

# RESEARCH AGREEMENT

Sponsor: .....  
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Contractor: Charles University, Prague  
Faculty of Mathematics and Physics  
Ke Karlovu 3  
121 16 Prague 2, Czech Republic

Project leader: Luděk Klimeš  
Charles University  
Faculty of Mathematics and Physics  
Department of Geophysics  
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Contract for: SEISMIC WAVES IN COMPLEX 3-D STRUCTURES

Contract period: October 1, 2016, through September 30, 2017.

Type of contract: Fixed amount.

Yearly fee: 16 000.- EUR (All taxes included)

Payment due: January 31, 2017.

In witness whereof, the parties hereto have executed this agreement on the day and year specified below.

Sponsor: .....  
.....

Contractor: Charles University  
Faculty of Math. and Physics

Signature: .....

Signature: .....

Name: .....

Name: Prof. RNDr. Jan Trlifaj, CSc., DSc.

Title: .....

Title: Vice-dean

Date: .....

Date: .....

This agreement deals with fundamental research into seismic wave propagation in complex 3-D structures. The research will consist of theoretical and numerical studies on the seismic ray method and its extensions, as well as on its combinations with other methods. The emphasis will be put on new, stable, more efficient and flexible algorithms for both forward numerical modelling and inversion of seismic wave fields in 3-D inhomogeneous, isotropic and anisotropic structures. Considerable attention will be also devoted to non-traditional applications involving shear waves, converted waves, shear wave splitting in anisotropic media, particle ground motions, etc.

This agreement establishes sponsorship for the twenty-fourth year of this long-term research programme. The participation in the research programme is open to any organisation interested in exploration seismology.

Therefore, the ..... (the Sponsor) and the Charles University, Prague, Faculty of Mathematics and Physics (the University) do hereby agree as follows:

1. The University shall exert its best efforts to perform the services detailed in the document entitled: "The Research Programme on Seismic Waves in Complex 3-D Structures" (the Research Programme), which is attached and by this reference made a part hereof. Inasmuch as the number of participating sponsors will be directly related to the support level of the Research Programme, the resultant level of effort put forth will also be directly related to the number of sponsors participating. The performance shall begin on October 1, 2016, and terminate not later than September 30, 2017, unless the period of performance is extended by mutual agreement of the Sponsor and the University. This agreement may be amended only by written modification executed by authorized representatives of the Sponsor and the University.

2. As full consideration for the services to be performed hereunder, and for all expenses incurred during the performance of this agreement, the Sponsor shall pay to the University the amount of Sixteen Thousand Euros (16 000.- EUR) all taxes included, payable to the Komerční banka a.s. (swift address KOMBCZPPXXX), Václavské nám. 42, 114 07 Praha 1, Czech Republic; account number 38330021/0100 (Charles University, Praha, Faculty of Mathematics and Physics), IBAN format of the account CZ910100000000038330021, variable symbol 983.

This amount shall be paid in full immediately after signature of this agreement and not later than January 31, 2017. Inasmuch as the number of sponsors participating in this research programme may vary, the University's level of effort in regard to the magnitude and nature of research will be in the proportion to the number of sponsors. In the event of there being unexpected funds at the completion of the research period or the termination of this agreement pursuant to paragraph 10, the University shall either reimburse the participating sponsors on a pro-rata basis or, at the sole option of the Sponsor, employ the Sponsor's share of such funds on a pro-rata basis to fund the future year's research as may be mutually agreed upon.

3. A report setting forth significant achievements and findings of the research shall be submitted to each sponsor on an annual basis; a final report summarizing the results of the research shall be delivered within sixty (60) days of the expiration date of the project effort. Use and distribution of reports, or any part thereof, shall be at the discretion of the individual sponsors.

4. The University shall have the right, at its discretion, to publish the results of the research supported by this agreement. Papers and articles to be published will acknowledge the Sponsor's support of the research and will be provided to the Sponsor for review, at such time that amendments are still possible.

5. Dr. Luděk Klimeš will serve as the supervisor during the research project. His deputies will be Dr. Vlastislav Červený and Dr. Ivan Pšenčík.

6. All rights and titles in and to any invention, patents obtained on any of such inventions, copyrights, computer programs and the like, made under this agreement shall vest in the University, subject to a licence to make, use, perform, copy or sell any of said inventions, computer programs and simulation techniques and methods to which the licence applies, and the like, which the University hereby grants the Sponsor, its affiliates, and subsidiaries which shall be irrevocable, nonexclusive, unrestricted and royalty-free.

7. Title to all items of property acquired under this agreement shall vest in University.

8. Liability: The University shall not be liable for any loss or damage incurred by the Sponsor or any affiliate of the Sponsor arising out of the application of the results of the project to the extent that such loss or damage does not result from negligence on the part of the University or the supervisor, as the case may be. The University shall carry out the study and discharge its other obligations under this agreement as an independent contractor and no person of the University, including the supervisor, shall be considered person or an agent of the Sponsor. The Sponsor shall not be liable for any loss or damage incurred by the University and/or any third party in connection with this agreement.

9. Within the twenty-fourth year of the programme, one two-day meeting will be held in Prague on June 19–20, 2017, to summarize and present the research findings and results, and discuss the programme for the twenty-fifth year. Additional meetings may be organized under the mutual agreement of the Sponsor and the University.

10. The performance of all or a part of work under this agreement may be terminated unilaterally by either party whenever the Sponsor or the University determines that such termination is in their best interests. Termination of work hereunder shall be effected by delivery of a written notice of termination specifying the extent to which performance of work under the agreement is terminated and the date upon which termination becomes effective. For the University, such notice shall be delivered in writing to the Dean or Vice-dean. For the Sponsor, notice shall be delivered to the address specified on page 1 of this agreement. Upon receipt of the notice, 60 days are required to allow the parties to cancel outstanding commitments and to conclude work in an orderly fashion. Costs associated with such termination are allowable costs under this agreement. This includes

costs incurred prior to the receipt of notice but which are or may be payable during the sixty day termination period or thereafter. Any funds remaining unspent following termination will be refunded to sponsor on a pro-rata basis.

11. Upon the annual expiration of this agreement, continued sponsorship of research shall be subject to terms and costs as may be mutually agreed upon.

12. No presentation made in writing or otherwise constitutes part of this agreement unless explicitly stated herein or in amendments to this agreement as specified in paragraph 1.