



# ExoClock Newsletter

Dear ExoClock participants,

This is the second newsletter where we share the latest news of the Project. The number of observations is gradually increasing, although the weather has not been stable during the last month. Thank you again everyone for your efforts and keep up the great work!

## 1. Updates on the website

We have added some new features on the website to make your observation planning more efficient.

### ➤ **Horizon Line**

The horizon line feature allows you to define the altitude of the horizon according to the location of your observatory. This facilitates your observing planning as horizon points differ from place to place. It is quite useful especially if you have trees, buildings or other obstacles that hide parts of the horizon. You will know with more accuracy when the target will rise or set accordingly.

Telescope / Camera			Observatory											
Name	Size	Camera	Name	Latitude	Longitude	S	SW	W	NW	N	NE	E	SE	
Meade LX200ACF	14.0"	SBIG STXL6303E	Warrambungle Observatory	-31.28°	149.19°	20.0°	20.0°	20.0°	20.0°	20.0°	20.0°	20.0°	20.0°	<input type="button" value="Edit"/>

### ➤ **Information about the targets/catalogue**

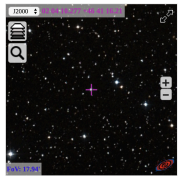
We are now sharing all the information we use, related to the planets and their hosting stars. Under the Ephemerides tab, click to each exoplanet to find out more. You can use is parameters if you wish to fit your light curves with HOPS on your computer.

### ➤ **Current status of targets' ephemerides**

On the same pages, apart from the information on the exoplanet, you can find a chart which demonstrates past and current observations of this particular target. You can see the comparison between them and how close they are to each other. If you have observed a target and your observation is published, this will also be included in the chart. We can an example below (HAT-P-32 b).

## HAT-P-32b

The Star			
StarId	HAT-P-32		
GAIA DR2	35634829686230272		
ZMASS	J02041028+4641162		
RA	02:04:10.2775	DEC	+46:41:16.210
Parallax	3.43 mas	PM.RA	PM.DEC
	-9.825 mas/y		3.477 mas/y
V <sub>mag</sub>	R <sub>mag</sub>	I <sub>mag</sub>	J <sub>mag</sub> H <sub>mag</sub> K <sub>mag</sub>
11.44	11.23	10.844	10.251 10.024 9.99
G <sub>mag</sub>	G <sub>BP</sub> mag	G <sub>RP</sub> mag	
11.133	11.41	10.719	



The Planet	
Discovered by	Hartman et al. 2011
Ephemeris by	Hartman et al. 2011
Priority	MEDIUM

Mid-time	
2454420.44712 ± 9e-05	BJD <sub>TDB</sub>

Period	
2.150008 ± 1e-06	days

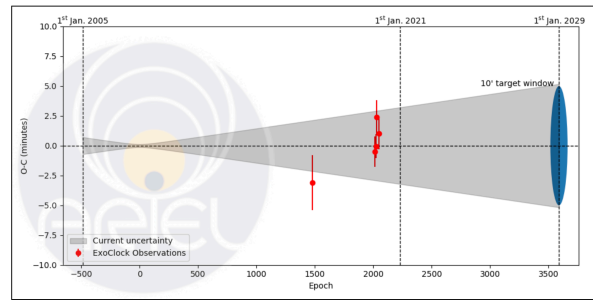
Root	Depth*	Duration*
R <sub>band</sub>	29.63 mmag	3.12 hours

\* Calculated from the parameters below, using [TOLIGHTBOX](#)

Limb Darkening Parameters		
T <sub>eff</sub>	Log(g)	Fe/H
6207 K	4.32 cm/s <sup>2</sup>	-0.04 dex

Transit Parameters		
R <sub>p</sub> /R <sub>*</sub>	a/R <sub>*</sub>	
0.1512605	6.063	

i	e	ω
88.9 deg	0.0	0.0 deg



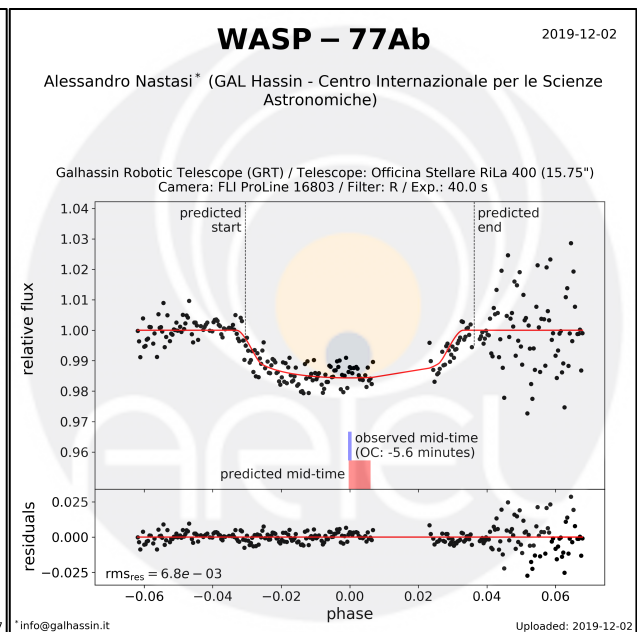
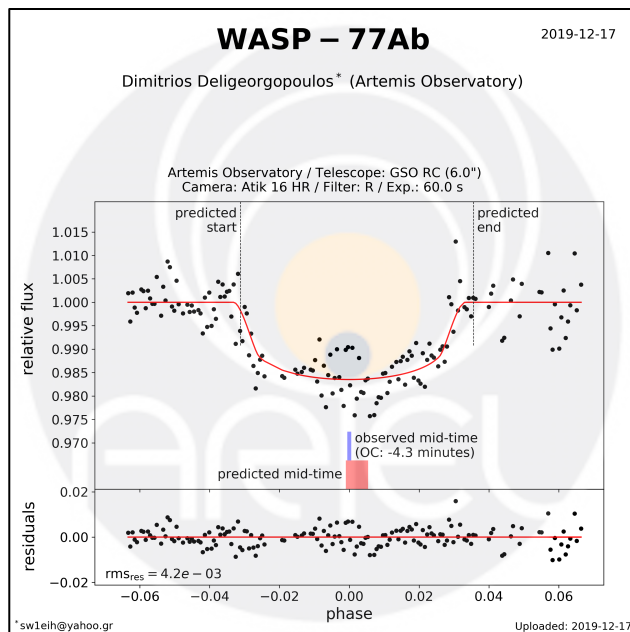
## 2. Highlighted Observations

### ➤ WASP-77Ab---Ephemeris refinement

For this month's issue, two are the highlighted observations. WASP-77Ab is a target marked with a high priority. Two observers from different locations observed the transit during different nights and their results are consistent. The combination of the two observations will allow us to refine the ephemeris with high accuracy.

**Congrats to the members Dimitrios Deligeorgopoulos from Greece and Alessandro Nastasi from Italy for their great results!**

We will reanalyse the data to achieve the highest precision. Below you can see a preliminary analysis of both observations:



### 3. Updates on HOPS software

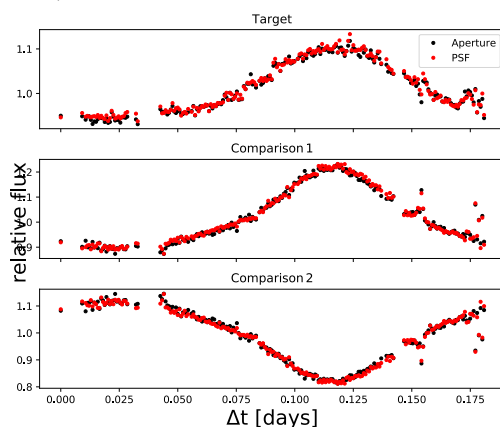
Make sure that you download the new version of HOPS from: <https://exoworldsspies.com/en/software>  
The updated version includes some improved features regarding observation planning and analysis:

- **More stable alignment**  
The new alignment is able to identify fainter stars and as a result is more stable.
- **Horizon line**  
You can edit the horizon line in HOPS/My Profile to help you plan observations, in general.
- **Navigation buttons**  
We have added navigation buttons to navigate through the different stages of analysis, for example from reduction to photometry etc., without closing the software.

### 4. Question of the month

After photometry, how do we find out which of the comparison stars are variable so we can return to photometry and exclude them?

This is a question that many of you have been asking during the last months. When using HOPS, after photometry is completed, there is a window showing the light curves for the target star and all the comparison stars. You can identify which ones are consistent and which one is different to the other ones. The light curve that is different corresponds to star that is variable. An example is shown below where the third light curve has an inverse variability compared to the other two light curves, this is the variable star that needs to be replaced. **Remember to use at least two comparisons stars, to check for variable stars.**



Finally, we remind you to send us at [exoclockproject@gmail.com](mailto:exoclockproject@gmail.com):

- Ø Your feedback on the website
- Ø Suggestions for new features
- Ø Questions on the observations or the analysis
- Ø Ideas for topics you would like to see in the newsletters

Happy holidays to everyone and Festive Greetings,  
The ExoClock Team

P.S. Very soon the **ARIEL open conference** will take place and **ExoClock** will be presented to the scientific community. We will share with you all the latest news regarding the mission!