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WP 5, task 5.1: Feasibility fast track open access pilot

Deliverable 5.1 Report on feasibility fast track open access

Background

CERIC started offering open access in 2014, with a first test call in March that year. From then, two calls per year have been issued and over 1100 projects have been completed with the measurements performed in the instruments offered by the consortium. The submission of a project to a call requires planning the experiments well in advance, since there are six months of time between calls. Moreover, from the moment a proposal is submitted until the moment a measurement is performed, there are at least three additional months of waiting. For this reason, some facilities have implemented fast access procedures that allow, in very specific cases, to have access to facilities with much shorter waiting times. The ISTAC (international Scientific and Technical Advisory Committee) of CERIC recommended that CERIC implements a fast access as well. Research projects, especially highly innovative ones, represent the challenge of being highly risky. Evaluators appreciate the innovative character of a project, as much as they hesitate to recommend providing time when there is a high uncertainty associated to a measurement campaign. The fast track access is a clue element for this highly innovative projects, allowing to evaluate the feasibility and providing researchers with the material to support their project proposal. Therefore, with a small investment of time by the facilities, evaluators are facilitated in their task and the time assigned to a proposal is more likely to produce groundbreaking results, making a more efficient use of the facilities. Learning from the ACCELERATE partners experience, CERIC developed its own procedures for fast-track open access. The main scope of this procedure for CERIC was to serve increasingly inter-disciplinary users, which may not have the expertise in all the analytical techniques needed. The proposed fast access will allow feasibility studies on a single instrument. The present report encloses a summary of the main features and related results as well as potential future developments.

Implementation of the fast track open access pilot

Existing know-how: Fast access in ACCELERATE partners (TUM FRMII) and in CERIC Facilities

Some ACCELERATE consortium partners have a consolidated experience in fast access. The partner TUM, running the FRMII neutrons reactor through their cooperation in MLZ, the Heinz Maier-Leibnitz Zentrum, has been implementing this modality of access for several years. In their fast access programme, called “Rapid Access programme”, a limited number of days (up to a maximum of three beam days out of 60 per reactor cycle, four times a year) are allocated by a fast response process. It is devoted to those measurements that do not fit into the normal proposal workflow, with two calls followed by peer reviews per year. The user presence for that kind of experiments is not necessary and therefore samples are sent to the designated local contact that carries out the proposed measurements. Users are then provided with the raw experimental data as well as pre-treated data for further analysis. Only part of the instruments (four in total) are available for

the Rapid Access. Proposals for Rapid Access can be submitted anytime; ten days before each reactor cycle the received proposals are reviewed by the established Science internal committees, that evaluate not only the scientific potential of the experiment but mainly how suitable it is for the rapid access, against the regular submission calls. Beamtime to Rapid Access proposals is allocated up to a maximum of 12 hours. Proposals with existing samples (at the time of submission) have priority. Regarding the CERIC consortium, only one of the Representing Entities has a similar system in place, although the principle is different. The synchrotron Elettra offers the possibility of fast access for macromolecular crystallography experiments since 2011. Half of the available user time per semester is dedicated to fast track proposals. This procedure is not intended as a feasibility test but rather as a full measurement, the rationale behind this fast access mechanism lies on the complexity and uncertainty in sample preparation and its short lifetime. It is dedicated to macromolecular crystallography experiments having a well-defined experimental setup and samples suffering of a rapid decay in terms of quality since formed. It reduces significantly the time between proposal submission and allocation and requires that crystalline samples be ready in the moment of proposal submission. An average proposal requires three shifts (24 hours) but there is no restriction for the amount of time a proposal can require. Access is granted from 1 to 3 months from the application for beamtime. It is possible to submit a proposal anytime during the year, so no deadlines are present. At the beginning of every month the proposals submitted in the previous one are evaluated by an appropriate Proposal Review Panel (M). The beamline scientist makes the beam time allocation in the following month, according to the score assigned on the basis of scientific relevance. Diversely from FRMII, in this fast access mechanism the unsuitability of the experiment for the regular calls (every six months) is a pre-condition to request fast access, but the main criterion to win time in the facility is the scientific excellence. Rejected proposals can be resubmitted to compete for time in the following month.

Fast Track access in CERIC

After having analysed the state of the art in ACCELERATE and CERIC facilities, CERIC identified the most suitable option for its own procedure, described below

Implementation

Two phases of implementation have been proposed:

- the pilot foreseen in this project, tested by a restricted group of facilities, and
- a second phase of the pilot, where the tested method would extend to the rest of CERIC facilities willing to offer this kind of access.

The first phase started in 2017 lasting 4 semesters (two years).

Facilities involved

In the pilot, the Austrian, Czech, Italian and Slovenian partner facilities dedicated 5 days per semester to these proposals and those hours have been granted on demand until exhausted. Later, other facilities decided to add new instruments to the offer, and some, as the Czech, decided to limit this pilot because it was too time consuming, since most of the potential applications did not comply with the eligibility criteria.

Submission of proposals

The submission of proposals was continuous, through the IT platform currently used for regular proposals submission. The system was adapted, as an activity of WP2, to allow to introduce the changes in the form and workflow. Fast track proposals require a discussion between the instrument scientists and the researcher (applicant) before the submission. Unlike with the regular call, this was not only encouraged but mandatory. Such discussion had the scope to assess the requirements for fast access and the non-suitability of the proposal to be submitted through the regular channel, as well as to provide the instrument scientist with all the necessary information to evaluate the proposal, since the form for the description of the project is minimal in the view of reducing the administrative burden as much as possible.

Requirements

Proposals eligible for fast access should have a strong motivation for applying through this channel, satisfying one or more of the following criteria:

- as for regular CERIC proposals, show a multi-technique approach to a scientific problem,
- prove the need to test a new instrument or sample,
- be necessary to validate a result for an imminent publication, or
- any other valid justification for a fast and short access.

Although the first requirement is to show a multi-technique approach, the application for fast track access can involve only one instrument.

Selection of proposals and allocation of instrument time

The fast-track access was limited to few proposals per semester and granting a very limited number of hours, therefore it did not compete with the peer-reviewed open access. Proposals received through continuous submission were evaluated by the facilities directly. The decision on the allocation of time was up to them.
The most frequent requested assignment was 12 hours but in some cases, depending on the specific problem has been extended to a maximum of 48 hours.

Reporting

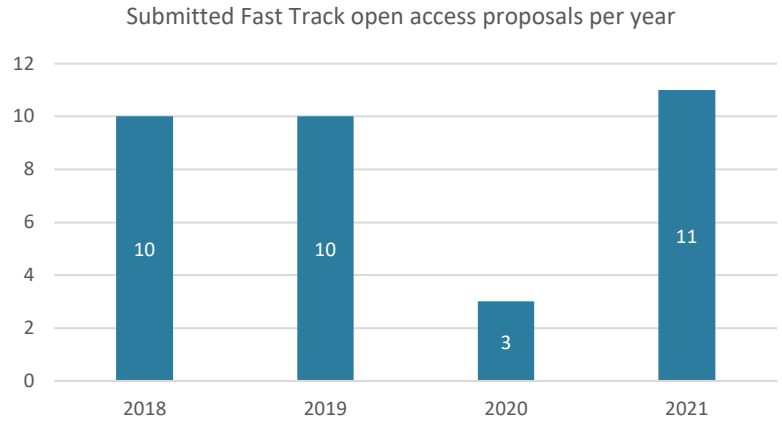
Users were asked to fill in a report on the achievements and usefulness of the measurements performed. Instrument scientists have been also interviewed after the end of every semester of fast access experiments, for the duration of the pilot, in order to collect their feedback and propose any necessary change in the process.

Mobility support

Mobility support, similar to the one offered to the regular open access proposals, has been provided also to the fast track proposals as part of the trans-national access (TNA). Up to two users for each measurements were eligible to request support for the travel and accommodation.

Results of the pilot

Since the implementation of the Fast Track open access pilot a total of 34 proposals were submitted over 4 years [Fig.1]. 26 out of 34 submitted proposal were scheduled and the feasibility measurements regularly performed no longer after, usually within one month from the submission, as foreseen for this pilot.



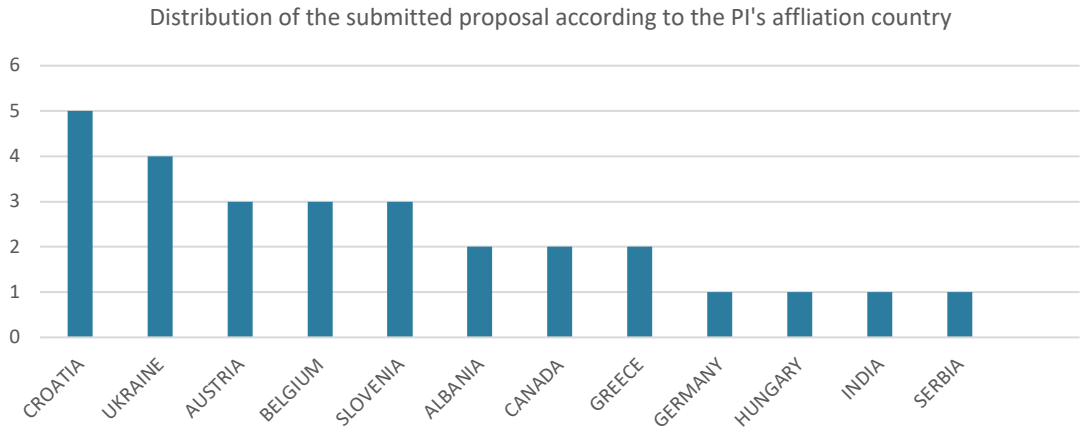
[Fig.1]

	2018	2019	2020	2021
ASKA - 600 MHz NMR Spectrometer	0	1	0	0
DAVID – 800 MHz NMR Spectrometer	2	0	0	0
DXRL – Deep X-ray Lithography*	0	0	1	2
LSLTUG – Dynamic & Static Light Scattering	0	1	0	0
MAGIC – 600 MHz NMR Spectrometer	2	2	0	0
NAPXPS – Near Ambient Pressure X-ray Photoelectron Spectroscopy	1	0	0	0
SAXS – Small Angle X-ray Scattering*	0	0	1	8
SISSI-BIO – Synchrotron Infrared Source for Spectroscopy and Imaging	1	4	0	0
SXFTUG – Lab Small Angle X-ray Scattering	0	1	1	1
XAFS – X-ray Absorption Spectroscopy	4	0	0	0
XPSXPD – X-ray Photoelectron Diffraction	0	1	0	0

*SAXS and DXRL joined the pilot later (in 2020)

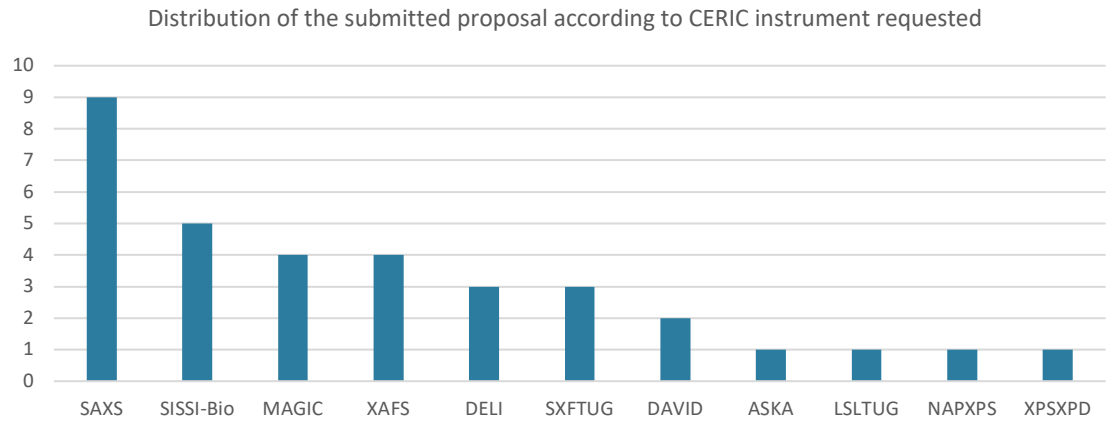
During 2020 a lower number of Fast Track open access proposals were submitted due to the beginning of the COVID-19 pandemic and consequent start of the COVID-19 Fast Track open access.

According to the Principal investigator's affiliation country, as declared in the VUO, the majority of proposals were submitted from Croatia and Ukraine, with 35% of the total coming from CERIC member countries [Fig.2].



[Fig.2]

Among the instruments available for the FT open access pilot, SAXS was the most requested. To be noted that, as mentioned before, some of the instruments available at the beginning of the pilot stopped to offer access for FT proposals in a later stage. This was mainly due to the overload the pilot generated in the researchers running the instruments in the facilities, because of a misunderstanding of the goals of the fast track by the potential users.



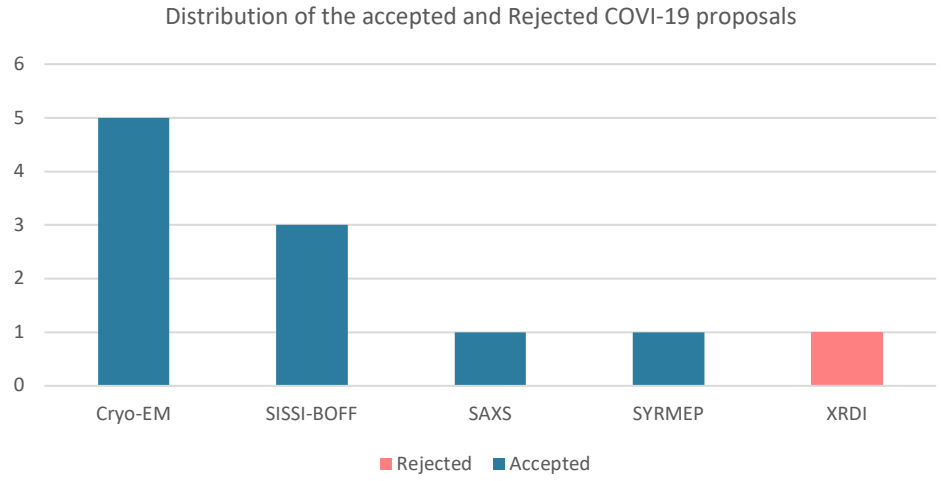
[Fig.3]

Based on a comparison between the PIs of the fast track proposals and the ones for the regular yearly calls, we can conclude that 30% of the successful fast track proposals have been used as a ground for the preparation of a regular proposal later submitted through the CERIC open access. If the proposals were submitted by someone different than the PI of the fast track, then we may have missed them.

COVID-19 fast track open access

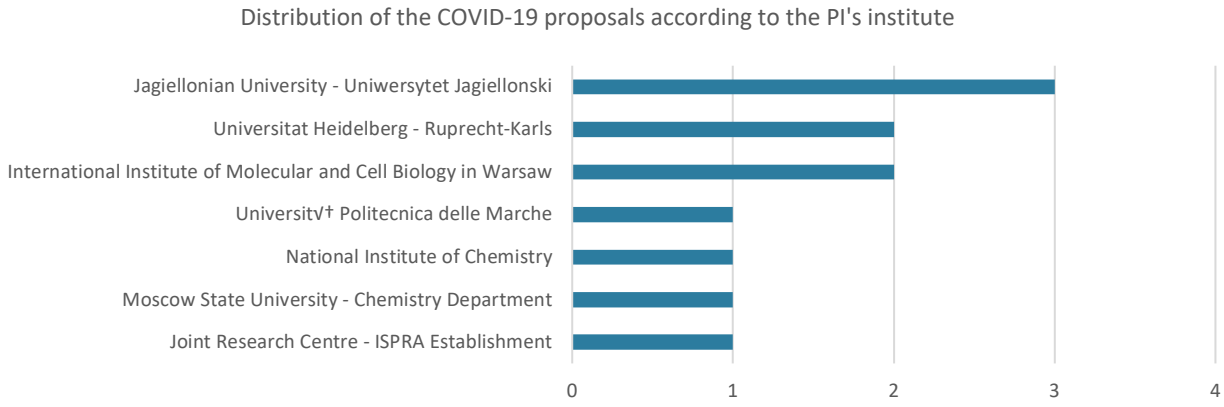
During the first weeks of the COVID-19 emergency, CERIC set up a priority Fast Track Access to its most relevant instruments for COVID-19 related experiments. This timely response was possible only because of the experience acquired during the development and implementation of the

Accelerate Fast-Track Access pilot and the knowledge gained during the project itself. Featuring a continuous submission, the evaluation procedure was simplified through internal feasibility and excellence review, internal meaning by personnel of the facilities to which users were applying. The scheduling, unless otherwise requested by the user, was granted within one month from the submission of the proposal. Users were encouraged to contact the facilities and discuss their projects in advance with the scientific personnel before submitting their proposal.
The regular submission and evaluation procedure followed in the two yearly calls for proposals, that usually takes approximately 3 months, was deemed inappropriate to deal with this emergency so the solutions adopted as well as the systems already developed for the Fast Track open access pilot paved the way for a COVID-19 dedicated access.
To allow the fastest exploitation and dissemination of the results, a reduced embargo period was set for the raw data obtained through this access, limited to 6 months from the end of the measurements.
Due to the lack of the necessary bio-safety accreditation in the CERIC facilities, only samples guaranteed as non-harmful and with no ability to cause or transfer viral infection were accepted for research.
After 15 months of operations (March 2020 – June 2021), CERIC has received 11 proposals from which 10 have been positively evaluated and performed [Fig.4].



[Fig.4]

A distribution of the COVID-19 proposals submitted to CERIC according to the institute of the principal investigator is shown below [Fig.5].



[Fig.5]

Based on the technical capabilities of the instruments part of CERIC and their availability, a selection of 15 instruments has been offered to the scientific community for COVID-19 related research. In addition 20 instruments from the Italian Network for Micro and Nano Fabrication were made available as well, through the electronic submission system developed by CERIC. Unlike other fast track proposals, the COVID-19 related ones could apply for multiple instruments in the same proposal and the amount of time that can be requested is not limited.

Future of the pilot and conclusions

Fast Track access is a service many RIs are already proving to the scientific community, with each Institute developing his own rules, based on the possibilities of their facilities the available instrumentation, to accommodate the necessity of their users.

The Fast Track open access pilot developed by CERIC in the frame of the Accelerate project was created with a defined goal: to allow feasibility studies without the necessity to undergo the lengthy procedure used for regular proposals, giving the possibility to test samples and techniques before engaging in the design of a full proposal to be submitted during the two yearly Calls for Proposals. This proved to be advantageous for users, who could test and tune their proposals, for facilities that could make the most efficient use of the infrastructure, maximising the outputs, and for reviewers that had available solid background material to evaluate the proposals. The possibility for a continuous submission and fast scheduling for short measurements were appreciated by the CERIC user community as demonstrated by the number of FT proposals received during the four years of operation (34) as well as those accepted (76,5%). On the other hand, the pilot was also useful for CERIC itself to develop the procedures and understand the resources and the planning necessary to run this kind of access, as well as the possibilities it offers in terms of outcome. Almost one third of the performed fast-track proposals were used to support full proposals, later submitted during the two yearly Calls organized by CERIC. At the same time the Fast Track open access pilot, that was designed as a tool for feasibility tests, demonstrated that there was scope for a diverse use, based on the request by the scientific community to be able to perform short measurements necessary to complete, complement or support a complex research work about to be published.

Based on the experience acquired from the fast-track open access pilot, and the developed electronic submission system, it was also possible to set in a very short time span, a dedicated

channel for COVID-19 related research, which has shown a good response from the community and served to also as inspiration to the implementation of this dedicated access by other RIs (e.g. Elettra Sincrotrone Trieste, the Italian Representing Entity).
Given the positive outcomes of this pilot the solutions developed will keep running regularly after the end of the project. The Fast Track access channel could be the key to implement new solutions in the future for crisis such as the COVID-19, but also the Green Deal or other global challenges.