Radar Product Software Engineer  
Garmin Stellenbosch

September 2024

# Key details

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| Summary: | Software development for consumer radar products |
| Experience: | Graduate to mid-level (2-4 years) |
| Qualifications: | BEng or BSc Hons in Electronic Engineering, Computer Science or similar |
| Location: | Stellenbosch, Western Cape, South Africa (in-person with remote flexibility) |
| Employment Equity: | Preference for candidates from the designated EE groups |

# Who we are

Garmin Stellenbosch is the R&D team behind the award-winning [Varia Bike Radar](https://www.garmin.com/en-ZA/p/721258), [Approach R10 Golf Launch Monitor](https://www.garmin.com/en-ZA/p/695391/), and the [Xero C1 Pro Chronograph](https://www.garmin.com/en-ZA/p/771164).

Our mission is to bring radar to life!

* We explore new low-cost radar technologies
* We create amazing new products that people use every day
* We take high-quality products through mass production and into the market

If you are excited about working on the next great radar product in an energetic team environment, then Garmin Stellenbosch is the place for you!

# What you'll do

We are looking for a full time **Radar Product Software Engineer**. In this role, you will contribute to software and algorithm development for new radar products and applications.

You will:

* Join a local radar software team that is part of an international multi-disciplinary product team
* Amaze the users of our radar products by developing and fine-tuning algorithms in a MATLAB environment
* Bring the magic into the real world by implementing algorithms in embedded C and C++
* Make our products a joy to use by creating embedded software than runs smoothly and reliably in C and C++
* Lay the foundation for a successful product by contributing to software requirements, architecture and detailed design
* Solve problems by applying sound techniques to identify the root cause and provide a reliable solution
* Help maintain a high standard of excellence in the team by participating in peer reviews of software designs, algorithms and source code

You may also:

* Participate in software release testing and hardware/software integration testing
* Contribute to PC tools development using C# and Python
* Help drive exploration into new technologies
* Travel to Garmin's offices in the USA, Canada and Taiwan

# What you'll need

The following skills will be essential for success in this role:

* Demonstrated ability to solve programming problems with high-quality code
* Proficiency writing embedded software in C or C++
* Eagerness to learn and ability to self-start
* Excellent collaboration and communication skills, to operate successfully within a local and international development team
* Ability to work independently under only general guidance

And the following skills and knowledge would be highly advantageous:

* Signal processing and algorithm development for CW and FMCW radars
* Programming and data visualisation and analysis using MATLAB
* Electronic/embedded hardware design
* Electronic testing using equipment such as signal generators, oscilloscopes and spectrum analysers
* Communications protocols such as UART, SPI, I2C, and CAN, and the ability to test and debug these using tools such as logic analysers
* ARM microcontrollers from ST, Nordic, Texas Instruments and NXP
* Programming in C# or Python
* Version control tools (e.g. Git)
* Agile (Scrum) software development methodology
* Unit testing and Test Driven Development, using frameworks such as Google Test (gtest)

# Apply now!

Does this excite you? Solve the coding challenge below to apply!

If you have not received the result of your application within three weeks of applying, please consider your application to be unsuccessful.

Applicants must possess a valid South African ID number. Preference will be given to Employment Equity candidates with the relevant qualifications, experience and skills.

We reserve the right to not make an appointment for this position.

# The Garmin Product Software Engineer Challenge

We are developing a new system that can track a basketball in flight. The system consists of two sensors placed on the basketball court, one in the centre and one under the net. Each sensor measures the distance from that point on the court to the ball.

We are busy testing the system using a basketball cannon, which can move around on the court, and launch the ball from different heights, and at different speeds and angles.

For now, we're moving the cannon in a straight line between the two nets, and aiming it at a point directly above the goal. So it's just a 2D problem – the ball won't miss to the side, but based on the speed and angle at which the ball is launched, it may overshoot or undershoot the goal, or bounce in or out off the backboard.

The diagram below shows the dimensions and positions of the court, the hoop, the backboard, the ball, and the sensors.

Diagram of a basketball court with a basketball hoop and a ball

Description automatically generated

Attached is a file called **basketball.csv** with measurements over time for the two sensors, for six balls that were launched from different positions. For example, column b1\_s1 has the distance between Ball 1 and Sensor 1 for various points in time. For most of the shots, the measurements stop while the ball is still a distance away from the net. **Can you predict which of the shots will end up in the goal?**

To apply for the position as a Radar Product Software Engineer, please send an e-mail with **"Product SW: <Your name>"** as the subject, and include the following:

* Your CV, academic record, and a copy of your South African ID
* A summary of which balls you believe will end up in the goal
* The source code you used to solve the problem
* The output of your code, including any relevant plots and text output
* A description of your approach to the problem, explaining how you implemented the code, and how you determined which balls will end up in the goal.