



RadioNet support for Short Term Missions Application form

STM INFORMATION	
APPLICANT 'S NAME	Jonas Flygare
APPLICANT'S AFFILIATION	Phd Student at Onsala Space Observatory
HOST INSTITUTE	Technological Development Center National Geographical Institute Spain
DATE OF THE STM	13 th – 27 th June, 2017
TOTAL COST OF STM	1500 Euro
OTHER SOURCES OF FUNDING	Additional IGN funds
Request (max. 2,5 pages)	
Topic	<p><i>Collaboration in feed development inside BRAND.</i></p> <p><i>Onsala Space Observatory, Onsala Sweden and the Technological Development Center at National Geographical Institute, Yebes, Spain have similar involvement in number of common project as for example IVS and EVN. Both institutions are also involved in BRAND project, part of the EC funded Radio Net H2020. Within the project both institutions are supposed to develop broad-band feeds for illumination of reflector optics antennas with different geometries. In addition there are number of areas where face to face discussion of common technical challenges and ideas will be crucial for finding novel solutions. Personal visit of Jonas Flygare to Yebes will be of great use in order to refine the project related issues and also to facilitate direct exchange of technical experience. Such short term mission will be also good opportunity for Jonas to create contact with some word leading companies in the area of radio astronomy located near Madrid in Spain.</i></p>
Proposed work	<p><i>The proposed work areas are as follow:</i></p> <ol style="list-style-type: none"><i>1) Work on common format of far-field patterns for data exchange between CST and GRASP.</i><i>2) Investigate different noise models and computational approaches for calculating the noise pick-up via side-lobes.</i><i>3) Alternative solutions for controlling the modes in broad band feeds.</i><i>4) Alternative designs for the feeding and back-short of QRFH.</i>
Cross-disciplinary	<p><i>Yebes and Onsala are working on similar topics as for example feeds for reflector antennas and low-noise amplifiers. Those components are also of interest for the geodetical VLBI (IVS) and also for the SKA. Outcomes from the development could be used for ground-based and satellite communication.</i></p>

Impact	<p><i>The success of the development of broad-band front-end for BRAND will have big impact on the EVN in terms of unifying the equipment and enhancing the science capabilities of the network. The developments result of this collaboration will be open for the radioastronomical community.</i></p>
Curriculum Vitae	<p><i>(CV Summary)</i></p> <p><i>Master of Science Degree, Engineering Physics, Chalmers University of Technology, Sweden, 2016</i></p> <p><i>Master's Thesis: "A Wideband Quad-Ridge Flared Horn Feed Design for the Square Kilometre Array Band 1"</i></p> <p><i>2.5 years employed as a researcher at Onsala Space Observatory, mainly for the SKA-project.</i></p> <p><i>PhD Student since 2016</i></p> <ul style="list-style-type: none"> • <i>Wideband feed development and design for radio astronomy for 2.5 years at Onsala Space Observatory, mainly for the SKA-project.</i> • <i>Instruments include:</i> <ul style="list-style-type: none"> - <i>BRAND feed development.</i> - <i>SKA SPF</i> - <i>Onsala 20m telescope</i> - <i>Onsala Twin Telescopes (VGOS)</i> • <i>Specialize in: Feed design, Wideband antennas for radio astronomy, Optics, QRFH, optimizations and algorithm, computational electromagnetics, tolerance analysis.</i> • <i>Software include: CST, GRASP, MATLAB, FEKO</i> • <i>Programming skills: JAVA, C, VBA, LabVIEW</i> • <i>Measurement experience in anechoic chambers, VNA, antenna ranges.</i> • <i>Teaching electromagnetic fields and circuit theory for college students.</i> • <i>Semi-conductor and thin-film transistor research and development for 1 year in CA, USA.</i> • <i>Publication total: 5 published. 2 published peer-reviewed journal papers (1 IEEE-MTT), 3 proceedings papers.</i> • <i>Examples:</i> <p><i>"A Wide-band Feed System for SKA Band 1 Covering Frequencies From 350 - 1050 MHz," European Conference on Antennas and Propagation 2016.</i></p> <p><i>"Development of Quadruple-ridge Flared Horn with Spline-defined Profile for Band B of the Wide Band Single Pixel Feed (WBSPF) Advanced Instrumentation Programme for SKA," 2016 IEEE International Symposium on Antennas and Propagation (APSURSI)</i></p>



MINISTERIO
DE FOMENTO

SUBSECRETARIA

DIRECCIÓN GENERAL DEL
INSTITUTO
GEOGRÁFICO NACIONAL

SUBDIRECCIÓN GENERAL DE
ASTRONOMÍA, GEOFÍSICA Y
APLICACIONES ESPACIALES

Jonas Flygare
Onsala Space Observatory
Observatorievägen 90, Råö
Onsala, Sweden

Yebes, February 14th 2017

Dear Jonas,

It was a pleasure for us to learn about your interest for a short stay at Yebes Observatory. We found your CV extremely interesting and very connected to our development fields. Further, your institute Onsala Space Observatory (OSO) and ours share common projects like BRAND, part of the EC funded Radio Net H2020. In this aspect, we would be glad to have the opportunity to discuss with you some topics that are of mutual interest, as for instance, the design and characterization of broad band feeds and low noise cryogenic receivers.

We are pleased to invite you for a short stay at Yebes Observatory which could be carried out preferably from 13th to 27 June 2017 or anytime or duration we agree from April to September.

We are sure that this stay will be helpful for the BRAND project and also it will reinforce the contacts between OSO and IGN. Without any doubt it will be a very good input to BRAND and will help to improve the results of the project.

José Antonio López Fernández
Director of the Technological Development Center
National Geographical Institute, Spain

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Jonas Flygare

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Summary

Ph.D. Student at Onsala Space Observatory (Swedish National Space Observatory), research interest in antenna feed design, optimization and optics. Feed development for the international EVN RadioNet, BRAND-project, and SKA project (<https://www.skatelescope.org/>).

Several years of experience from research and development in Antennas and Propagation, Electronics, Semi-Conductors, RF technology, both in Sweden and abroad, specializing in Antennas and focusing on Radio Astronomy.

Publications: <https://scholar.google.com/citations?user=V7yvehEAAA&hl=en&oi=ao>

Experience

Ph.D. Student at Chalmers University of Technology, Earth and Space Sciences, Onsala Space Observatory

December 2016 - Present (3 months)

Research in the field of antennas, optics and propagation for radio astronomy including VLBI. Specialized in feed development for reflector telescopes and quasi-optical system analysis.

- Development for the RadioNet-project, BRAND, working with feed design and optimization.
- Teaching: Electromagnetic field theory and circuits for college students.
- Publications 2014-2016: 5 published. 2 published peer-reviewed journal papers (1 IEEE-MTT), 3 proceedings papers.

Project Engineering Intern at Chalmers University of Technology, Earth and Space Sciences, Onsala Space Observatory

October 2014 - November 2016 (2 years 2 months)

Antenna feed development, mainly for the SKA-Project (<https://www.skatelescope.org/>).

Position corresponds to full-time Research Engineer.

- Antenna design and optimization

(<http://www.chalmers.se/en/centres/oso/news/Pages/Swedens-biggest-contribution-yet-to-the-worlds-largest-radio-telescope.aspx>).

- Antenna characterization through EM-simulations and measurements.
- Software development for antenna optimization.

Project Engineering Intern at Chalmers University of Technology, Earth and Space Sciences, Onsala Space Observatory

June 2014 - August 2014 (3 months)

- Water vapor radiometry data analysis and processing using MATLAB.
- Software development for different projects, such as a micro controlled frequency synthesizer, mainly written in C and MATLAB.
- Maintenance programming and setup for a Beam Scan Profile Measurement station written in LabVIEW and MATLAB where a Hexapod is automated to scan the antenna beam.

Project Engineering Intern at Chalmers University of Technology, Signals and Systems, Antenna Group

March 2014 - May 2014 (3 months)

- Tolerance analysis of ridge-gap waveguides.
- Using MATLAB and CST Microwave Studio to perform a Monte Carlo analysis for the tolerances of different parameters and their effect on the waveguide performance.

(+ 1 Month in September 2014)

Test Technician at CBRITE Inc

June 2012 - June 2013 (1 year 1 month)

- Testing and analyzing thin film transistors for the backplane of the next generation of flat screens.
- Working in R&D environment setting up tests, collecting data, analyzing and presenting results.
- Duties included enhancing and modifying the lab equipment.
- Did also work in the process of making the TFTs with sputtering, photolithography and etching in cleanroom environment.

Sales Representative at CETAC | Chalmers Engineering Trainee Appointment Committee

October 2011 - June 2012 (9 months)

- Sell based assignment.
- Networking with companies to achieve and enhance an internship in the US.
- Connections and sales were made through telephone, email and personal meetings.

Summer Intern at Jobs Between Semesters

June 2009 - August 2011 (2 years 3 months)

- Logistics Worker at SKF, Summer 2011, preparing shipments and responsible for correct orders being sent out.
- Fire Guard at Volvo, Summer 2010 and 2009, responsible for fire safety during construction work. Preventive work, identifying dangers in the work environment.

Education

Chalmers University of Technology

Master of Science (M.Sc.), Engineering Physics, 2010 - 2016

Chalmers University of Technology

Bachelor of Science (B.Sc.), Engineering Physics, 2007 - 2010

Activities and Societies: Welcoming Committee at the Physics Faculty, Electronics Repairs and Revival, Physics Student Board, CETAC | Chalmers Engineering Trainee Appointment Committee (See Experience and Organizations for details).

University of Gothenburg

Economics, Business/Commerce, 2011 - 2012

Skills & Expertise

Antennas

CST Microwave Studio

Simulations

Matlab

Computational Electromagnetics

Physics

Programming

GRASP

Stochastic Optimization

R&D

Artificial Neural Networks

Computational Physics

Java

LabVIEW

Mathematica

Software Development

Testing

LaTeX

C

Display Technology

Transistors

Thin Films

Sputter Deposition

Photolithography

Research and Development (R&D)

Electronics

Courses

Bachelor of Science (B.Sc.), Engineering Physics

Chalmers University of Technology

Automatic Control

Environmental Physics

Experimental Physics
Thermodynamics and Statistical Mechanics
Special Relativity
Fourier Analysis
Optics
Solid State Physics
Subatomic Physics
Quantum Physics
Applied Quantum Physics
Electrical Circuits and Systems
Linear Algebra and Geometry
Mechanics
Programming
Object-Oriented Programming
Mathematical Statistics
Mathematical Analysis
Real Analysis
Technical Communication
Multivariable Analysis
Linear Algebra and Numerical Analysis
Vector Fields and Classical Physics
Complex Mathematical Analysis
Theory of Electromagnetic Fields

Economics, Business/Commerce

University of Gothenburg
Applied Economics and Commerce
Finance
Macroeconomics
Microeconomics

Master of Science (M.Sc.), Engineering Physics

Chalmers University of Technology
Antenna Engineering
Quantum Mechanics
Advanced Quantum Mechanics
Artificial Neural Networks
Advanced Classical Physics
Computational Electromagnetics
Computational Physics
Plasma Physics with Applications
Stochastic Optimization Algorithms
Gravitation and Cosmology
Quantum Field Theory
String Theory

Independent Coursework

Leadership Training

Internet Development and Publishing

Organizations

Welcoming Committee at the Physics Faculty

January 2008 to January 2009

One year of preparation and responsible for the welcoming of over a hundred new students to the physics faculty at Chalmers University of Technology.

Physics Student Board

Board Member

May 2010 to May 2011

Dealing with questions in general concerning the students and our role at Chalmers University of Technology.

Electronics Repairs and Revival

Member, Chairman

May 2009 to June 2011

Student organization for repairing, maintaining and reviving electronics. We repaired and restored mainly pinball games and vending machines. My role included one year as the chairman of the organization.

Intize

Math Mentor

January 2014 to June 2014

Math Mentor for High School students through the non-profit organization Intize.

Projects

Askloster Symposium 2011

July 2011 to Present

Members: Jonas Flygare

Organizing and working for a week long physics and math conference in Varberg, Sweden.

Languages

English

(Full professional proficiency)

Swedish

(Native or bilingual proficiency)

Spanish

(Elementary proficiency)

Interests

Surfing, Skiing, Photography, Guitar, Places and People.

Jonas Flygare

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[Contact Jonas on LinkedIn](#)