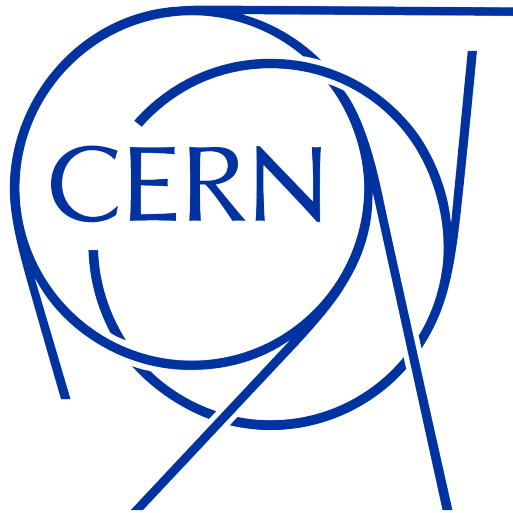


# CERN Summer Student Report: Improving CERN's Wikipedia Presence and Developing the CERNipedia

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## **Abstract**

This Summer Student 2023 project was on improving CERN's Wikipedia presence, with an additional aim of developing the CERNipedia. Throughout the nine weeks of the project, 597 total edits were made across 130 CERN related articles, as well as 92 photos uploaded to Wikimedia Commons. The main focus was on the Isotope Separator On Line DEvice (ISOLDE) facility, containing CERN-MEDICIS and twelve fixed experimental setups. Overall, I was able to create 1 B-Class article, 7 C-Class articles, 3 Start-Class articles, bring two articles from Stub to C-Class, and one article from Stub to B-Class. Developing CERN's Wikipedia presence is important as it provides a free, accessible source of information to the general public, integral to maintaining CERN's internal ambitions. The CERNipedia is a resource for internal CERN staff to find information, combining the various directories across the CERN website into one central source. A structure for the pages in the CERN Wiki was created during this project to act as a guide for future implementation.

# 1 Introduction

Tim Berners-Lee, a previous CERN employee and the inventor of the World Wide Web, envisioned the web as a collaborative medium with the ability for it to function as a web editor [1]. Wikipedia follows this vision as an open content source, encouraging anyone to create, improve and expand the world's largest encyclopedia. Expertise in a subject is not necessary for users to edit an article, and collaboration allows the website to be updated thousands of times an hour. Whilst there are studies determining aspects of Wikipedia to be unreliable, the easy access of information has had an undoubtedly positive impact upon the general public [2].

The summer student project aimed to improve CERN's Wikipedia presence by creating and developing articles related to experiments carried out at the site. One aspect of CERN's mission is to "engage all citizens in research and in the values of science" which can be achieved by making sure the public can be informed about the work at CERN [3]. As Wikipedia is a popular source of information, by successfully improving CERN's content on the website, information can be accessed by anyone. To do this, research papers, news publications and CERN's own website was used to synthesise complex information into digestible articles relating to CERN.

Another feature of the project was to create the CERNipedia, a wiki for CERN users. Currently, CERN's information is distributed over many individual websites, which are difficult to navigate between. The aim of the CERNipedia is to provide a central platform for the access of information for CERN employees and users [4].

## 2 Wikipedia

### 2.1 CERN's Existing Wikipedia Presence

CERN's Wikipedia presence, developed over many years by a number of individual contributors both directly involved and uninvolved with the organisation, covers a wide range of projects to varying degrees of detail and popularity. In 2022, the main *CERN* Wikipedia article received a daily average of 2071 pageviews, with a maximum occurring on the 5th July 39,509 following a new energy world-record for the LHC, seen in Fig.1 [5]. This peak in pageviewers can be seen across multiple CERN articles, including the *LHC*, *Proton Synchrotron Booster (PSB)*, and *ISOLDE* (previously On-Line Isotope Mass Separator). The increase in pageviewers across CERN's pages reflects the ability of Wikipedia to introduce new members of the general public to the work that is being performed at CERN. Therefore, updating, improving and creating articles related to CERN will allow the public accessible avenues to find out about information at any point in time.

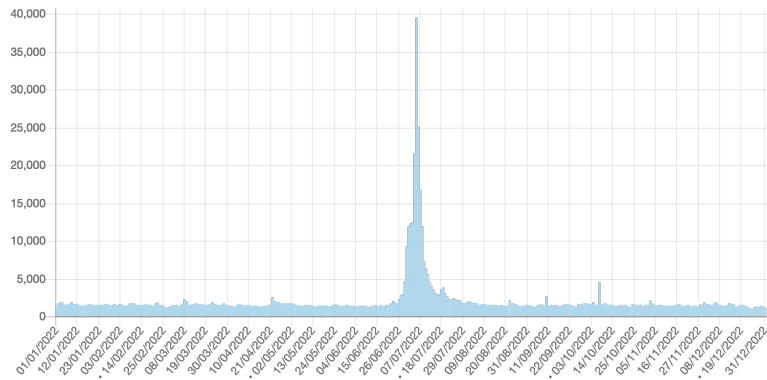


Figure 1: Daily pageviews over the year of 2022 for the CERN Wikipedia page. The peak occurs on 05/07/2022 at 39,509 pageviews. The daily average for the period is 2071. Data taken from WMCloud Pageviews Analysis.

Typical CERN articles get a daily pageview average of around 5-20, significantly less than the main articles. However, it is still important to develop these articles in order to get them to the same standard as the main CERN articles. Furthermore, new publications of results from experiments could lead to more traffic, and it would be important to have articles for users to read in these cases.

## 2.2 A Guide to Wikipedia Articles

Wikipedia articles do not all follow the same format, however a good article (GA) will contain the same features, indicative of the standard of quality it requires. They are always well-written, maintain a neutral point of view, illustrated with media, and are broad in coverage of the topic. The article should not omit any major piece of information, and should have completely verifiable research [6]. Currently, only one CERN related article is listed as a GA, *Safety of high-energy particle collision experiments*, however there are several B-class articles which may be in need of a review to classify them as GAs. Whilst the ultimate goal should be to produce only GAs relating to CERN, this process takes much more time than was available in the nine weeks of the project. Instead, I focused on creating articles for experiments that previously did not have dedicated articles, with the goal of achieving as many C-class articles as possible. Additionally, I expanded existing articles to contain more up-to-date and relevant details. Finally, I updated CERN-related articles without an image, to have an appropriate image.

To find a CERN Wikipedia article to update, it is useful to start with the pages *Category:CERN* and *Category CERN experiments*. These pages contain all the articles related to CERN which provides a good starting point to find an article to expand. For the project, I focused on experiments performed at CERN and developed a common structure to use. Every article starts with a lead section, which provides a short summary of the most important content and generally consists of no more than four paragraphs. In the lead, it is important to include an image related to the article, such as a photo of the experiment or key result. Following this, I included a background or purpose section, detailing necessary theory and motivation for the experiment. The experimental setup section was implemented next which, alongside diagrams or images, explained the how the components of the experiment works. Finally, the results section disclosed any published results of the experiment, and future work. I also included an external links and reference section at the end of every article. By following this structure, I made sure to include all the necessary information in a format that can be found in most CERN articles, therefore giving them a common link.

Every piece of information written in a Wikipedia article must be properly referenced, preferably with secondary sources [7]. External sources, not from the *CERN Document Server (CDS)*, were the best references to use for pieces of information, however they often were not detailed enough. Therefore, I found references using *InspireHEP* and *Google Scholar*, which provided me with academic papers with the appropriate level of detail needed to create an article. However, the CDS was useful in finding images, updating their copyright to the appropriate CC-BY-4.0, and uploading them to their appropriate Wikipedia pages.

## 2.3 CERN Articles of Focus

### 2.3.1 ISOLDE

The main focus of my project was on the Isotope Separator On-Line Device (ISOLDE) facility at CERN, which produces radioactive ion beams (RIBs) for use in various experimental setups also at the facility. Initially, I was provided with annotations of the pre-existing Wikipedia article from the Spokesperson of ISOLDE, Sean Freeman. These annotations provided a starting point to expand the article to contain current information, to sharpen up some areas, and to eliminate any inaccuracies.

I implemented a huge restructure of the *Facility and concept* section of the Wikipedia article. The restructure involved creating separate subsections for the various equipment used at ISOLDE, including ISCOOL, RILIS, CERN-MEDICIS, REX-ISOLDE and the HIE-ISOLDE upgrades. The purpose of this change was to make it easier for the reader to understand the objective and results of each section, and how they relate to each other. From this, any more upgrades of the ISOLDE facility can easily be added to the article, such as the Phase 3 upgrades of HIE-ISOLDE. To further improve the ISOLDE article given more time, the other sections can be split into different subsections where appropriate.

Other major CERN projects, such as the Large Hadron Collider (LHC) and the *Underground Area (UA) experiments* have their own dedicated template, displayed on each related Wikipedia article. The purpose of templates are to allow for recurring information in a consistent way, and allow for a navigational box. The aim of the template created was to provide accessible information on the experimental setups, and other facilities linked to ISOLDE. The necessity for a template was increased by the creation of new articles, relating to ISOLDE, particularly for the experimental setups. Additionally, after speaking with the ISOLDE Spokesperson, I changed the name of the article from On-Line Isotope Mass Separator to ISOLDE. The majority of the sources online referred to the facility exclusively by ISOLDE, which didn't align with the original name, and therefore may have been limiting traffic to the article.

Furthermore, the addition of an experimental setups section allows the reader to gain knowledge of the purpose of the RIBs produced at ISOLDE. This follows the German edition of the ISOLDE article, which already contained this information, and the translated text was used as a guide to my version of the article. The aim of this section was that the reader can gain an overview of the experimental setups, and can investigate them further by accessing the individual pages.

The result of the modifications I have made to the ISOLDE page during this project is that the page contains updated information. The article was reviewed and deemed B-Class standards, which suggests it is "mostly complete" and doesn't have any "major problems" [8]. An important update was included the HIE-ISOLDE Phase 2 upgrades, which have been completed since this article had a full review. Following the completion of the third and final phase, the article will need to be updated to contain these upgrades. Therefore, whilst the article has been thoroughly updated to contain the latest news, it must be maintained in order for it to stay a good representation of the current state of ISOLDE. The importance of CERN's presence on Wikipedia is reflected in this, as the updates required using many resources that the general public would not want to parse. Furthermore, ISOLDE itself is not as well known as some of the other projects at CERN such as the LHC, despite getting a larger percentage of protons from the Proton Synchrotron. By expanding the Wikipedia content, public knowledge about the facility may increase its popularity, as studies have shown a well-written article leads to increased awareness [9]. Therefore through the ISOLDE article, the project has been successful in its aim to expand existing CERN Wikipedia content.

### 2.3.2 Permanent experimental setups

There are currently twelve different permanent experimental setups located in the ISOLDE facility. One goal of the project was to create a Start-Class page for each of the experimental setups, including details about the experiment's aim, background theory, how the setup works, and any results that have been published. As well as this, to include up-to-date photos of the experimental setups, in order to display the experiment to the reader. From this, each of the articles follow a similar format, with modifications only dependent on the availability of resources.

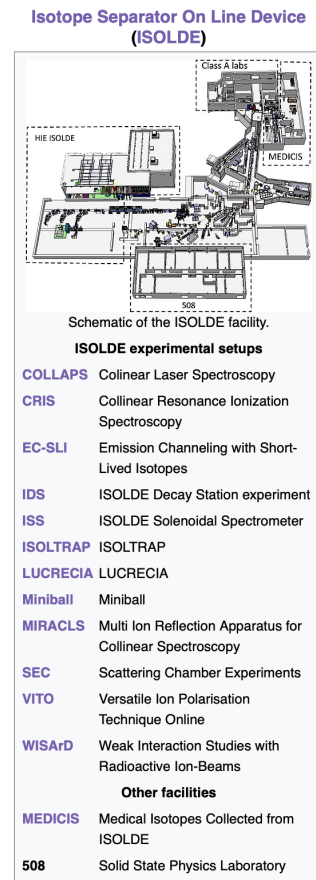
Once I completed the first draft for each of the experimental setups, I contacted a member of the group to ask for feedback and modifications they would like to see made to the article. By doing this I was able to communicate with CERN employees who were well-versed in the experiment, and could point out mistakes or areas to expand on. Both CRIS and Miniball were articles that improved greatly based on feedback I had from members of the team.

Whilst most of the finished experimental setup articles have not yet been given a classification, the [VITO](#), [MIRACLS](#), [WISArD](#), [ISOLTRAP](#) and [LUCRECIA](#) experiment articles have been classified as a C-Class article. The conditions for this category are multiple reliable sources and better developed in style, structure and quality than a Start-Class article [10]. As the articles are similar in structure to the other setups, it is reasonable to assume that the others would also be considered a C-Class. Therefore, this exceeds the aim of creating Start-Class articles, and provides a higher level of information to the reader. To improve the articles, any gaps should be filled in and the flow of the articles should be reassessed. Wikipedia is collaboratively driven, which means any user can edit the article and improve features. As a result, I am confident that in time the experimental setup articles will improve and update according to recent publications and results.

### 2.3.3 CERN-MEDICIS

Another important aspect of the project was creating and developing the Medical Isotopes from ISOLDE (MEDICIS) article. This followed from the original ISOLDE article, which provided a limited amount of information on the MEDICIS facility, and led to the creation of the individual [CERN-MEDICIS](#) page. MEDICIS is a facility that produces medical isotopes for use in research laboratories and hospitals, in order to advance

Figure 2: ISOLDE template used for Wikipedia page.



the treatment and diagnosis of cancer. The research that results from MEDICIS is very important, and would be of interest to the general public, considering the area of medicine it concerns. Due to this, it was important to develop the article as a potential to inform new readers of the project. The finished page has been rated a C-Class article, which is appropriate given the short amount of time MEDICIS has been operational and the low number of research papers published. In order to improve the article, more studies should be included once published and there should be detailed information about the safety precautions that MEDICIS uses.

### 2.3.4 Other articles

Other articles created and expanded includes the *UA series of experiments*, the *DELPHI experiment*, *LEAR*, and the *LHCf experiment*. The last three of these articles are part of the [WikiProject Physics](#), a project for expanding existing physics articles. These Stub-Class articles were expanded with the hope that they would eventually be reassessed to be at least Start-Class. Additionally, I created *List of CERN Scientific Committees*, which contained tables of the current and past committees of CERN.

See Appendix 1 for a full list of articles worked on during the project.

## 3 CERNipedia

CERNipedia is resource for CERN employees that provides a central platform of information. This will be done by combining the information from individual websites on the CERN server, for a more accessible and easy-to-use place to find information about the various departments, experiments, groups and people of CERN. The type of platform used for the CERNipedia is Wiki.js, which is a free wiki engine.

### 3.1 Structure

As part of my project, I developed a structure that can be used for the CERNipedia, and created sample pages to fill the wiki. The aim of the structure is to provide a starting point for creating pages, as well as ensure that all information from existing CERN pages has a place in the CERNipedia.

The Wiki.js uses a folder structure to contain the network of pages. To create a page, it must be nested within a series of folders by providing an exact path. For example, to create a page for the head of the Beams department, Rhodri Jones, it must be linked under the path `sectors/ats/be/people/rhodri_jones`. The software also allows folder to be their own pages, which allows the beams department to have their own page at the location `sectors/ats/be`.

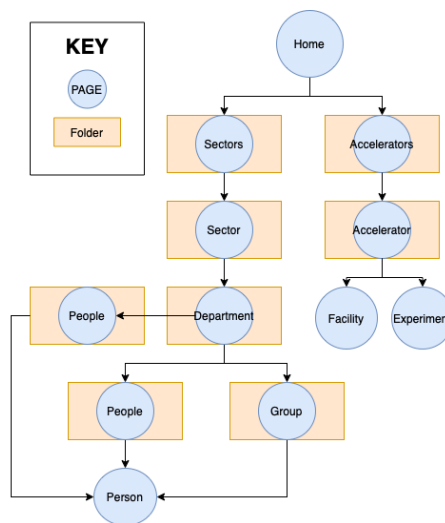


Figure 3: Initial proposed structure of CERNipedia. The circles denote pages and the rectangles denote folders. The pages will mostly contain already written information from the pre-existing CERN websites.

Figure 3 shows the initially proposed structure for the CERNipedia including pages and folders that can be created using the Wiki.js software. Using this structure, the vast majority of the content across CERN webpages

can be covered on the CERN Wiki, with the possibility of adding more to the structure if necessary. For example, this does not cover all the content on the CERN Home page which includes physics theory, computing and resources. However, by adding more folders to the structure, such as a Computing folder connected to the Home page, the entirety of the content can be added. During my project, I populated pages relating to the left-hand side of Fig.3 and successfully created a web of navigable pages.

After discussions with others involved with the CERNipedia, the structure was changed to better reflect the contents of CERN's presence on Wikipedia. In this case, all persons will be located in a people directory, instead of distributed through the various departments and groups. This enabled the articles from Wikipedia to be automatically converted to CERNipedia pages into one main folder, able to be referenced by pages from other folders if necessary. Tags were crucial in order for the user to filter their search, for example they can choose tags 'theory' and 'physicists' to find all theoretical physicists pages.

## 4 Conclusions

In conclusion, the aim of developing CERN's Wikipedia presence has been successfully completed, predominantly through expanding the coverage of ISOLDE on the platform. The ISOLDE page was expanded by developing the section on Facility and Concept, and by adding more sections, including one on experimental setups. From this expansion, new individual articles were created for the experimental setups, which provided detailed information on the theory, setup and results. ISOLDE is now represented by CERN's Wikipedia coverage to a similar degree as more popular articles, such as the LHC. The expansion was successful as the ISOLDE article has been reviewed as a B-Class article, showing a vast improvement from its previous stub categorisation. Furthermore, five of twelve of the individual setup articles have been rated a C-Class article, as well as CERN-MEDICIS. Therefore, it is clear that the project successfully improved CERN's Wikipedia coverage, with ISOLDE as a specific example of this success. Future work on developing CERN's Wikipedia presence should be to keep articles up-to-date, following new publications and experiments.

The other project aim, to create a resource for CERN employees to find information, CERNipedia, was successful as although the site wasn't completed populated, a structure was developed to ensure that this could happen in the future. The structure allows for pages to be easily navigated between, and enables more additions to be made if necessary. Future work includes importing every CERN-related Wikipedia page into the CERN Wiki, and classifying all pages with tags so that users can easily sort and filter. A system in which the pages could be dynamic and automatically updates if changes to their respective Wikipedia page was made would be a significant achievement for the CERNipedia.

## 5 Acknowledgements

I would like to thank my supervisor Jens Vigen for his advice and guidance throughout the project, and his infectious enthusiasm for Wikipedia and the CERNipedia. I would also like to thank Benjamin Bergia for his work on building and developing the CERN Wiki. Furthermore, I would like to thank the ISOLDE collaboration, many of whom were kind enough to take the time to give feedback on the articles I'd written. Finally, I'd like to thank the Summer Student Team for organising this incredible programme.

## References

- [1] T. Berners-Lee and M. Fischetti. *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by Its Inventor*. Turtleback, 2004.
- [2] Stacey M. Lavsa, Shelby L. Corman, Colleen M. Culley, and Tara L. Pummer. Reliability of wikipedia as a medication information source for pharmacy students. *Currents in Pharmacy Teaching and Learning*, 3(2):154–158, 2011.
- [3] CERN: Our Mission. <https://www.home.cern/about/who-we-are/our-mission>. Accessed: 2023-08-30.
- [4] L Pieper. Cernipedia : réflexion sur la création d’une application web permettant la recherche dans des bases de données relatives à la documentation du cern. *Sonar*, 2022.
- [5] The third run of the Large Hadron Collider has successfully started. <https://home.cern/news/news/cern/third-run-large-hadron-collider-has-successfully-started>, 2022. Accessed: 2023-08-30.
- [6] Wikipedia:Good articles. [https://en.wikipedia.org/wiki/Wikipedia:Good\\_articles](https://en.wikipedia.org/wiki/Wikipedia:Good_articles). Accessed: 2023-08-30.
- [7] Wikipedia:Identifying and using primary sources. [https://en.wikipedia.org/wiki/Wikipedia:Identifying\\_and\\_using\\_primary\\_sources](https://en.wikipedia.org/wiki/Wikipedia:Identifying_and_using_primary_sources). Accessed:2023-08-30.
- [8] Wikipedia:Content assessment/B-Class criteria. [https://en.wikipedia.org/wiki/Wikipedia:Content\\_assessment/B-Class\\_criteria](https://en.wikipedia.org/wiki/Wikipedia:Content_assessment/B-Class_criteria). Accessed:2023-08-31.
- [9] M Rihat. 5 Benefits of Establishing a Wikipedia Page for Your Brand. <https://www.linkedin.com/pulse/top-5-benefits-establishing-wikipedia-page-your-brand-md-rihat/>. Accessed:2023-08-30.
- [10] Wikipedia:Content assessment/C-Class criteria. [https://en.wikipedia.org/wiki/Wikipedia:Content\\_assessment/C-Class\\_criteria](https://en.wikipedia.org/wiki/Wikipedia:Content_assessment/C-Class_criteria). Accessed:2023-08-30.

## A Appendix 1

Further information on my Wikipedia contributions throughout this project can be found from my user page: [Madeleinehales](#).

### A.1 Created Pages

| Page Title                                                | Current Size (bytes) | Assessment |
|-----------------------------------------------------------|----------------------|------------|
| <a href="#">CERN-MEDICIS</a>                              | 24632                | C          |
| <a href="#">COLLAPS experiment</a>                        | 9179                 | Unknown    |
| <a href="#">CRIS experiment</a>                           | 14626                | Unknown    |
| <a href="#">EC-SLI experiment</a>                         | 7576                 | Unknown    |
| <a href="#">ISOLDE Decay Station experiment</a>           | 17123                | Unknown    |
| <a href="#">ISOLDE Solenoidal Spectrometer experiment</a> | 11944                | B          |
| <a href="#">ISOLTRAP experiment</a>                       | 14513                | C          |
| <a href="#">LUCRECIA experiment</a>                       | 11473                | C          |
| <a href="#">Miniball experiment</a>                       | 16284                | Unknown    |
| <a href="#">MIRACLS experiment</a>                        | 10592                | C          |
| <a href="#">SEC experiment</a>                            | 7923                 | Start      |
| <a href="#">UA3 experiment</a>                            | 3773                 | Start      |
| <a href="#">UA6 experiment</a>                            | 6520                 | Unknown    |
| <a href="#">UA7 experiment</a>                            | 6141                 | Unknown    |
| <a href="#">UA9 experiment</a>                            | 5207                 | Start      |
| <a href="#">VITO experiment</a>                           | 9618                 | C          |
| <a href="#">WISArD experiment</a>                         | 13120                | C          |
| <a href="#">List of CERN Scientific Committees</a>        | 8878                 | C          |

### A.2 Significantly Expanded Pages

| Page Title                                 | Size Expanded (bytes) | Description                                                                                                                                                                                                       |
|--------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">ISOLDE</a>                     | 62155                 | Improved article according to annotations from ISOLDE spokesperson. Major overhaul of facility and concept sections, and inclusion of new experimental setups and beamline installations sections. Stub → B-Class |
| <a href="#">DELPHI experiment</a>          | 15991                 | Expanded from stub with new sections. Refined after feedback from DELPHI spokesperson. Stub → C-Class                                                                                                             |
| <a href="#">LHCf experiment</a>            | 11366                 | Expanded from stub with new sections.                                                                                                                                                                             |
| <a href="#">Neutron Time of Flight</a>     | 8142                  | Expanded from stub with new sections. Stub → C-Class                                                                                                                                                              |
| <a href="#">Low Energy Antiproton Ring</a> | 7367                  | Expanded from stub with new sections.                                                                                                                                                                             |
| <a href="#">NA49 experiment</a>            | 5608                  | Expanded from stub with new sections                                                                                                                                                                              |
| <a href="#">WA89 experiment</a>            | 2389                  | Introduced experimental setup section.                                                                                                                                                                            |
| <a href="#">CERN</a>                       | 2906                  | Updated Non-Member States and added popular culture mention.                                                                                                                                                      |

### A.3 Other Expanded Pages

A number of other pages were expanded during the project. These aren't listed but can be found on my Wikipedia contributions page.

## **A.4 Images Added**

Uploaded 92 images to Wikimedia Commons.