



Internationale Kommission zum Schutz des Rheins
Commission Internationale pour la Protection du Rhin
Internationale Commissie ter Bescherming van de Rijn

ICPR Tender documents (specification and terms of reference)

Name of the assignment:

Reprogramming of the GIS tool "ICPR FloRiAn (Flood Risk Analysis)" identifying flood risk reduction for use with QGIS or/and ArcGIS Pro

Initial situation and purpose of the terms of reference for the reprogramming of the "FloRiAn" GIS tool

The International Commission for the Protection of the Rhine (ICPR) has developed a method to assess the effects of measures on flood risk, which has been implemented in a geoinformation system (GIS – ESRI ArcMap, including version 10.8, with spatial analyst extension) by the engineering office HKV together with the ICPR expert group HIRI (EG HIRI). The "ICPR FloRiAn (Flood Risk Analysis)" tool (Figure 1) is used to quantitatively and regularly verify the effectiveness of flood prevention measures on the Rhine. The Floods Directive (FD) gives a 6-year cycle in which the calculations must be repeated and progress compared to the previous cycle must be demonstrated. Two synthesis reports have already been published, most recently in 2021, which are based on calculations with FloRiAn of flood-related negative consequences on human health, the environment, cultural heritage and economic activities as well as the influence of measures on these.

Due to restructuring at ESRI and ESRI's obligation to switch from an ArcMap licence (on which the tool ran as a toolbox that also used Spatial Analyst) to ArcGIS Pro, it will no longer be possible to continue using the tool in its usual form in the ICPR Secretariat (which carries out the calculations for the EG HIRI) from September 2024. For this reason, the ICPR Secretariat has tested whether FloRiAn also works with ArcGIS Pro or QGIS. It turned out that FloRiAn is not compatible with these programmes without reprogramming. **The ICPR (EG HIRI) has therefore decided to outsource the adaptation of FloRiAn to QGIS and/or ArcGIS Pro.**

All important information and reports on the "FloRiAn" method and tool can be found in Chapter 6.

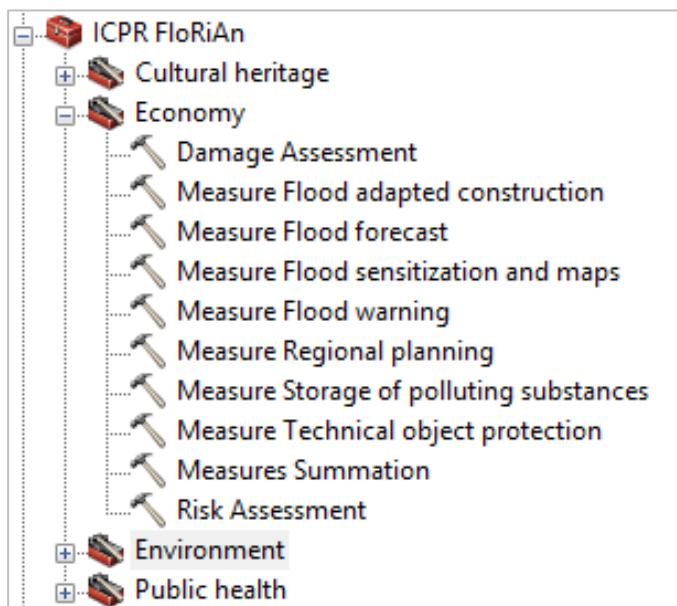


Figure 1: Calculation modules/steps of FloRiAn (ArcGIS-Toolbox), e.g. "Economy":

For each type of flood-related asset (= "negative consequences" according to the FD), damage due to three flood scenarios ("Damage Assessment"), the effect of different measures ("Measure XX") and the sum of it on reducing this damage ("Measure Summation") and the risk (combination with the probability of flooding for three flood scenarios; "Risk Assessment") is calculated.

1. Purpose of the document

These terms of reference or specifications define the services to be provided by the bidder on the basis of the information described in this document. It regulates the procedure and form of the tender submission and is the basis for the solicitation.

2. Initial situation

International Commission for the Protection of the Rhine: The ICPR was founded by the governments of Switzerland, France, Germany, Luxembourg, the Netherlands and the EC as a water protection commission for the Rhine. The co-operation that has existed since 1950 has been extended to Austria, Liechtenstein and the Walloon Region since 2001 as part of the joint implementation of EU directives throughout the river basin. The secretariat is based in Koblenz.

The expert group "Flood Risks" (EG HIRI) and work carried out: The EG HIRI is an ICPR expert group subordinated to the Working Group "Floods and Low Water" (WG H). In the ICPR Action Plan on Floods (APF) (1998), the prevention/reduction of flood risks and damage was agreed as one of the main objectives in addition to the protection of the population. Since 2015, this objective has remained in the [International Flood Risk Management Plans \(IFRMPs\)](#) for the Rhine basin and in the ICPR umbrella programme "[Rhine 2040](#)".

The task of the EG HIRI is to identify the effectiveness of the measures for the stated objectives. In order to examine the extent to which these objectives have also been achieved quantitatively, a method first had to be developed, for which the ICPR Working Group on Floods and Low Water appointed the EG HIRI. Based on the then rather qualitative approach to determining the change in flood damages and risks, a clear and comprehensible, predominantly quantitative verification tool with measurable and reproducible indicators for individual categories of measures has been created since 2015: the [GIS tool "FloRiAn"](#), which is used by the EG HIRI on the main stream of the Rhine in particular, but which now also has many external applications (see information in Chapter 6).

In order to be able to compare the results of older investigations with the measures implemented within the framework of the FD or the ICPR programme "Rhine 2040" in the future and to continue using the tool for calculations of the EG HIRI, it is necessary to adapt FloRiAn for use with **QGIS and/or ArcGIS Pro**.

3. Aim of the assignment and boundary conditions

3.1. Assignment description

The assignment covers two interlinked part assignments and an additional option:

1. In connection with the IFRMP and its implementation in the International River Basin District (IRBD) Rhine and the objective achievement monitoring of "Rhine 2040", the GIS tool FloRiAn, which **allows to assess/evaluate the reduction of flood risk, must be reprogrammed so that it can be used with QGIS or/and ArcGIS Pro**. The bidder (engineering office or similar) should present both options in its bid (with separate cost description) : Adaptation in QGIS (favoured variant of the ICPR) and adaptation in ArcGIS Pro. It should also be described whether a simultaneous reprogramming for both programmes would be possible and what costs would be involved. The function of the instrument should not be impaired or changed, but only compatibility with QGIS or/and ArcGIS Pro should be established. For the three flood scenarios ($HQ_{\text{frequent/high}}$, HQ_{medium} , HQ_{extreme}), the types of measures (indicators) defined in the ICPR and the 4 protection assets according to the FD (human health, environment, cultural heritage and economic activities) must be taken into account (see details in Chapter 6).
2. To demonstrate and prove the functioning of FloRiAn, comparative calculations (content to be agreed together with the client) with previous results are to be carried out after the reprogramming. This should show that the main calculation steps and methodology have not changed (reproducibility) and that any deviation in the results is only due to the change of software used (ArcMap -> QGIS/ArcGIS Pro). The newly programmed tool and the input or output data (results) must ultimately be installed on a computer at the ICPR Secretariat, with the help of the contractor, so that the Secretariat can check whether the newly programmed tool works properly and delivers plausible results. In future, the Secretariat/ICPR should be able to use the tool without having to adjust it for new versions of QGIS and/or ArcGIS Pro. During or after completion of the work the contractor gives an introduction to the code used/programmed in the tool and how to modify it (to enable any possible future adjustments to the tool by the secretariat/ICPR directly).
3. The bidder should also offer the option of supporting the secretariat in using the tool after completion (submission) of the work, based on a hourly rate. The costs for this option are to be listed separately.

Delivery of assignment:

The following work is delivered by the end of the assignment:

- the reprogrammed FloRiAn tool
- the installation and introduction of the tool (incl. codes and possibilities to change the tool in-house) at the ICPR Secretariat
- test calculations including controlling by the Secretariat (max 2 months)
- a short report summarising the work carried out (see chapter 4 „Reporting“)
- the programming codes
- the input and output data used/changed (results of calculations with the reprogrammed tool and results of comparative calculations)
- if deemed useful by the client/contractor: adaptations of the current technical documents for the tool ("User guide" and/or "Technical reference", see chapter 6)

Acceptance of the delivered work is notified at the latest 2 months after delivery of the last item.

3.2. Important boundary conditions

Reproducibility and ownership: The results of the reprogrammed tool should be transparent and reproducible. The contractor should carefully document the reprogramming carried out and the analysis for reproducibility and deliver the data, codes and results used to the client (property of the ICPR).

3.3. After sales service

Once acceptance and payment have been made to the service provider (contractor), the client reserves the right to inform the contractor of any problems or defects that arise in the use of the tool within one year of payment. In this case, the contractor is required, as far as possible, to find solutions to these problems together with the client or to correct and resend the tool.

4. Organisational details

The contractor (engineering office or similar) is determined through a call for tenders in which - if available - several offers are obtained and compared. After the deadline for the submission of tenders, the ICPR Secretariat and EG HIRI will coordinate the selection of the service provider and make a decision based on the contract award criteria mentioned in Chapter 5. Only if necessary, the contractor(s) will be invited to a bidder hearing (online or in Koblenz) to present their bids in the presence of the ICPR Secretariat and/or EG HIRI.

The ICPR's expert group HIRI is responsible for the technical direction of the project. The work organisation is shown in the following table:

Role	Function	Person/institution
Client	Initiator and responsible for the realisation of the assignment	ICPR
Technical direction	Responsible for the technical and scheduling specifications and achievement of the objectives within the set cost and time frame; if necessary, provision of data	Expert Group HIRI of the ICPR, represented by the Chair of the EG HIRI, Jörn Kautzmann (employee of the FGG Rhine)
Administration	Handling correspondence and payment transactions	ICPR Secretariat (Adrian Schmid-Breton and the ICPR Managing Director, Marc Daniel Heintz)

Project duration: The execution of the assignment should begin **midOctober/or beginning of november 2024 and be completed by 31 March 2025** at the latest.

Reporting: A short report should be prepared summarising the adjustments and calculations made to and with the tool, the results of the analysis and exemplary / comparative calculations performed to ensure existing functionality. In addition, the reporting of the contractor contains further information deemed useful by the contractor and/or client, guides/instructions for the use and on the calculation process of the tool (e.g. by adapting the technical documents for the tool "User guide" and/or "Technical reference", see chapter 6) as well as guides/instructions for (future) programming of the tool, etc.

5. Administrative details

Company profile of the bidders:

- Head office, branches (how many, where)
- Legal form
- Size, turnover, number of employees
- Market position in the countries involved and in Europe
- List of the most important/relevant services and references provided in recent years

Compliance : The bidder must prove its suitability for this contract, including which persons with which qualification will carry out the work.

Work plan and schedules

Detailed information on the planned procedure and the underlying data used and to be supplied:

- Information on the format of the data, information and text to be supplied;
- Detailed work plan with cost estimate and information on delivery dates.

A detailed and binding processing/work plan must be enclosed.

Pricing and Costs: All prices and costs incurred by the client as external remuneration in connection with the analysis, reprogramming, calculation and processing must be listed transparently, i.e. comprehensibly. Other costs (e.g. for transport, insurance, inspection, customs and other import duties) must also be stated.

Miscellaneous / Appendices: The bidder is free to include any information they consider important.

Confidentiality : The specification or terms of reference and the data/information provided by the ICPR in this context may not be made accessible to third parties without prior consultation. All knowledge, data, codes or the tool itself obtained in connection with the terms of reference must be treated confidentially (see chapter 5). This also applies to bidders who do not receive the assignment.

Queries regarding the specification/terms of reference: All queries regarding the terms of reference must be sent per Email **by 16 September 2024** to [secretariat\(at\)iksr.de](mailto:secretariat(at)iksr.de). After this date, a timely response to questions can no longer be guaranteed. Providers have until 16 September 2024 to request the list of anonymised questions posed by other providers and the answers provided from the secretariat.

Submission of tenders : Tenders must be **submitted** as a pdf in English **by 30 September 2024, 17:00 to the above email address.**

If the pdf exceeds the email sending size, providers can be offered an ftp server on request to the above email address before the 30 September 2024.

Contract award criteria: The following criteria are decisive for the award of the contract:

- Quality of the offer
- Proven experience from similar projects
- Experience with/knowledge of QGIS and ArcMap/ArcGIS Pro (incl. programming)
- Other services and references
- Economic efficiency
- Delivery times

Terms of payment : Invoice in Euro. Payment is made after acceptance of the delivered assignment (see chapter 3.1). Details on reporting can also be found at the end of chapter 4. See also the information on after sale services in section 3.3.

If required, an advance payment can be made by the ICPR after the assignment has been placed.

Contact details of the ICPR:

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6. Provision of important documents, the tool and test data by the client

Much of the information and documents are already available on the ICPR's public website, in particular on the FloRiAn page: <https://www.iksr.org/en/topics/floods/flood-risk-tool-florian>

To facilitate the submission of bids and, if applicable, the execution of the work, the ICPR provides bidders with a **special downloadable folder** containing all important documents as well as the "FloRiAn" tool and test data. **If you are interested to get this folder for the preparation of the bid, please contact the [sekretariat\(at\)iksr.de](mailto:sekretariat(at)iksr.de).** Please consult first the "Read me" document in the folder. Please note that the tool, the information and the data are only to be used internally for the preparation of the bid (and, if applicable, the execution of the work) and must be treated confidentially (see chapter 5).