



# ExoClock Newsletter

Dear ExoClock participants,

we hope that you are doing well, and you enjoyed the summertime!

First of all, we would like to welcome the new members! To engage with the community, we sent out a newsletter like this at the beginning of every month and we hold a regular meeting on the last Thursday of every month. You can read the past newsletters, watch the past meetings, and have access to other educational material at:

[www.exoclock.space/users/material](http://www.exoclock.space/users/material)

We also organise meetings dedicated to new ExoClock members. These meetings are held on the Friday just after our regular monthly meeting, and they are not recorded. In these meetings, newcomers have the opportunity to ask questions of any level related to the operation of the website, observations of transits, data analysis etc.

Finally, we have a Slack channel for more direct communication and if you want to join, please send a request at [exoclockproject@gmail.com](mailto:exoclockproject@gmail.com).

**In this newsletter, we discuss:**

- 1. 1st Annual ExoClock meeting – links & summary**
- 2. Website updates**
- 3. HOPS updates**
- 4. Highlighted observations**
- 5. Current campaigns**
- 6. ALERTS**

## 1. 1st Annual ExoClock meeting

On the 25th & 26th of September we held our 1st Annual ExoClock meeting virtually in which 150 participants were registered. We had 26 presenters who gave us very interesting talks on the science of Ariel, on how the project works, on their own work, on their contribution to the project and on the collaboration between their efforts and ExoClock. All the presentations were recorded and can be accessed from this link after logging in.

[https://www.exoclock.space/annual\\_meetings](https://www.exoclock.space/annual_meetings)

If you participated to the meeting or if you watched the videos, we would really appreciate your feedback, it will only take a minute to fill this survey:

<https://forms.gle/Hiixe1fx1wyxhF918>

Thank you all for attending this meeting and we hope that this can be arranged on a yearly basis.

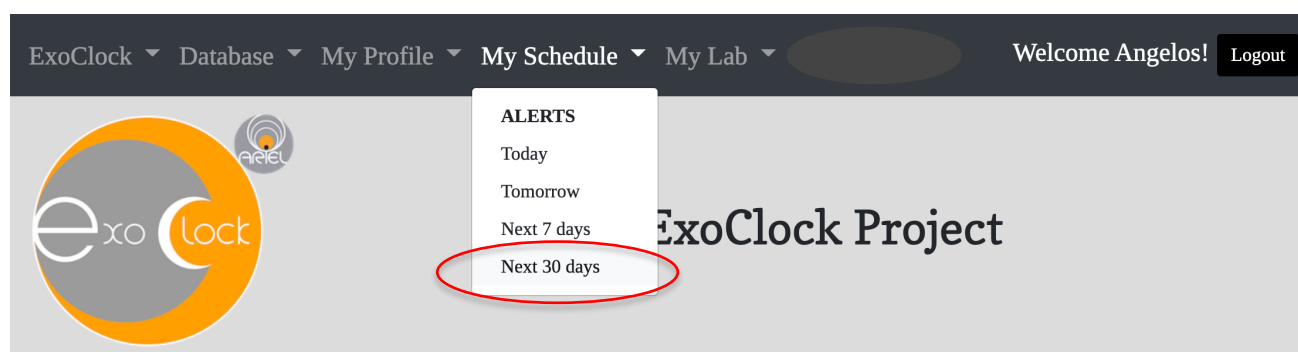
Briefly the main topics presented and discussed, were:

- Connection between ExoClock and the Ariel consortium
- Presentation of results on exoplanet research by partners
- ExoClock organisation, current status and future plans
- Contribution to the project without equipment
- Use of the resources produced by the project at schools and universities
- Updates from the working groups

## 2. Website updates

### ○ Scheduling on ExoClock

The ExoClock scheduler now includes the option of prediction for the next 30 days. Check the “My schedule / Next 30 days” tad for planning further in the future.



○ Scheduling on ExoWorldsSpies

So far, the priorities on the ExoWorldsSpies general scheduler were out of date. We have now linked the two schedulers (on ExoClock and ExoWorldsSpies) so that the planet parameters, the predicted times, the priorities (including ALERT), and the observed drifts are updated live on both. A general scheduler will soon be implemented on ExoClock, too.



### Transit Scheduler

Latitude (degrees, from -90 to 90)  Longitude (degrees, from -180 to 360)  Telescope Aperture (inches, greater than 6)  Preferred Time Zone (hours, from -12 to 12)

Horizon altitude (degrees, 20 to 80)

S  SW  W  NW  N  NE  E  SE

Calculate transits for...  
 Next 24 hours  
 Next 7 days  
 Next 30 days  
 Next 6 months (takes time...)  
 Next 12 months (takes time...)

Starting from...  
 Now  
 Other date:

Ordered by...  
 Time  
 Planet name

Planet	Star RA/DEC J2000	$R_{mag}$ mag	Transit Depth mmag	Duration hours	1h Before Ingress	Observing times [UTC+3.0] and target position			1h After Egress
						Transit Start	Mid Transit	Transit End	
<b>KELT-16b</b> LOW PRIORITY All transits for KELT-16b	20:57:04.4386 +31:39:39.629	11.601	14.77	2.49	2021/10/08 19:24 66° E	2021/10/08 20:24 77° SE	2021/10/08 21:38 80° SW	2021/10/08 22:53 68° W	2021/10/08 23:53 57° W
<b>WASP-89b</b> LOW PRIORITY All transits for WASP-89b	20:55:35.9893 -18:58:16.047	12.73	20.46	2.46	2021/10/08 20:17 30° S	2021/10/08 21:17 31° S	2021/10/08 22:31 28° S	2021/10/08 23:44 21° SW	2021/10/09 00:44 13° SW
<b>HAT-P-23b</b> LOW PRIORITY All transits for HAT-P-23b	20:24:29.7235 +16:45:43.810	12.27	17.48	2.19	2021/10/08 22:38 56° SW	2021/10/08 23:38 45° W	2021/10/09 00:44 33° W	2021/10/09 01:49 20° W	2021/10/09 02:49 9° W
<b>HAT-P-38b</b> LOW PRIORITY All transits for HAT-P-38b	02:21:31.9802 +32:14:46.090	12.36	10.97	3.16	2021/10/09 00:14 60° E	2021/10/09 01:14 71° E	2021/10/09 02:49 82° S	2021/10/09 04:23 67° W	2021/10/09 05:23 56° W
<b>K2-260b</b> <b>ALERT PRIORITY</b> DRIFT APPLIED: 23.4 minutes All transits for K2-260b	05:07:28.1588 +16:52:03.795	12.53	12.44	4.17	2021/10/09 01:27 34° E	2021/10/09 02:27 45° E	2021/10/09 04:32 64° SE	2021/10/09 06:37 62° SW	2021/10/09 07:37 53° SW

**ALERTS and drifts (drifts are already applied)**

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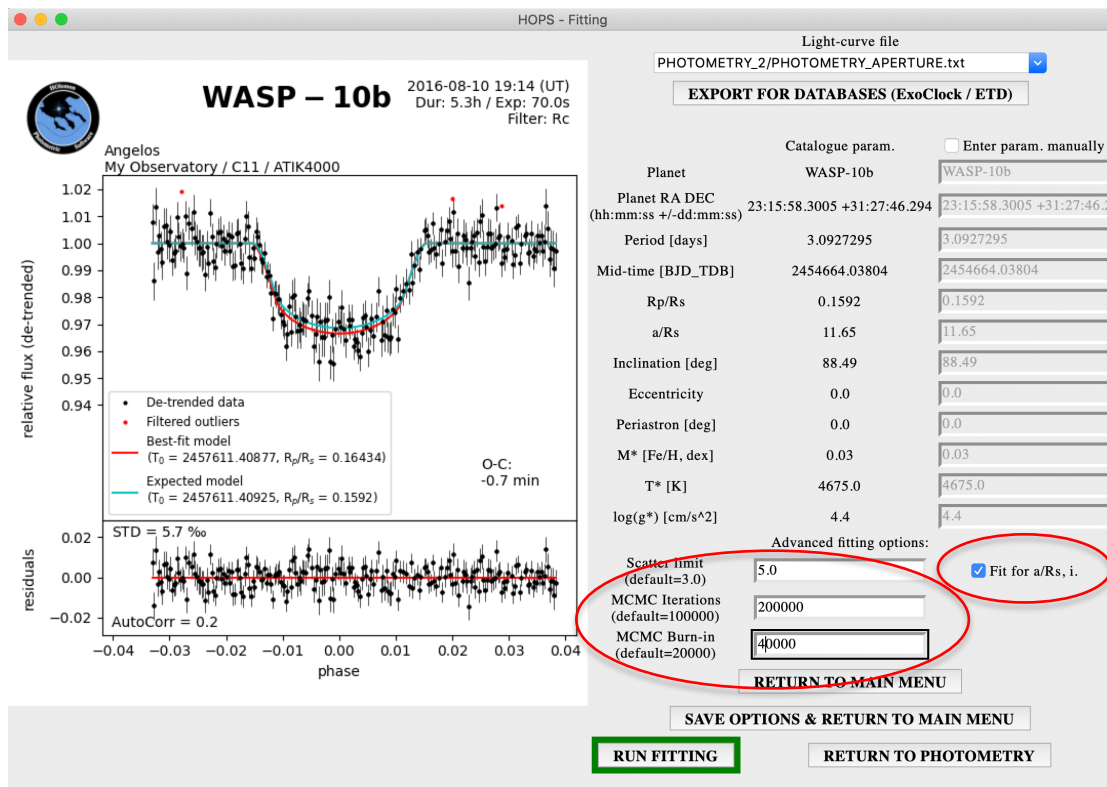
### 3. HOPS updates

Version 3.0.3 is now available on

<https://www.exoworldsspies.com/en/software/>

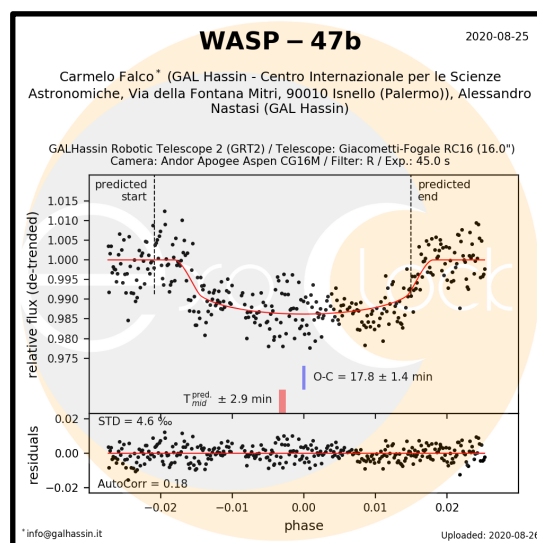
In this version, HOPS is directly linked to the ExoClock database in order to reduce the discrepancies between the two analyses (local or online). For the link to be active you will need to be connected to the internet.

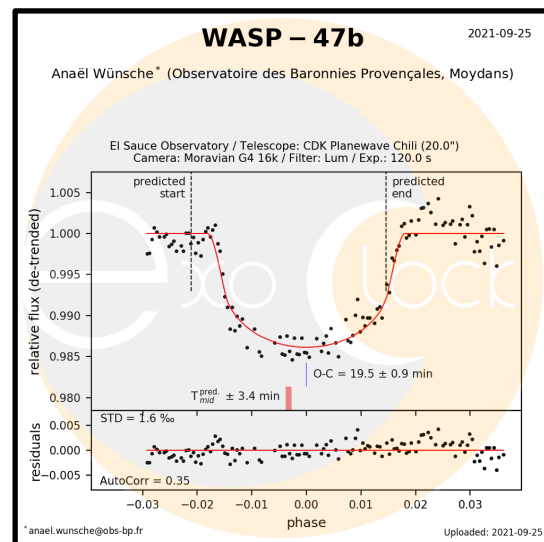
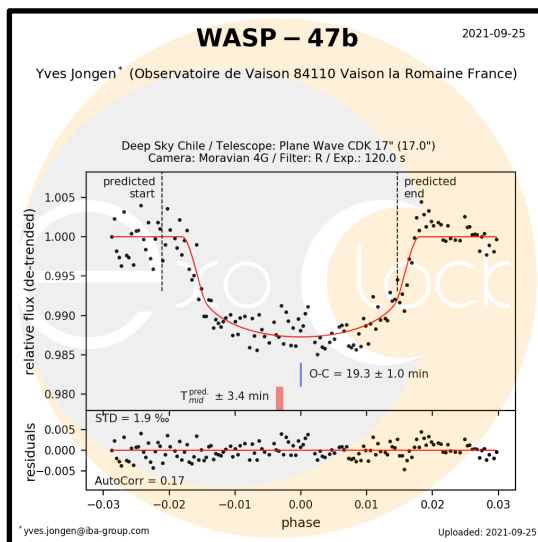
Also, version 3.0.3 allows for the fitting of the two extra orbital parameters ( $a/R_s$  – the orbit semi-major axis – and  $i$  – the orbit inclination). To enable this feature just tick the relevant checkbox. It is advised to double the default number of MCMC iterations and MCMC burn-in when fitting for these extra parameters.



#### 4. Highlighted observations

We received many observations which we can highlight, thank you everyone. For this month, we have selected **WASP-47b**. A shift of **~18 minutes** was initially identified by Carmelo Falco on the 25<sup>th</sup> of August 2020. One year later, more recent follow up observations by Yves Jongen and Anaël Wünsche confirmed this shift. Below you can see the light-curves. Congratulations for your efforts!





## 5. Campaigns

Currently, we are holding observing campaigns for two planets: TrES-1 b and HD 80606 b

### Why TrES-1 b ?

From the data we have, TrES-1 b seems to be decaying: the time it takes to circle its star once is getting shorter by around 11 milliseconds per year. This is an exciting discovery as, although many short period planets are expected to be decaying, evidence for this has only been found for a couple of systems (e.g. WASP-12 b). Given that TrES-1 b is currently observable, we would like to kindly ask you to observe a transit of this planet if you can over the coming weeks! The more data we have, the more precisely we will be able to constrain the decay rate. If you do manage to acquire an observation of TrES-1 b it would be extremely great! You wouldn't need to do anything special in terms of the analysis, just upload the observations to ExoClock in the normal fashion. Once all the observations have been gathered, we can proceed with the decay analysis and work towards a publication.

If you have any questions, please contact: Billy Edwards, one of our coordinators, ([billy.edwards.16@ucl.ac.uk](mailto:billy.edwards.16@ucl.ac.uk)) and Simone Hagey, a master's student based at the University of British Columbia in Canada ([simone.hagey@usask.ca](mailto:simone.hagey@usask.ca)) who are leading this effort.

### Why HD 80606 b ?

HD 80606 b is a very eccentric ( $e=0.933$ ), long-period ( $P\sim 111$  days) planet which transits only one or two times per year! The transit duration is 12 hours so to cover a complete transit, we need to combine observations from different locations. HD 80606 b will be observed by the James Webb Space Telescope which is about to be launched in December. To better predict the timing of the 2022 transits, it is very important to observe the next transit of HD 80606 b from the ground. The transit will happen on the 7<sup>th</sup> of December, and we are collaborating with the Exoplanet Watch project in the USA to cover the complete phenomenon. More details will follow closer to the date but if you are interested, please book the 7<sup>th</sup> of December on your calendar from now!

Of course, anyone who contributes will be invited to co-author the publications of these results.

## 6. ALERTS

Please check your personalised alert schedule at:

[www.exoclock.space/schedule/alerts](http://www.exoclock.space/schedule/alerts)

for the **ALERT** planets and if you get a clear sky and a long-enough night, you can try observing them!

The following targets are in the current **alert system**:

- WASP-71b
- WASP-20b
- WASP-63b
- WASP-101b
- Kepler-5b
- WASP-126b
- WASP-100b
- WASP-136b
- HAT-P-40b
- K2-260b

We remind you that many targets were not in the alert list, before an unexpected shift was identified by you, the ExoClock participants. This highlights the importance of observing targets that are also of low and medium priorities.

Clear Skies,  
the ExoClock team