Welcome to the world of signals intelligence, or SIGINT as it’s known in the intelligence community. The above are just some of the electronic signals you’ll get to work with as a signals analyst. SIGINT covers many types of signals including communications intelligence (COMINT), telemetry (foreign instrumentation signals intelligence, or FISINT), and radar and other non-communication electronic signals (ELINT). This article focuses on the ELINT career field.

**Reading the squiggly lines**

If weapon systems are your game, then you may be analysing the telemetry that’s used to monitor the performance of cruise, air-to-air, ballistic and surface-to-air missiles (SAMs) as these weapons are tested and developed. Telemetry analysis is related to ELINT and has been called the ‘speciality of specialities’ by many of my colleagues, and for good reason. The data in a telemetry signal usually consists of channels containing ‘squiggly lines’, and there can be hundreds of these channels within one telemetry signal, depending on the complexity of the weapon. Identifying what these squiggly lines are monitoring is not always a simple task! Telemetry is also used in aircraft development and testing, and telemetry from the US space shuttle and space launch vehicles monitors everything from pitch, yaw and roll to fuel-consumption rate, fuel-chamber pressure and altitude.

Finding weapons signals is the first step in the military’s efforts to defeat those weapons before they’re used against your troops – your mates. Once you’ve identified the signal of interest, electronic countermeasure techniques, called electronic attack (EA), can then be developed to render the weapon ineffective, such as jamming the signal with electronic noise or using a deceptive signal to throw the missile off course. Your discovery might help save many lives.

**Making the grade**

So what does it take to get into this career field? Signals analysis and reporting does require some basic understanding of maths as you’re dealing with the frequencies, bandwidths and basic parameters (characteristics) of an electronic signal, but, with many experienced analysts available to help you develop your skills, you’ll mostly just need a good attitude and a willingness to learn. Like most jobs, you’ll also need adequate writing skills to report your results. Nowadays, analysts deliver their intelligence information in multimedia formats and in models.
**INTERCEPTING ELECTRONIC SIGNALS**

Electronic signals transmitted as radio waves may be intercepted by anyone with the appropriate hardware, which includes anything from handheld radio receivers to satellites — provided that the signal is strong enough to be detected. A distress signal from a downed pilot is designed to be powerful enough to be heard by your search-and-rescue assets, but stealthy enough to avoid being heard by the enemy.

Satellites come in all shapes and sizes, depending on the mission and the capabilities required. SIGINT satellites are optimised to detect electronic signals of interest to a government’s strategic and tactical objectives.

The NSA is the world’s largest electronic intelligence processing organisation, responsible for gathering, analysing and reporting electronic signals from collection assets around the world. These signals are primarily of interest to military leaders and government policy planners.

A downed pilot may hide for several days before he/she believes it’s safe to transmit a distress signal, which can contain location coordinates and a text message of the pilot’s physical condition and other information.

The safety of soldiers in the field is the highest priority within the intelligence community during combat operations. No task rates higher in the SIGINT community than searching for transmissions from a downed pilot or missing soldiers.

**Pine Gap receives information from a satellite in orbit.**

**A unmanned aerial vehicle (UAV) transmits its signal to a ground controller, or the signal can be linked to a remote controller thousands of kilometres away via satellites.**

**Soldiers can control UAVs and receive the downlink, which usually includes a video signal — all this while communicating with other troops and intercepting the enemy’s signals.**

**Interception of communication signals is a vital part of maintaining a tactical advantage.**

**Illustration by Steve Hobbs**

**Photo of Afghanistan © Commonwealth of Australia”**

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Editor’s note: We’ve done our own research into who you might approach if you’re interested in a career in signals analysis. Check out the Defence Signals Directorate (DSD) at www.dsd.defence.gov.au. DSD is responsible for the bulk of Australia’s military-related signals analysis. The Defence Science and Technology Organisation (DSTO) – www.dsto.defence.gov.au – also provides scientific and technical support to a wide range of defence projects. Civilian defence contractors such as Raytheon, Thales and BAE also provide signals analysts to many defence projects.

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