



TROND S TRONDSEN, PH.D.

University of Calgary
Dept. of Physics & Astronomy

T 403-220-7913
F 403-210-8974
trond[dot]trondsen[at]ucalgary.ca

<http://www.phys.ucalgary.ca>

PERSONAL DATA

Date of Birth: <withheld> • Sex: Male • Visa Status: Landed Immigrant, Canada • Citizen of the Kingdom of Norway • Language Skills: English, German, Norwegian, Swedish, Danish • Driver's Licenses: Alberta Class 5 license and EU International Driver's License • Industry Canada licensed ham radio operator (VE6NOR).

AREAS OF EXPERTISE, EXPERIENCE, AND CAPABILITIES

Remote sensing • space plasma physics • academic and technical writing • charge-coupled device (CCD) imaging systems • optical and electro-optical systems • low light-level imaging in visible and IR • optical design using Zemax • calibration and characterization of optical instrumentation • knowledge of RF systems and circuits, wireless (radio) communications • radar techniques and spectral analysis • scientific programming (several languages including assembler code) • writing Linux device drivers • scientific image/data acquisition, processing, and analysis • digital and analog control theory • computer interfaces to real-world • real-time software programming • basic FPGA programming • digital and analog electronic design, microprocessors, and embedded applications • functional definition and system design of scientific instrumentation • space flight systems, radiation environment • video editing • graphic design • photography • arctic winter field-work.

EDUCATION

PH.D. COSMIC GEOPHYSICS, UNIVERSITY OF TROMSØ, NORWAY — 1998

Developed a portable intensified imaging system (optics, electronics, hardware, software) and applied it to auroral studies in the Canadian arctic, publishing findings in refereed scientific journals (*Journal of Geophysical Research*, *Geophysical Research Letters*, *Annales Geophysicae*).

M.SC. APPLIED PHYSICS/ELECTRICAL ENGINEERING, UNIVERSITY OF TROMSØ — 1988

Developed a novel, practical method for determining signal losses (the "System Constant") in waveguides and filters for calibration purposes at the UHF/VHF European Incoherent Scatter Radar Facility EISCAT near Tromsø, Norway. The method relies on precise ionospheric plasma-line frequency measurements using a charge-coupled device based spectrum analyzer.

B.SC. PHYSICS, UNIVERSITY OF TROMSØ — 1986

PROFESSIONAL EXPERIENCE

PRESIDENT, KEO SCIENTIFIC LTD — 2003-PRESENT

Keo Scientific Ltd. designs and builds highly sensitive scientific instrumentation, capable of wavelength-resolved imaging of sub-visual emissions from the upper atmosphere, for defense and research institutions worldwide.

RESEARCH ASSOCIATE, UNIVERSITY OF CALGARY, INST. FOR SPACE RESEARCH — 1998-PRESENT

NORSTAR/CGSM/MSI Program Scientist/Engineer, responsible for a network of multispectral imagers across Canada • Lead Investigator on the ePOP (Enhanced Polar Outflow Probe) Fast Auroral Imager • ePOP Science Team member • Co-Principal Investigator on KuaFu Project Ultra-Violet Auroral Monitoring Cameras (UVAMC) • Principal Investigator on the Meridian Scanning Photometer Design Project • Member of NASA THEMIS Mission Team • Optical Designer on U of Calgary H-Beta Photometer Project

IMAGING SPECIALIST, UNIVERSITY OF CALGARY, INSTITUTE FOR SPACE RESEARCH — 1997-1998

Principal Investigator on the The Portable Auroral Imager project • Research Scientist/Programmer, Canadian Space Agency's CANOPUS Project • Technical consultant/liaison on Imager for Magnetopause-to-Aurora Global Exploration (IMAGE), the first NASA medium-class satellite explorer (MIDEX) project • Participating Scientist on the IMAGE project • Participating scientist on the NORSTAR project.

RESEARCH ENGINEER, UNIVERSITY OF CALGARY, INSTITUTE FOR SPACE RESEARCH — 1993-1996

Responsible for the design, implementation, and calibration of a compact and portable imaging system that is now being used for high-resolution video imaging of the Northern Lights. The system is based on state-of-the-art intensified charge-coupled device video camera technology and high-resolution video recording technology. The design was dictated by requirements as to angular and temporal resolution and light-gathering power given by scientific objectives. Made several field-trips into the Canadian arctic to apply the imager to auroral studies in conjunction with instrumentation permanently installed at the site. Data were subsequently analyzed, and several important findings published in international scientific journals.

RESEARCH SCIENTIST, RESEARCH COUNCIL OF NORWAY — 1988-1993

Designed, implemented, and characterized a computer controlled digital all-sky camera system for the observation of the Northern Lights from the Ramfjordmoen research station outside Tromsø, Norway. Wrote all real-time control software as well as a complete image processing suite • Took part in the design of the AURIO visible and ultra-violet auroral CCD imagers that is to fly on the European Space Agency's Polar Platform, part of the then U.S.-commissioned Space Station Freedom project • Participated in the preliminary design phase of the ultra-violet auroral imagers on the Swedish satellite Freja that was successfully launched in October 1992 • Assisted in the design of the Polar Camera (PoCa), a set of imagers for ground based observations of the aurora in polar cap regions (Ellesmere Island). This work included research into image compression algorithms and recommendation of preferred option based on certain design criteria, writing low-level software handling data communication between computer and cameras, writing an ephemerides software package, as well as doing the complete mechanical design of the camera units using the CADKey Computer Aided Design package (under the SGI IRIX O/S) • Designed an electronic testbed intended for the development of microprocessor, transputer, and charge-coupled device clocking applications..

RESEARCH ASSISTANT, UNIVERSITY OF TROMSØ, NORWAY — 1987-1988

Operated and maintained an ionospheric "Partial Reflection" (MF) radar system used for real-time determination of dynamic parameters of the upper atmosphere • Responsible for converting the Tromsø Ionosonde FORTRAN data presentation software for use on a new computer system.

ELECTRONICS TECHNICIAN, UNIVERSITY OF TROMSØ, NORWAY — 1987

Designed and implemented a dedicated digital controller and mechanical interface for controlling exposure time and frame rate of a 35 mm news-reel (*Filmavisen*) Eyemo motion picture camera. The camera had to be rebuilt slightly, as the camera had no accessible 1:1 axes; the most exact axis was one that rotated once per eight frames. A Nikon lens mount was fitted, and a Nikkor f/2.8, 8 mm fisheye was mounted. The camera was used to acquire color footage of the Aurora Borealis for a movie commissioned for the then-newly-opened Tromsø Northern Lights Planetarium.

LABORATORY ASSISTANT, UNIVERSITY OF TROMSØ, NORWAY — 1986

Assisted students in performing laboratory experiments in an introductory Analog and Digital Electronics course run by Dr. Ove Harang.

SCHOLARSHIPS, AWARDS, RECOGNITION

Faculty of Science Fellowship for Physics and Astronomy 2000 (CAD 6,000) • University Technologies International Inc. Fellowship in Science for 1999-2000 (CAD 15,000) • Norwegian Space Centre's Scholarship for promising young Norwegian research scientists, October 1989 (NOK 50,000) • Outstanding Student Presentation award received for an invited talk at the American Geophysical Union (AGU) Fall Meeting 1997, San Francisco, in a section on Alfvénic Structures and their relation to the Discrete Aurora.