

I am a software engineer interested in aerospace, electrical and civil engineering. My past experiences include CubeSat onboard electronics design, flight control software development and mechanical simulations. While working at Sakha Aerospace Systems, I was involved in spacecraft ground infrastructure operations.

My other interests include embedded systems, network engineering and website development. Check out my flagship project: [a real-time operating system kernel for 8-bit microcontrollers](#).

## Skills

<b>Tools and Languages</b>	C/C++, Assembly (AVR, x86), CppUTest, Doxygen, Python / Django, Git, HTML/CSS/JS, GnuRadio, KiCad EDA, SolidWorks, pfSense, VMware ESXi, $\text{\LaTeX}$ , TianoCore EDK II
<b>Communication</b>	English (C1), Russian (Native)
<b>Miscellaneous</b>	CEPT Amateur Radio License (callsign R0QAV), NTU EMI TA certification

## Technical Experience

<b>Teaching / Lab Assistant</b> <i>Sakha Junior Science Academy (SJSA)</i>	<b>Jan 2022 — Present (remote)</b> Yakutsk, Russia
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- Controlling SJSA ground station as a licensed radio operator, providing technical support.
- Supervising high school students practicing satellite communications ([news report in Russian](#)).
- Served as a research advisor for a student who won a silver medal at the Taiwan International Science Fair 2024.
- Helped to organize an international aerospace engineering school ([see page 2 and 27](#)) for high school students from Hong Kong; worked remotely as electronics engineering TA.
- Performed duties of flight director & RF communications engineer for a high altitude balloon launch ([news report](#)).
- Assisted colleagues from Siberian State Aerospace University, Krasnoyarsk, in receiving telemetry from their CubeSat ([ReshUCube](#), [NORAD 53382](#)) via SJSA ground station.

<b>Lead Engineer / SAKHACUBE-CHOLBON CubeSat</b> <i>Sakha Aerospace Systems, LLC</i>	<b>Jul 2021 — Present (remote)</b> Yakutsk, Russia
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- Serving as the lead engineer [for a CubeSat project](#); scheduled for launch in **Q4 2024**.
- Developing and maintaining web service infrastructure, see Projects section for details.
- Developing flight software for CubeSat Payloads, C / Atmel AVR.
- Preparing technical documents, reports and specifications with IEEE standards compliance.
- Designed CubeSat payload flight electronics – [YKTS-PL-EDU/16 MCU Cluster Module](#).

<b>Intern / Junior Software Engineer</b> <i>«Sever» Information Security Center, LLC</i>	<b>Mar 2021 — Jun 2021</b> Yakutsk, Russia
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- Developed an internal quote generation tool with automated supplier data import, Flask/Python.
- Practiced network engineering, VMware ESXi management.

<b>Intern / Electronics Engineer, Lab Assistant</b> <i>Yu. G. Shafer Institute of Cosmophysical Research and Aeronomy</i>	<b>Jun 2019 — Nov 2020</b> Yakutsk, Russia
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- Assembled PCBs for reindeer tracking collars, studied electronics engineering.
- Studied satellite & radio communication basics.
- Taken high-energy particle physics courses.

## Education

<b>Undergraduate</b> , Civil Engineering, National Taiwan University @ Taipei, Taiwan	2022 — Present
<b>High School</b> , V.P.Larionov Physics & Technical Lyceum @ Yakutsk, Russia	2012 — 2020

## Activities

2024 Taiwan International Mission Idea Contest on CubeSat (TIMICC) @ Kaohsiung – Research Presenter	Fall 2024
RunSpace Innovation Challenge 2024 @ Taipei – Research Presenter, Finalist	Fall 2024
NTU Civil Engineering TA workshop @ Xitou – Student	Fall 2024
«Step into the Future» International Student Conference @ Moscow – Research Advisor	Summer 2024
GISIT-2024 Geoinformation Systems Project Competition @ Yakutsk – Project Judge	Spring 2024
YKS-HKG Aerospace Engineering School 2024 @ Yakutsk – Teaching Assistant, Organizer	Spring 2024
Taiwan International Science Fair 2024 @ Taipei – Research Advisor	Winter 2024
National Taiwan University EMI TA workshop @ Taipei – Student	Fall 2023
MSU Aerospace Engineering School (RosCanSat competition) @ Moscow – Team Supervisor	Summer 2022
Yakutsk International Research School (YIRS) 2021 @ Yakutsk – Research Advisor	Fall 2021

## My Projects

### CUSF-Tawhiri Trajectory prediction tool

**Production usage**

Link: <http://tawhiri.stratoflights.yktaero.space>

Stack: Python, Flask, Jquery

- Fork of the original CUSF Tawhiri tool, adapted and hosted for Sakha Junior Science Academy.
- New features: custom ascent/descent profiles using time-altitude-rate curves, UI/UX improvements.
- Used to predict the flight path for the SJSA international aerospace school in March 2024.
- Additional work planned on request by [STRATONAUTICA, LLC](#) company.

### Ground Station Controller - stationctl

**In development**

Internal tool

Stack: Python, GnuRadio, Skyfield

- Estimates satellite position in real time using orbital elements.
- Automatically adjusts radio link parameters (data rate, carrier frequency with Doppler shift, etc.).
- Aims antenna rotator to the satellite position.
- Connects to the central server for scheduling and remote control as part of the GSN service.
- Production deployment & usage in Sakha Junior Science Academy.

### YktSat EDU/16 Payload Module

**In flight qualification testing**

Link: <https://yktaero.space/projects/item/ykts-pl-edu16-sptx>

Stack: KiCad, C/C++, Doxygen

- Expected to be launched in Q4 2024 with the SAKHACUBE-CHOLBON CubeSat.
- Compliant with PC/104, CubeSat, and Sputnix ICD specifications.
- 4-Layer modular PCB, designed from scratch in KiCad.
- Modular firmware written in C & AVR assembly, unit tests with CppUTest, CI/CD supported.
- Single makefile, firmware built and tested with self-hosted GitLab.

### YktSat PL-RTOS kernel

**Production usage**

Internal tool

Stack: C/C++, Doxygen

- Fully-featured Real Time Operating System (RTOS) kernel for MCUs.
- Currently supports AVR ATmega128 & ATmega2560, ARM Cortex-M4 support planned.
- Experimental task child-parent relationship with batch task operations.
- Mutex priority inheritance and FIFO locking.
- Built-in heap manager with allocation tracking and double free protection.
- Unit tests with CppUTest, Doxygen for documentation.
- Used in YktSat EDU/16 Payload Module firmware.

### Sakha Aerospace Systems Datasheet website

**Operational**

Link: <https://docs.yktaero.space>

Stack: Django, Jinja2, Django REST

- Provides users with a list of all published technical documents.
- Search, filtering, reordering supported.
- Stores and displays revision history for all documents, provides file downloads for every revision.
- Allows creating new documents and uploading files via administration panel.
- (Planned) GitLab CI integration for  $\LaTeX$  documents with automated publishing.

### Sakha Aerospace Systems server infrastructure

**Operational**

Link: <https://status.yktaero.space>

Stack: VMware ESXi, pfSense, nginx

- Various services for team collaboration: Nextcloud, Gitlab, Onlyoffice, Inventree.
- Simple status reporting with GitHub Pages, internal monitoring with Zabbix.
- Single Sign-On for all services using self-hosted Authentik, migration to Keycloak is planned.
- Fully self-hosted & virtualized, proper network isolation with VLANs, secure remote access with OpenVPN.
- Server uses enterprise-grade hardware.

### Jfkerman.me server infrastructure

**Operational**

Personal project, link: <https://jfkerman.me>

Stack: VMware ESXi, pfSense, nginx, Django

- Multiprotocol VPN for censorship circumvention, self-hosted Matrix server, TeamSpeak and SSO.
- Custom Outline VPN key management solution – [outline.jfkerman.me](https://outline.jfkerman.me), [see on GitHub](#).
- Deployed in 2022 as a response to Russian Wartime censorship law.
- More than 40 active users from my friend circles, 100+ VPN keys issued. Free of charge.

### UEFI mods

**Production usage**

Personal project

Stack: TianoCore EDK II, UEFITool

- DXE module with secret notes, activated with key combo, written in C with EDK II.
- Patched personal workstation EFI image with my custom DXE module, also added support for NVMe boot.
- Customized logos, UI images, backgrounds and DMI information; updated built-in DXE drivers to latest versions.
- Flashed modded images into hardware, haven't bricked my PC.