

# Astronomy & Astrophysics Subscribe to Open program

## 2022 Transparency Report

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# A&A Subscribe to Open program

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# Introduction

## *Subscribe to Open*

Subscribe to Open (S2O) is an alternative, transformative model that aims to transition subscription journals to open access (OA) using subscription revenue to cover open access publication costs. First introduced by [Annual Reviews](#), S2O has been embraced by a number of publishers who have come together in the [S2O Community of Practice](#). This innovative model builds on historical collaborative initiatives such as [SCOAP3](#) and [Knowledge Unlatched](#), and has quickly become an accepted approach for achieving open access in different communities.

A journal publishing under a Subscribe to Open model will publish its content in open access if sufficient subscriptions are renewed. If subscription renewal targets are not met, the content remains or reverts to being accessible to subscribers only.

We are very pleased to share this first Transparency Report of *Astronomy & Astrophysics*' Subscribe to Open initiative. The A&A S2O model is a bit more complex than for [other journals published by EDP Sciences](#). This is due to the complex financial structure of A&A. For more information on A&A's S2O model, see also the [FAQs](#).

## *Background: A&A and open access*

*Astronomy & Astrophysics* (A&A) is an international consortium governed by a [Board of Directors](#) made of researchers from 27 countries, mainly European. The Board sets the policies for A&A including general guidelines for publishing, the selection of the Editors, the various financial aspects, as well as membership of new countries. The journal has been published by EDP Sciences, an international publisher based in France, for over 20 years.

A&A has been for many years a “green” open access journal. As is the tradition in astronomy, A&A encourages authors to self-archive different versions of the article in arXiv under a non-exclusive license. A&A and EDP Sciences allow authors to self-archive even the final PDF file of the article exactly as published in the journal and without any period of embargo.

Notwithstanding the tradition of green OA in astronomy and the generous green OA policy applied by A&A and EDP Sciences, we felt that it is important to go further and study ways to transition the journal to full open access, in the general context of an evolution of publication models towards full open access. Publishers involved in transformative agreements also have a commitment towards the consortia involved in such agreements to transition the journals included in these agreements to full open access within a few years (see below, transformative agreements). Finally, the regular increase in paid open access by individual authors (see below, evolution of APCs) highlights the growing need of authors or their funders for full OA publication.

In 2019, A&A and EDP Sciences put together a working group to study how A&A could evolve towards full open access. This group, including members of EDP Sciences and of the A&A executive committee, as well as a head librarian in astronomy, met regularly to study several options to transition the journal to

full open access. A consensus formed in 2021 that the Subscribe to Open model would fit A&A's needs. This follows the rise of this type of collaborative model: by 2022, 17 publishers have adopted this model, publishing 96 S2O journals in 2022, according to a census by the [S2O community of practice](#). EDP Sciences also had the experience of being one of the early adopters of S2O, and of [successfully transitioning 6 mathematics journals](#) to open access following this model.

In September 2021, A&A announced that it would [publish under a S2O model in 2022](#). This announcement was made within weeks of the [American Astronomical Society announcing](#) that it would flip its journals to Gold Open Access. Thus, three core research journals in astronomy (A&A, Astrophysical Journal, Astronomical Journal) independently announced their transition to open access in 2022.

The new S2O publication model for A&A was communicated to subscribers and agencies in September 2021, and the 2022 subscription renewal campaign proceeded. The renewal campaign was regularly evaluated. The decision was finally made on the 4<sup>th</sup> of April 2022 by A&A and EDP sciences to publish the journal in open access in 2022 (see [press release](#)).

### *The A&A S2O model*

Under the S2O model, as long as subscriptions are renewed, the content is published open access. In practice, for A&A, articles newly accepted from the time of the decision to transition to OA are published open access under a [CC-BY 4.0](#) license. The date of the transition is the 4<sup>th</sup> of April 2022. Articles accepted on or after the 4<sup>th</sup> of April are thus published in open access. Articles accepted before this date are published in free access, that is, freely accessible to all, but not under CC-BY license.

OA implementation for newly accepted content is managed via the publication forms filled by authors when their articles are accepted. Authors of articles accepted before the 4<sup>th</sup> of April were asked to sign a copyright transfer form<sup>1</sup>. Authors of articles accepted or on after the 4<sup>th</sup> of April 2022 are asked to sign a license agreement for the publication of their article in open access.

There is a shift between the S2O cycle and the publication year running from January to December. In addition, there is a time lag between the transition to open access publication and the first articles effectively published in open access, as articles accepted before and after the transition go through the production process. Finally, the time between article acceptance and online publication can vary from article to article, due to variations in post-acceptance processes (e.g. language editing) and production processes (production time, time for authors to check their proofs...). For these reasons, there was a mixture of free access and open access articles appearing in A&A issues for some time throughout 2022.

Regarding the older archives: until 2022, A&A operated a 1-year “moving wall embargo”. All articles published in the Journal became freely accessible 12 months after publication. At the time of the transition to OA in April 2022, we released all content still under embargo in free access (free to read, no CC-BY license).

<sup>1</sup> Articles not open access are copyrighted to ESO, the European Southern Observatory. Articles published OA under transformative agreements, or articles for which authors pay an Article Processing Charge (APC) for OA publication, are always published in open access.

In future years, subscription renewals will continue to be evaluated year on year to decide whether open access publication can continue. If sufficient subscriptions are renewed, there will be no discontinuity in open access publication. If insufficient subscriptions are renewed, the decision will be made to stop open access publication. Articles accepted after this time will be published in gated access.

[FAQs](#) are available online and regularly updated to provide users with information on the A&A S2O model.

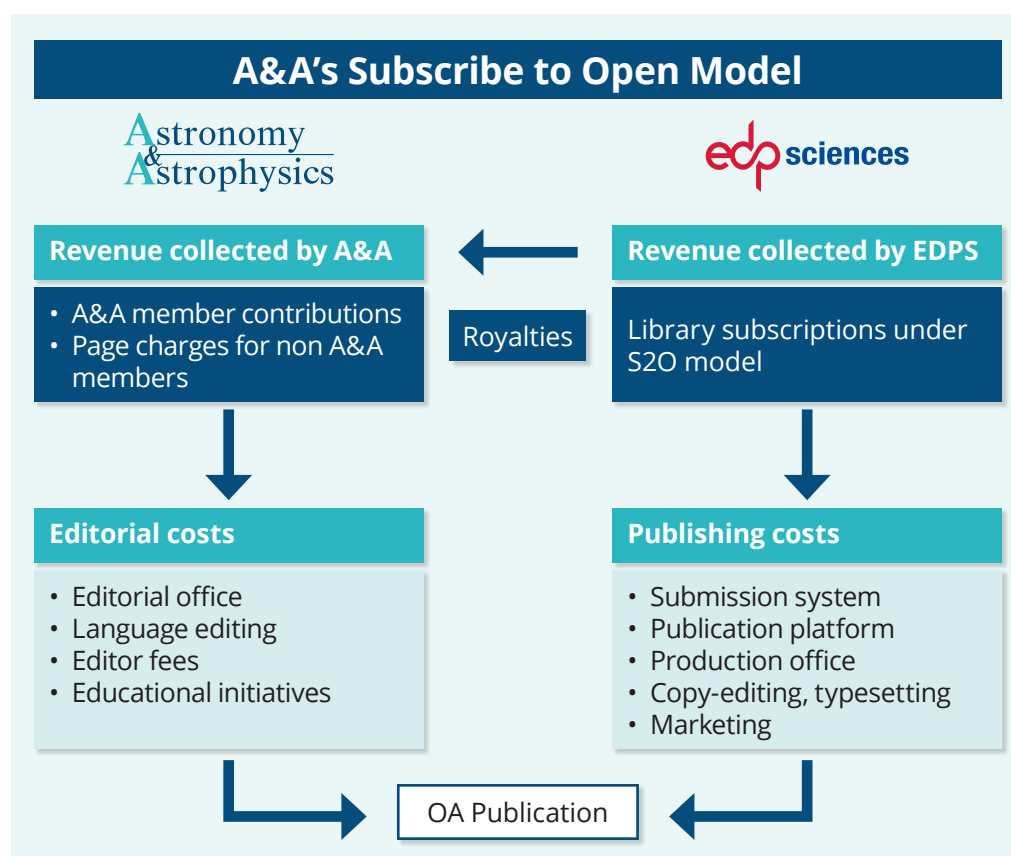
## Financial structure of A&A

- Editorial costs. A&A is a community journal which is sponsored by [member countries](#). Authors from member countries do not pay any charges to publish in the journal. Authors from non-member countries pay a modest [page charge](#)<sup>2</sup>. Page charges and contributions from member countries are used to fund the editorial costs of the journal. Page charges and member contributions are collected by the European Southern Observatory (ESO) on behalf of A&A with no intervention by the publisher.
- Publishing costs. For over 20 years and following successive tender processes, A&A and EDP Sciences have had a strong partnership and worked together for the success of the journal. The publishing costs for EDP Sciences to publish the journal are primarily funded by subscriptions (including fees from transformative agreements). Prior to the transition to open access, this was complemented by an additional revenue stream: Article Processing Charges (APCs) paid by authors who wished to publish their articles in open access. Subscriptions and APCs are collected by the Publisher, EDP Sciences, who also pay a royalty to A&A. Following the transition to open access under the S2O model in 2022, APCs were discontinued, and this revenue stream ceased for the publisher. EDP Sciences has always been keen to avoid “double-dipping,” by negotiating transformative agreements combining read and publish access with institutions and consortia having a strong involvement in the journal. The transition to the S2O model and complete removal of APCs is another step in this direction.

Although the financial streams related to “editorial” and “publishing” activities are clearly distinct, there is a relationship between the two, in that page charges in A&A help to spread the costs of running a journal and keep subscription prices down. This strategy has always kept our subscription price considerably lower than the competitor journals.

<sup>2</sup> **Page Charge:** Page charges is a set price per published page incurred by authors and in the case of A&A are used to subsidise editorial costs and keep the subscription price low.  
**Article Processing Charge (APC):** An APC is a fee charged to make an article open access on publication. The content is published under a Creative Commons (CC) license, and the APC is payable by the author, institution, or funding body.

**Figure 1.** Main sources of revenue and costs for the publication of A&A, following the transition to open access under the S2O model. “Library subscriptions under S2O model” includes transformative agreement, see Table 2.



Subscribe to Open (S2O) is an alternative subscription model which enables libraries to use their budgets to support open access publishing, using existing subscription workflows and channels. If sufficient subscriptions are renewed, the content is published in open access. A&A's version of the S2O model in 2022 is based on retaining the above financial structure as is. Editorial costs continue to be funded by A&A member contributions and page charges. Subscriptions continue to cover the publication costs of the journal in open access, and APCs are discontinued.

Although there are no APCs to publish open access in A&A following the transition to OA, page charges remain in place for authors from non-member countries. Nevertheless, fair and equitable access to publishing in A&A is a core value of the journal. In October 2022, A&A formalized a waiver policy for authors based in disadvantaged countries. Page charges are now waived if the first author is affiliated with one of the countries in [Group A of Research4Life](#).

**This first Transparency Report provides indicators concerning the revenue and costs of the publisher. Due to the change in the chair of the Board of Directors of A&A in 2022, details concerning the revenue and editorial costs of A&A could not be provided on time for the publication of this report. A more detailed report will follow in 2023.**

## Subscriptions

### *Evolution of subscription price*

**Table 1.** Evolution of A&A single-site institutional subscription prices since 2018. Multi-site subscription prices and transformative agreements are discussed between EDPS and the relevant customers on a case-by-case basis.

Year	Subscription price (€)	Year to Year increase (%)
2018	3215	
2019	3215	0%
2020	3215	0%
2021	3215	0%
2022	3315	3%

Yearly subscription price increases for A&A are decided in consultation between the board of A&A and the Publisher. Increases have historically been very moderate. A&A subscription prices did not increase for several years. In 2021 in particular, EDP Sciences froze subscription prices for all journals in the context of the COVID pandemic (see [press release](#)).

In 2022, we decided on a price increase of 3% for A&A. This is the first subscription price increase in several years. A regular increase in the subscription price is necessary to compensate for inflation, and to cover increasing publication costs due to the increasing number of articles published year on year, and the increasing number of pages of each article (see Table 3). Part of the publication costs are directly proportional to the number of pages published.

### *2022 subscription renewal campaign*

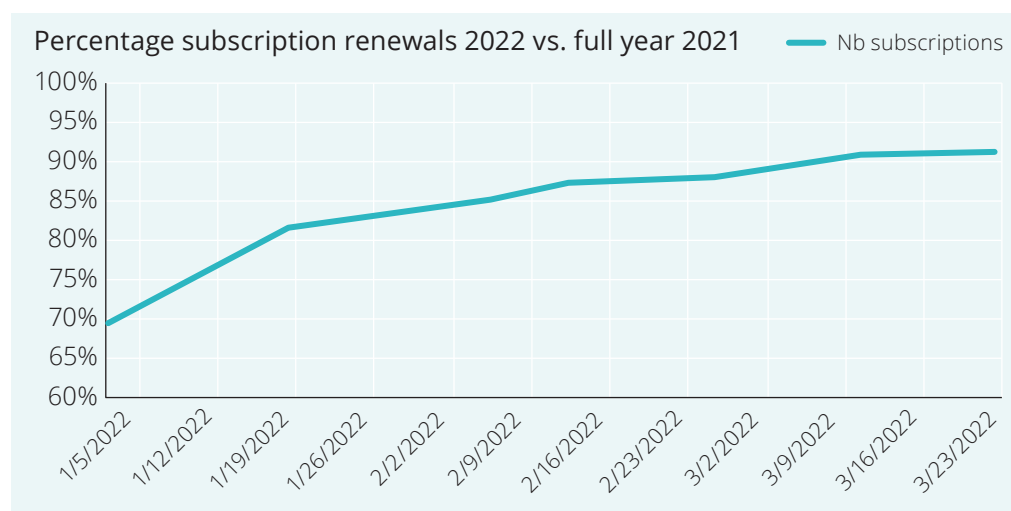
In September 2021, A&A decided that it would publish under the S2O model from 2022. The decision was communicated to agencies and subscribers. At this time, A&A was announced as being *published under a S2O model*, but that it would only be *published in open access* in the following subscription year if and when sufficient subscriptions were renewed.

We evaluated the subscription renewals compared on a bi-weekly basis starting in December 2021, see Figure 2. Subscription renewals were compared to the reference year 2021. The renewal rate only reached around 88% by the end of February 2022 compared to the full 2021 year. This was disappointing considering that 2021 was a year already affected by COVID-related budget cuts. This may indicate that a proportion of subscribers decided to adopt a “wait-and-see” approach.

We postponed the decision by a further 4 weeks. The decision to flip to open access was made on the 25th of March, with 91.5% subscriptions renewed on 25/03. Although this fell short of the 100% renewal target, we decided nevertheless to go ahead and attempt the OA flip for a first pilot year. This will be reviewed in 2023.



**Figure 2.** Number of subscriptions renewed throughout the 2022 subscription renewal period (% of total of 2021 subscriptions). NB: this includes only “traditional” subscriptions and Max Planck institutes, at the exception of institutes covered by the French national agreement (see the section below on transformative agreements).



Any subscription renewed after the 25<sup>th</sup> of March continues to be processed even though the decision to flip to open access in 2022 has already been made. We count on the support of libraries to continue to subscribe to S2O journals. All subscriptions contribute to the financial sustainability of the model, and to the decision to continue or adapt the S2O model in 2023.

### *Transformative open access agreements*

EDP Sciences has negotiated a number of transformative open access agreements over the past years. The transformative agreements covering A&A are the following.

- **National open access agreement in France.** In 2017, [a multi-year open access agreement was reached in France](#), running from 2017 to 2021 inclusive. French institutes opting in the agreement have access to the content, and their corresponding authors can publish open access in EDP Sciences journals. A&A is among the journals covered in this agreement. The agreement covers French institutes and organizations including the CNRS (Centre National de la Recherche Scientifique) and CEA (Commissariat à l'énergie atomique et aux énergies alternatives). This agreement has been renewed for the period 2022-2026.
- **Max Planck open access agreement.** At the end of 2018, [an open access agreement was reached with the Max Planck Society](#) in Germany. This is a pilot program for A&A only. The original agreement ran for a 2-year period from 2019-2020. It was renewed in 2020 and 2021 for additional periods of 1 year, under the same terms. This agreement allows access to the content and corresponding authors from Max Planck institutes can publish open access in A&A.
- **TU Delft agreement.** A more limited [agreement was reached with TU Delft in 2021](#), covering the period 2022-2024. This allows access to maths journals and A&A, and corresponding authors from TU Delft can publish a limited number of articles open access in any EDPS journal.

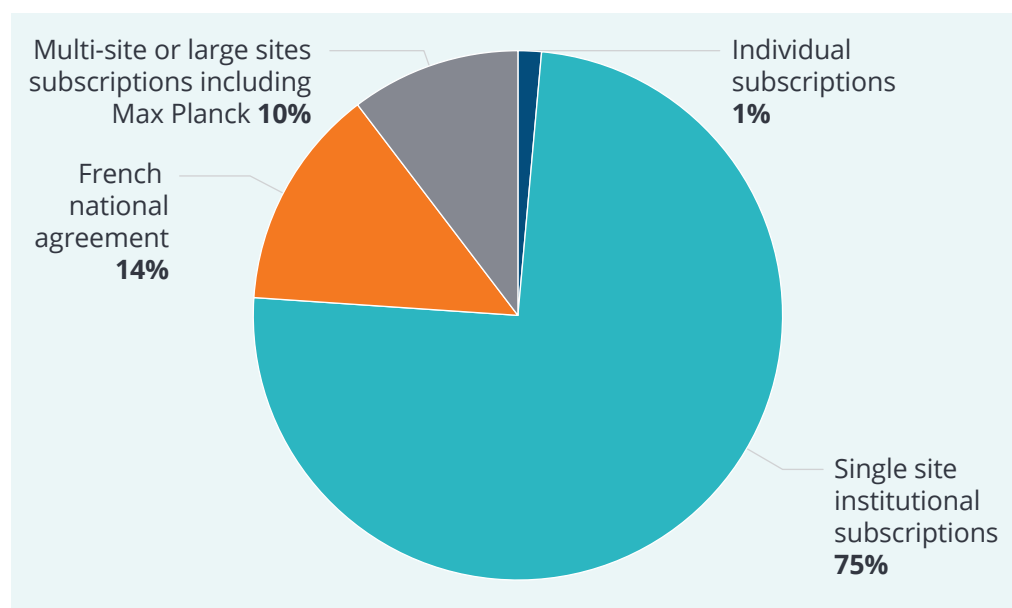
The parties of these agreements were very supportive of the evolution of A&A towards full open access under the S2O model and agreed to extend the agreement in 2022 under the same terms as previous years.



## Subscription types

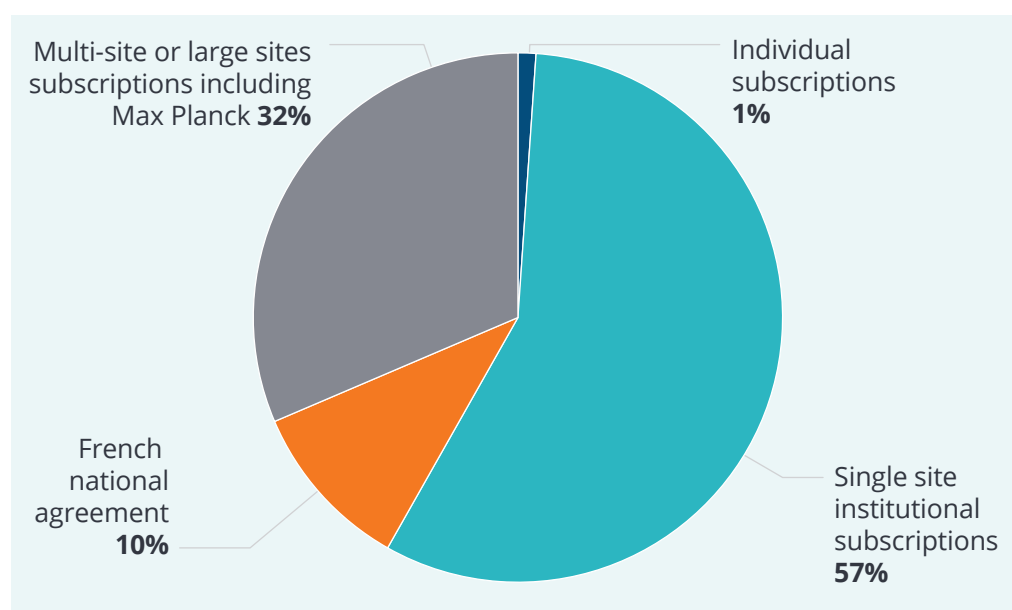
The below figures provide more information on the type of subscription.

**Figure 3. A.** Number of subscriptions per subscription type, for the full year 2021



The largest number of institutions subscribing to A&A are subscribing via single-site institutional subscriptions (75%). This is followed by multi-site institutional or large site subscription, including Max Planck Institutes who are part of the Max Planck open access agreement. Also included are institutions subscribing to EDP Sciences' full collection of journals. A small proportion of individuals (1%) subscribe to A&A.

**Figure 3. B.** Number of institutes covered per subscription type, for the full year 2021.



Multi-site or large site subscriptions can cover a varying number of institutes. Figure 3.B. represents the number of institutes covered. Under the French National Licence, each institution (e.g. each university) is considered a separate subscriber.

The agreement with the Max Planck Society is considered a “multi-site agreement”, the subscription covering several Max Planck Institutes throughout Germany.

## Article Processing Charges

Until the transition to open access under the S2O model in April 2022, A&A was a “hybrid journal”, meaning that most of the content was accessible to subscribers only, but authors could opt to pay an Article Processing Charge (APC) to publish their article in full, immediate open access and thus make it freely accessible to all. The evolution of APC rates for A&A since 2018 is presented in the Table below.

**Table 2.** Evolution of Article Processing Charges for open access publication in A&A since 2018.

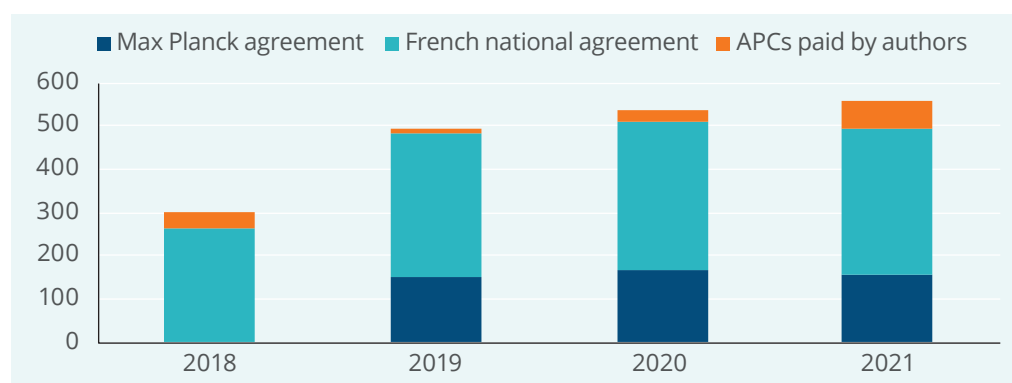
Year	APC rate (€)
2018	700
2019	1500
2020	1500
2021	1500
2022	1500

The APC rate increased in 2019 to better reflect production costs. APC rate increases are decided in consultation between the board of A&A and the Publisher. The evolution of APCs has remained stable over the period 2019-2022, at €1500 per article. APCs are discontinued for newly accepted articles as of April 2022 with the flip of the journal to open access under the S2O model. With the flip of the journal to open access under the S2O model, the potential of “double-dipping” has been entirely removed.

## Open access publication prior to the OA transition

The Figure below represents the evolution of the total number of articles published OA in A&A since 2018. This includes articles published OA under transformative agreements, and articles for which authors paid an APC to publish their article open access.

**Figure 4.** Evolution of OA articles published between 2018-2021.



There was almost a doubling of the total number of OA articles published between 2018 and 2021, from 300 to 559.

The number of articles published open access under transformative agreements increased over the years as new agreements were negotiated: the French agreement was signed at the end of 2017, the Max Planck agreement was signed at the end of 2018. The number of articles published within each agreement is relatively stable from year to year. EDP Sciences has put together a solid workflow to detect and check the main affiliation of the corresponding authors eligible for transformative agreements.

The number of APCs has increased steadily year on year, with a particularly high number in 2021 probably reflecting increasing funder mandates (and financial support) for open access publication. In 2021, the total number of articles published open access represented 26% of the total articles published. APC revenue for the Publisher will cease for articles accepted from April 2022.

## Publication statistics

**Table 3.** Evolution of the number of articles and pages published since 2018. Calculated metrics: average number of pages/article, and average subscription price/article.

Year	Number of articles published	Number of pages published	Average number of pages/article	Average subscription price/article (€/article)
2018	1919	27456	14.3	1.67
2019	2045	29891	14.6	1.57
2020	2153	31794	14.8	1.49
2021	2143	33150	15.5	1.50

The number of articles and pages published every year have increased steadily between 2018 and 2021. The average size of articles (number of pages/article) has also slowly increased year on year. Articles published in 2021 were more than a page longer than articles published in 2018 (from 14.2 to 15.5 pages/article in 2021). The increase in the number of published articles and the average size of articles generate increasing publication costs for the publisher.

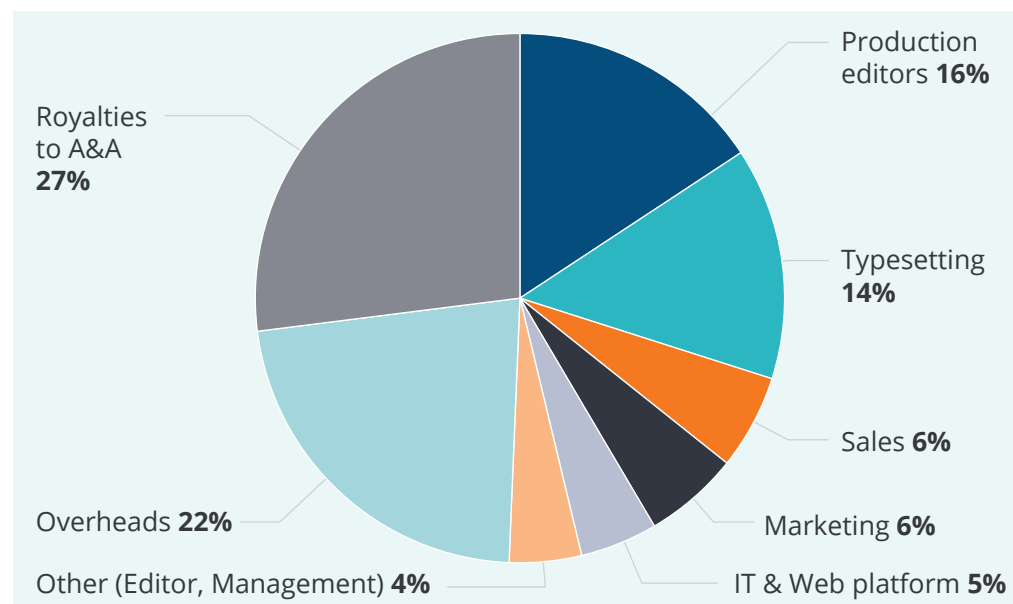
A derived metric, the average subscription price per article, is presented in Table 2 above (last column). The subscription price per article is a relatively common metric, see for example the database created by [Bergstrom and McAfee](#) which allows to compare price per article and price per citation for journals in various disciplines. For physics journals included in the database until 2013, mean price per article was around 28.39 \$/article, and median price per article was \$15.32 /article. The database doesn't have a separate "astronomy" category. The subscription price per article for A&A is an order of magnitude lower, at around 1.5€/article. This is made possible in part by the fact that subscription revenue only covers publication costs, while editorial costs are covered by contributions from A&A member countries, and page charges for non-A&A member countries (see Figure 1). A&A and EDP Sciences have also been keen to limit subscription price increases over the years.

The fact that subscription prices did not increase between 2018-2021 has meant an erosion of subscription revenue for the Publisher. This was partly compensated by an increase in article processing charges (APCs) paid by authors who chose the open access option to publish their article in A&A, prior to the OA transition in 2022.

## Breakdown of publication costs

The revenue collected by the Publisher includes subscriptions (including transformative agreements), and APCs until April 2022. These funds are used to cover the following costs. Financial data is for 2019.

**Figure 5.** Distribution of publication costs in 2019.



The publication of A&A by EDP Sciences is at financial equilibrium. Any financial margin by the Publisher is invested into improvements, particularly of the IT platforms. More precisely, EDP Sciences uses proprietary editorial and hosting systems, which are highly customized for A&A.

## Financial impact of S2O for the publisher

The Publisher's revenue will decrease significantly in 2022 following the implementation of OA publication under the S2O model. This is primarily due to the discontinuation of the open access option after April 2022, which means that there will be no APC revenue after that date. The number of APCs collected had increased significantly before then, which contributed to limit subscription price increases while the volume of articles published grew (see Table 3). Removing this source of revenue represents a significant financial commitment made by the Publisher towards the open access transition of A&A.

The elimination of APCs is expected by libraries who are more and more critical of publishers' "double-dipping" (the cumulation of subscription revenue and APCs originating from the same institutions). This has led to the rise in "[transformative agreements](#)" combining access to the content and unrestricted open access publication in the journals included in these agreements. This evolution is meant to be cost neutral for libraries, the price paid by libraries being calculated either on the basis of the subscription price ("read and publish" deal) or the APCs paid by the institution ("publish and read" deal). Transformative agreements are demanded by libraries and consortia to keep costs down and avoid "double-dipping". CoalitionS supports transformative agreements as a transition step to full open access transformation. Such agreements have been criticized for being



complex to negotiate, particularly for small structures with a low number of APCs invoiced. It is also unclear how the transition from transformative agreements (one-to-one deals) to full open access can take place (see e.g. [this report](#)).

The main open access partners of EDP Sciences for A&A, the French consortium and Max Planck Digital Library, have supported the OA transition of EDP Sciences journals for many years with transformative agreements. They have agreed to continue to subscribe and support the open access transition under a S2O model at a similar financial level than previously. The French national agreement has been renewed until 2026, ensuring a stable and significant source of funding for the S2O model of A&A.

For EDP Sciences, the financial impact of the elimination of APCs under S2O open access publication is known and significant. The unknown risk to the continuation of open access publication comes primarily from the evolution of “traditional” subscriptions. These subscriptions are renewed every year, and a proportion of subscribers may adopt a “[free-riding](#)” approach with the expectation that the content will continue to be freely accessible. We foresee that the risk could be higher in Year 2 of the open access transition, when the previous year’s content will already be open access, and usage reports to libraries will not capture the full usage of open access content by subscribing institution. OA publication with a CC-BY license means that articles can be republished on other sites. In addition, researchers can access A&A content without going through their institutional portal. This means that measured usage of individual institutions will not be as representative of the real usage of their researchers. Usage reports are an important part of the decision of libraries to renew their subscription.

In 2022, many libraries around the world, and the partners with whom we have worked on the transformation of the journal to open access for several years, have shown enthusiasm and support for the S2O model. We are continuing to explore possible adaptations of the S2O model in 2023 to provide further incentives to subscribe in order to keep publishing in open access in years to come.

## Conclusion

Despite the challenges brought about by the tradition of “green” open access in astronomy, and the complex financial structure of A&A, the Board of A&A and EDP Sciences have successfully transitioned the journal to open access in 2022 under a Subscribe to Open model. A&A was the first astronomy journal in the world to transition to open access under the S2O model. Continued open access publication in 2023 will depend on the continued support of libraries. Together, EDP Sciences and A&A are committed to keep reviewing and adapting the A&A Subscribe to Open model to respond and adapt to the demands of the librarian community.

Transparency in financial information is an expectation of the librarian community, particularly those institutions supporting collaborative open access publishing models. This first Transparency Report provides indicators concerning the revenue and costs of the publisher only. A more detailed report will follow in 2023.