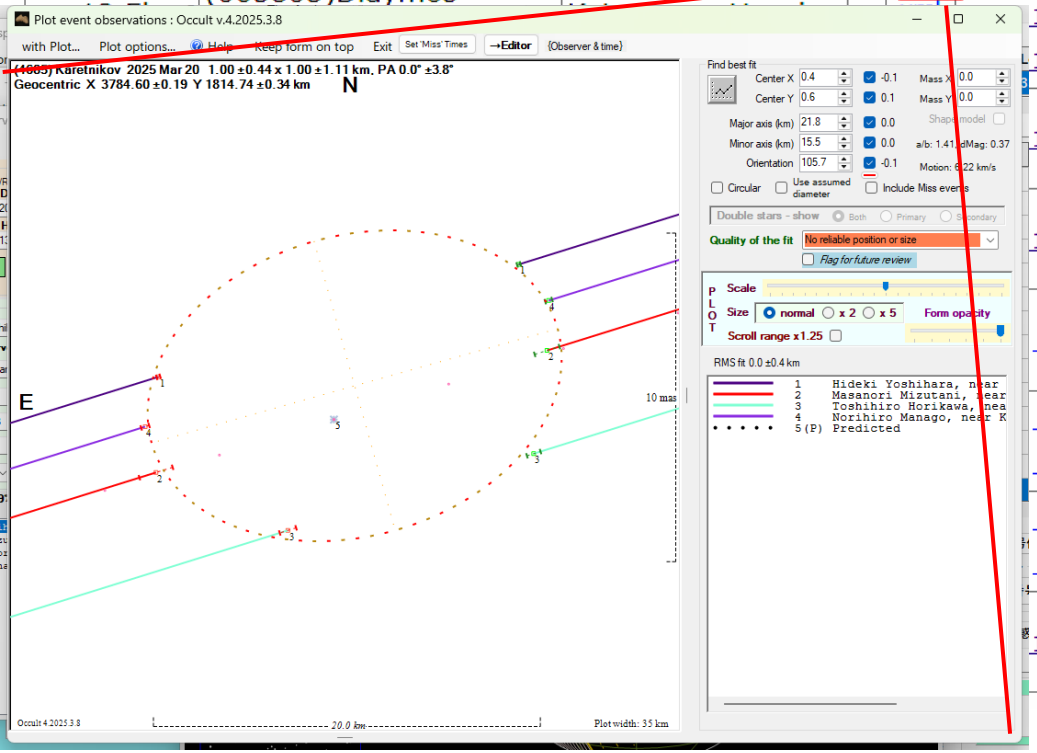
Result of Asteroidal Occultation Observation

Date Time	Asteroid number Name	Observer	Result	Light curve / Analysis	Star VMag	pred Drop										
2025.03.14 14.5h	(017524)1993 FS4	Hidehito Yamamura Hayato Watanabe Akira Asai	o o o	Plot xml	PDF 1 2 3 4 1 2 3 4	12.72	7.7									
2025.03.11	(065803)Didymos	Takeshi Nemoto Katsuhiko Kitazaki	o o	Plot	PDF 1 2 3 4 PDF 1 2 3 4	10.22	10.4									
					1											
					1 2 3 4											
					1 2 3	9.12	8.1									
					1 2 3 4	13.22	5.0	25cm	F4.0	Newtonian		0	2	460	140	avi	conf GPS	-0.47
					3 4	9.97	8.4	20cm	F4.0	Newtonian		4	2	401		avi	conf GPS	-0.18
					3 4	10.20	4.3	20cm	F1.5	Newtonian	ASI290MM Set	34.4	808x292	2	350	66		conf GPS	
					3 4			20cm	F3.3	SCT	ASI290MM Set	90.3	1440x544	2	329		avi	conf GPS	-3.54
					3 4						290MM							conf	-4.49
					3 4						290MM						avi	conf GPS	4.35
					1 2 3						290MM						avi	conf GPS	0.19



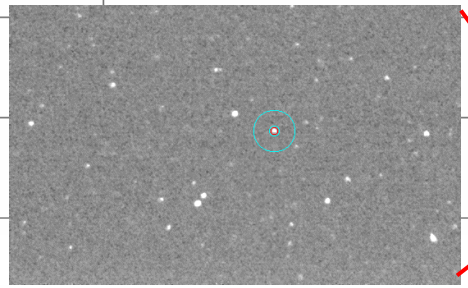
Exp=124msec / Frm No.716.0 / Frm Mid= 13h51m9.9397s, End= 10.0017s / Event=Frm mid -0.0124s +/-0.015s / CctAngle=0.0deg





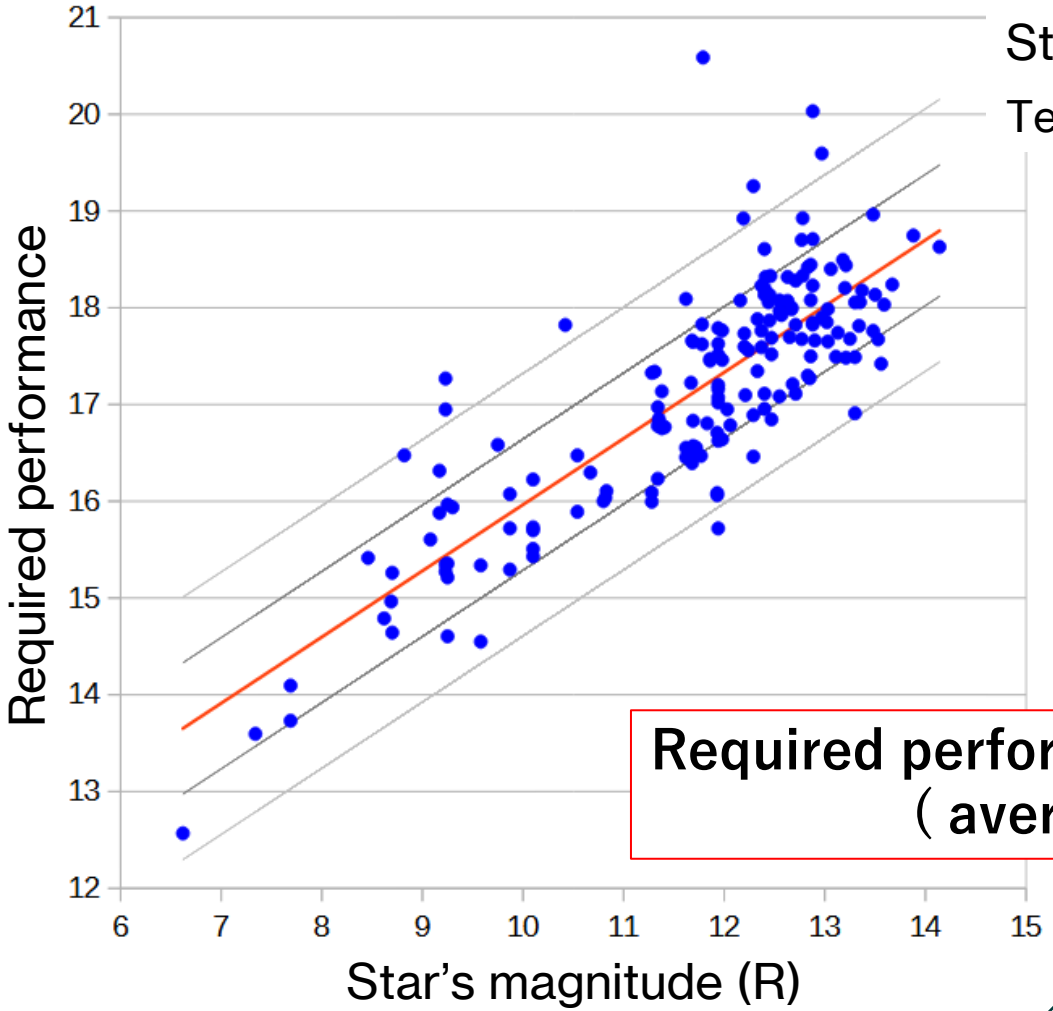
10_25_26Z_.CameraSetting

ASI462MM]
Binning=2
Capture Area=968x324
Colour Space=MONO8
High Speed Mode=Off
Gain=410
Exposure=8.7000ms



New Possibilities for Summarizing Observation Data

- Data is saved as a CSV file → Data can be processed with Excel



Star's magnitude (R)	12		
Telescope aperture(cm)	20		
Gain	478.4		
Frame exposure (ms)	平均	+1σ	-1σ
	100.0	186.2	53.7
Frame exposure (ms)	100		
	平均	+1σ	-1σ
Gain	478.4	532.2	424.6

Suitable setting can be calculated

Required performance= 0.6840 × RMag + 9.1248 +/- 0.6781
(average)

This relationship can be assumed to hold between a star's brightness, exposure time, and gain.

Instrument's performance= $\log_{2.5}$(Square of aperture$_{(cm^2)}$ × Frame exposure$_{(msec)}$ × $2^{(Gain/60)}$)

Apophis has been selected as the first flyby target for DESTINY+. DESTINY+ is planning a flyby of Apophis in February 2029.Conducting occultation observations before the flyby to determine Apophis's orbit and precise size is essential for the success of the DESTINY+ mission. While there have been no observation opportunities in recent years, opportunities will arise starting in 2028. There will be 60 opportunities between January 2028 and the end of January 2029. Of these, 7 are likely observable from Japan.

				RUWE	Mag [V]	Mag [R]	Dur. (sec)	Uncertainty (sec)	Shadow Velocity(m/s)	Distance (km)	Fresnel Number	Area
1	2028-01-02	13h 00m - 13h 14m	UTUCAC4 404-000176	0.95	12.2	11.67	0.01	0.04	14454	44101452	0.85	China, Japan
2	2028-01-10	14h 39m - 14h 55m	UTUCAC4 426-001125	1.25	11.4	10.97	0.011	0.04	13905	45447833	0.83	Thai
3	2028-01-10	12h 39m - 12h 52m	UT UCAC4 426-001114	1.1	13.6	12.88	0.011	0.04	13911	45432873	0.83	China
4	2028-01-13	18h 18m - 18h 31m	UT TYC 4681-02316-1	0.85	11.6	11.22	0.011	0.04	13680	46300541	0.81	EU
5	2028-01-14	14h 43m - 14h 56m	UTTYC 4682-00516-1	0.9	12	11.48	0.011	0.05	13621	46569817	0.81	Mid Asia
6	2028-01-20	02h 32m - 02h 46m	UTUCAC4 451-002232	1.2	12.3	11.6	0.011	0.05	13262	48499630	0.77	USA
7	2028-01-26	11h 21m - 11h 37m	UTUCAC4 467-003011	0.95	13.6	12.98	0.012	0.05	12918	51237271	0.73	China, Japan
8	2028-01-26	03h 09m - 03h 25m	UTUCAC4 466-003007	1.1	13.1	12.4	0.012	0.05	12934	51072713	0.73	USA
9	2028-02-04	15h 25m - 15h 42m	UTUCAC4 486-004147	1.2	12.1	11.27	0.012	0.06	12561	55874805	0.67	Thai
10	2028-02-05	05h 13m - 05h 29m	UTUCAC4 487-004365	1.05	13.1	12.44	0.012	0.06	12543	56188960	0.67	USA
11	2028-02-19	21h 40m - 21h 56m	UTUCAC4 512-006229	1.05	12.8	11.94	0.012	0.07	12338	64716039	0.58	EU
12	2028-02-20	05h 13m - 05h 28m	UTUCAC4 512-006280	1.05	13.3	12.55	0.012	0.07	12340	64910516	0.58	USA
13	2028-02-23	00h 35m - 00h 50m	UTUCAC4 516-007323	0.95	11.7	11.07	0.012	0.07	12361	66630892	0.56	South America
14	2028-02-26	11h 10m - 11h 23m	UTUCAC4 520-007868	1	12.5	11.52	0.012	0.07	12408	68755181	0.55	AUS
15	2028-03-11	12h 59m - 13h 15m	UTUCAC4 534-011745	1.1	12.1	11.26	0.012	0.08	12738	77401938	0.48	China
16	2028-03-13	10h 06m - 10h 22m	UTUCAC4 536-013164	1.15	12.6	12.08	0.012	0.08	12796	78538882	0.48	Japan
17	2028-03-13	01h 22m - 01h 34m	UTUCAC4 535-012750	1.1	13.9	13.36	0.012	0.08	12784	78314485	0.48	South America
18	2028-03-16	10h 36m - 10h 52m	UTUCAC4 538-015011	0.85	13.6	12.96	0.012	0.08	12898	80334057	0.47	Japan

The Solutions for Efficient Observation Reporting and Collection

1. Some new feature added to LIMOVIE

[1] Load files to get various configuration and parameter automatically

Camera setting file (ZWO ASI series)

Prediction xml file

[2] Automatic report making

Analysis results [event time, .dat light curve data, various configration] can be output directly as a report.

2. New collection system "ROREM"

- Providing a system that collects report emails with minimal effort -

[1] Transcribe from email report to OBS.XML file automatically.

[2] Collect various files on observation

AVI, camera setting, GPS log, light curve CAV, light curve graph image ..

[3] Store various data and make it accessible to anyone at any time.

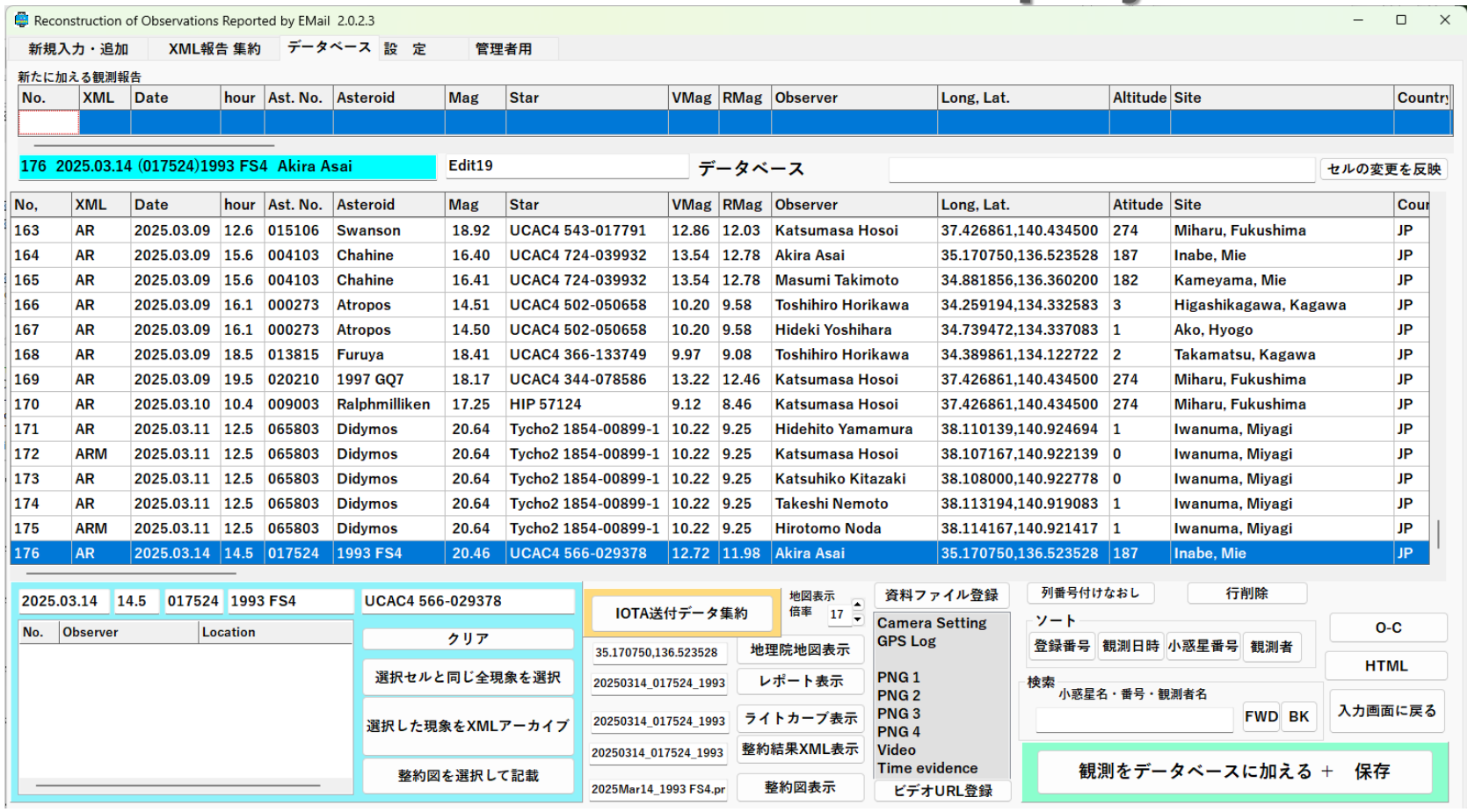
Make a HTML file from database automatically.

[4] Make regional report to IOTA centre automatically

OBS.XML files for each phenomenon

.dat light curve files for each observation

We will continue ROREM project



Thanks for your kind attention