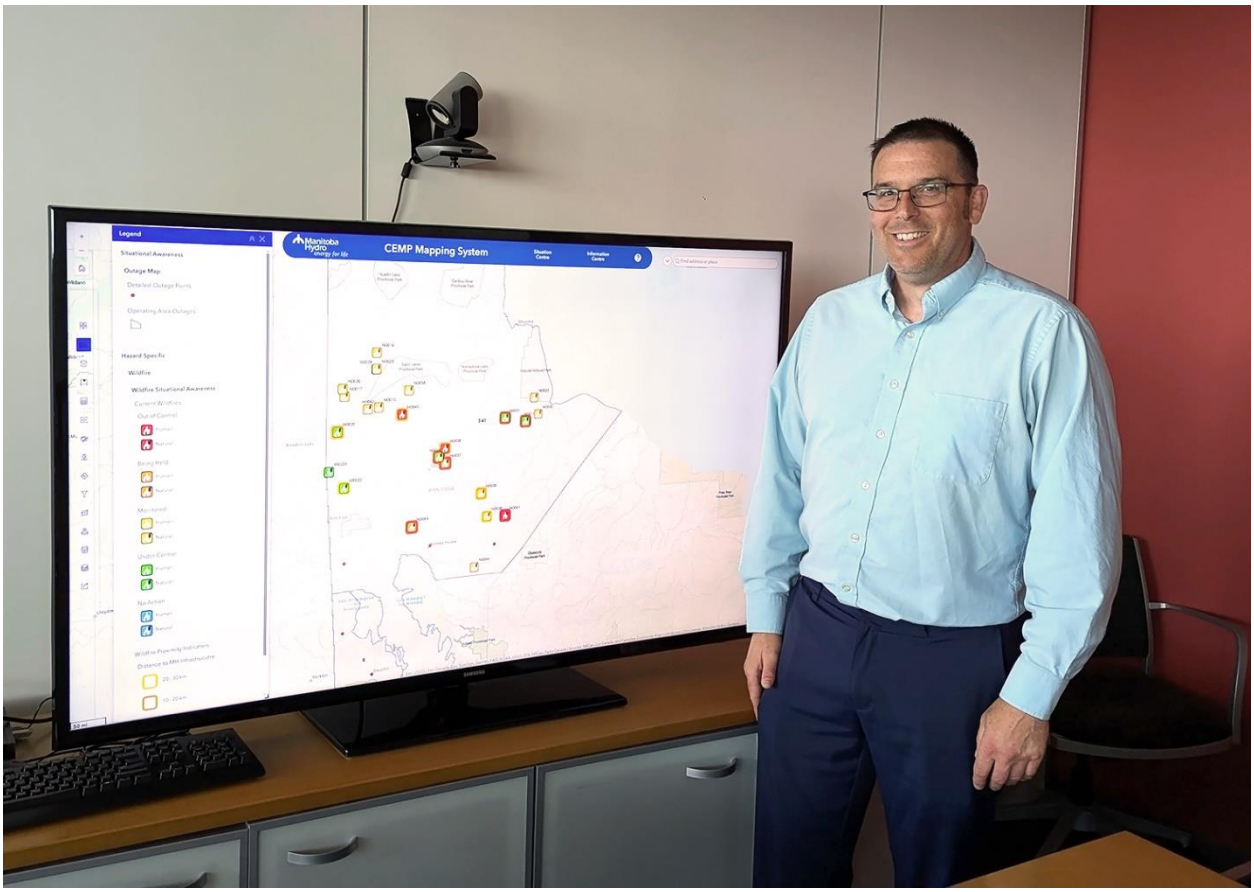
Living in the future: data within data

Gone are the days of paper maps and guesstimates, Manitoba Hydro is living in the future! For decades, we've used visual data from video footage or first-hand accounts to map out our infrastructure and assets. But now, technology helps us get an even more robust and reliable lay of the land, delivered to our computers and mobile devices on demand.

"**Geographic Information System** (GIS) is a framework for gathering, managing, analyzing and visualizing both temporal and spatial data," says **James Kellough** (Geospatial Data Services). "The process and technology by which we accomplish this has come a long way from Babylonian clay tablets circa 600 B.C., which many consider to be the very first GIS."



James developed invaluable tools that will be used and expanded upon for years to come.
Alt-text: James smiling and standing beside a monitor displaying the CEMP Mapping System.

The **Geospatial Data Services Group** manages, creates, and maintains GIS data and tools for many groups across the corporation, such as Safety/Health and Environment, Engineering, Asset Management, Transmission & Distribution Environment & Engagement, Construction, Operations, Property, and any other groups that utilize geospatial data.

“Our group has about a dozen GIS professionals, and we all are quite specialized in what we do,” says James. “I work a lot with ‘Geomedia’, which is photos and videos that have spatial and temporal components and information attached to it.

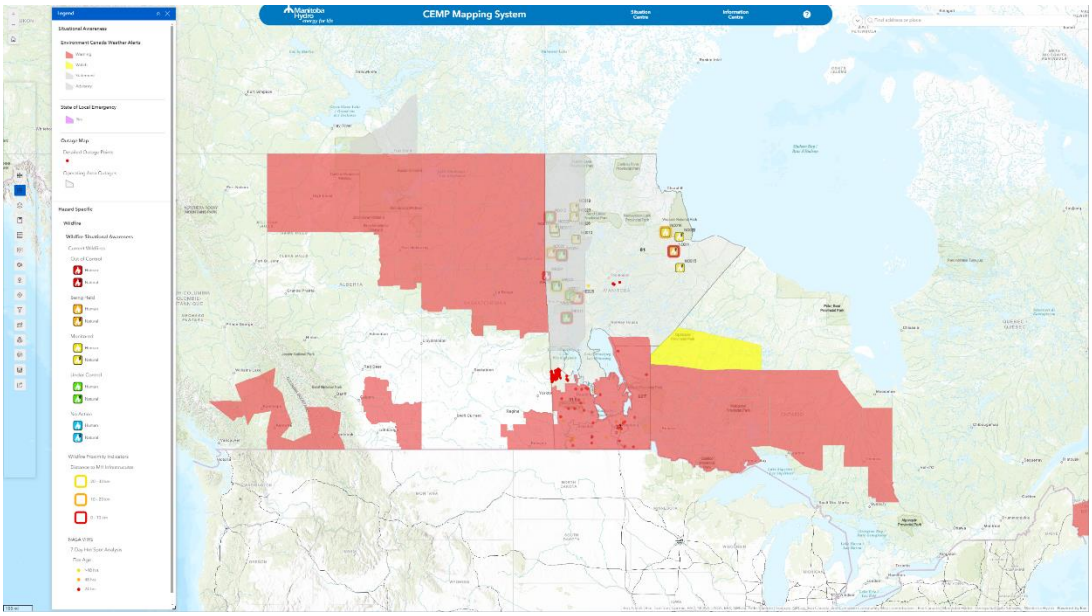
“I helped bring **full motion video** to Manitoba Hydro. It's kind of a new frontier in the GIS world and one that I've always had an interest in.”

In essence, folks head out with unmanned aerial vehicles (UAV a.k.a. drones) to gather georeferenced footage, known as Full Motion Video (FMV).

Manitoba Hydro is the only corporation in the province to have a full motion video server. It can store and deliver massive amounts of geospatial data within video files. Standard databases for geospatial information typically only provide access to vector and raster data formats.

The Geospatial Data Services Group support over 2,000 Electric Geographic Information System (eGIS) and GIS users across the corporation by creating web apps, like the Corporate Emergency Management Program (CEMP) Mapping System, and mobile tools that can be used out in the field for data collection and analysis. As well as the collection of drone footage, lidar information and traditional map creation.

Corporate Emergency Management Program (CEMP) Mapping System (CMS)



The CEMP Mapping System has a variety of data points you can toggle between and is updated in real-time.

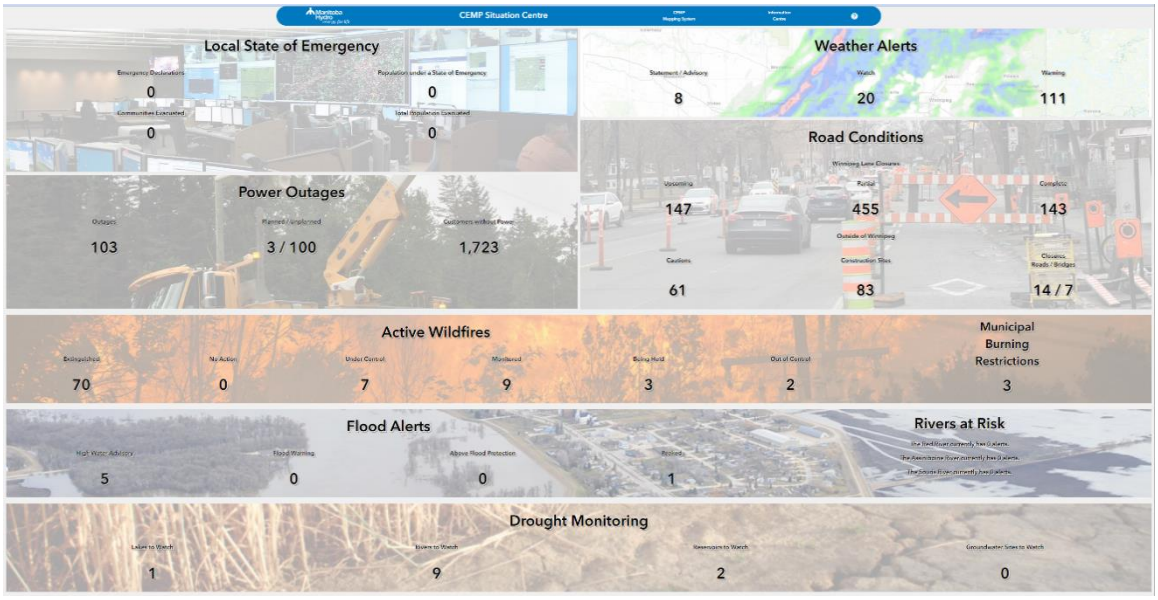
Alt-text: Screenshot showing the CEMP Mapping System over a map of Canada. Visible are areas under Weather Warning in red, Weather Watches in yellow, and Forest Fire icons peppered throughout Northern Manitoba.

James introduced this system around 10 years ago as a single-page web map used primarily for planning and situational awareness purposes. He said it has grown to “a behemoth of a web map, the largest I’ve ever seen,” with up to 350 different data layers.

That map is still used, but it has since evolved to include a myriad of hazard-specific dashboards with an extensive library of digital and interactive resources. It is currently being transitioned to a new platform that has better functionality and some excellent new features.

“The system works with a lot of internal information — data we’ve collected ourselves — but it also includes an awful lot of external data sources from the province of Manitoba, the federal government, NASA, and other stakeholders within the emergency response and management community,” said James.

Data like outages, weather alerts, provincial road conditions/closures, flooding and water level information, wildfires, drought warnings, etc. You name it, there’s a pretty good chance Manitoba Hydro is tracking it in real-time in the “CEMP Situation Centre”. It’s all about situational awareness — you cannot plan for, mitigate, or respond to what you are not aware of.



The CEMP Situation Centre offers a convenient overview of all current information.
Alt-text: Screenshot showing the CEMP Situation Centre. It displays values of Local State of Emergency, Weather Alerts, Power Outages, Road Conditions, Active Wildfires, Municipal Burning Restrictions, Flood Alerts, Rivers a Risk and Drought Monitoring.

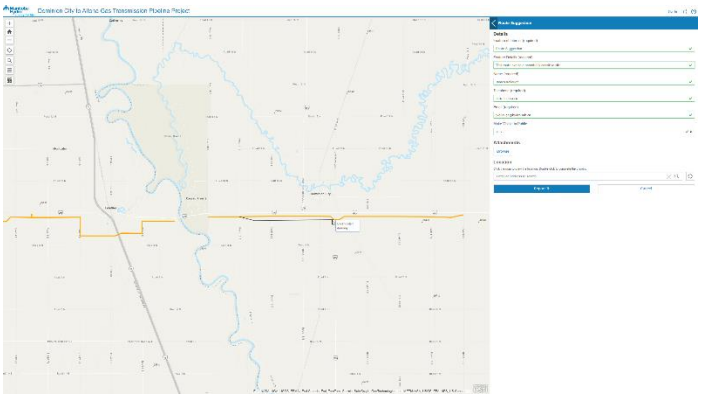
“Not only do we consume this external data, but we add value to it for our internal purposes, we beef it up,” said James. For example, the Geospatial Data Services Group inputs wildfire data from the province then begins to calculate proximity to our infrastructure. “That way, we can tell if our infrastructure is in danger and notify necessary parties as quickly as possible.”

Public Outreach

Traditionally, the Project Engagement section of the Transmission & Distribution Environment & Engagement department would set up a townhall to gather resident feedback and engage with affected parties. Notes, route suggestions, comments, and points of interest would be written directly on a paper map, then brought back to James to decipher and digitize.

An old-school setup in a hotel lobby. Far too much paper.
Alt-text: Hotel lobby with a map of Manitoba propped on an easel. Brochures and more information are laid out on the coffee table.

Since we were unable to gather at the height of the pandemic, James worked on a web-based solution that wound up being so efficient, it's now the standard! Called a **Public Feedback Portal,** it can be accessed by anyone using a smartphone, tablet, or computer.



The new Public Feedback Portal! Easy, accessible, available at your fingertips without having to leave your house.
Alt-text: Screenshot showing the Public Feedback Portal. It shows a digital map with the proposed route and the left-hand side shows text boxes and dropdown menus where you can add your feedback.

“We will put up the preferred preliminary route for a transmission line so members of the public can view an interactive map to provide feedback directly and instantly,” said James. “It's an opportunity for the community to see what we're thinking in terms of the routing process, and an opportunity for them to engage with us.”

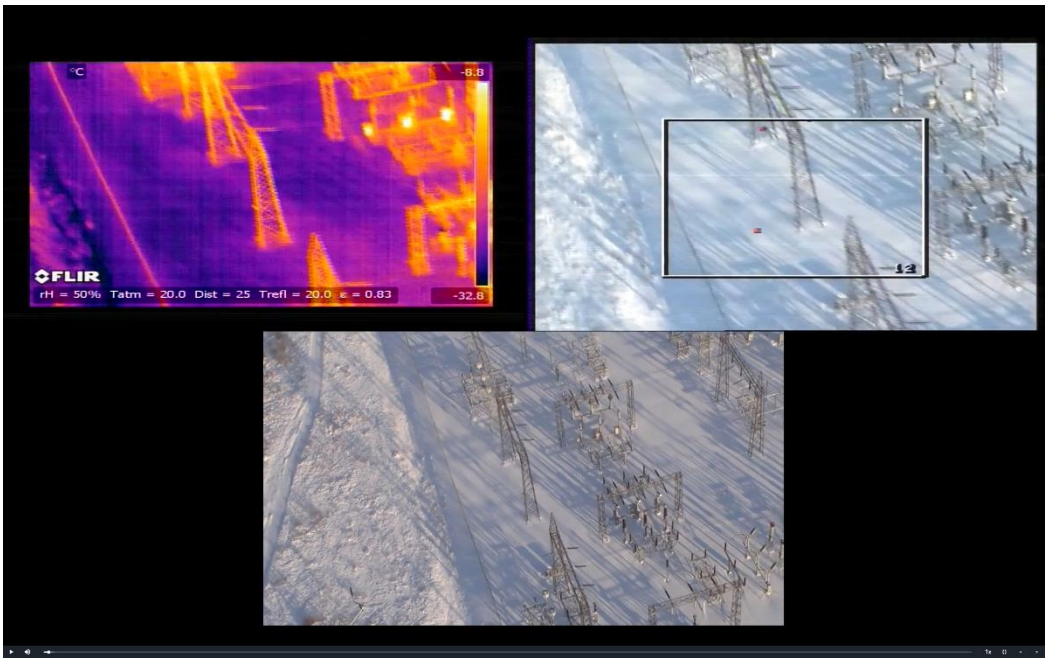
The feedback gathered helps Manitoba to mitigate impact o properties, or sensitive areas such as burial sites or historically relevant grounds. Communities have an accessible means to voice their concerns while Manitoba Hydro gains invaluable knowledge.

Not only are these Public Feedback Portals a resounding success in crowd sourcing information, but it also saves Manitoba Hydro a lot of time, money, and resources. Though public open houses are still held, there is no more need for meticulous digitization of paper maps — reducing human error.

Planning and Monitoring with FMV

Manitoba Hydro is an industry leader in the use of spatially referenced images and video (Geomedia) throughout all stages of a project's lifecycle, from pre-project reconnaissance and planning to post-project quality control and monitoring.

“We fly the completed, energized line with an HD camera, infrared camera, and corona sensor,” said James. “By using corona sensors, Manitoba Hydro can monitor the condition of its transmission lines, detect early signs of potential issues, and perform maintenance to prevent outages and extend the lifespan of the equipment.”



Corona sensors and infrared help us see spikes in activity and abnormalities in energized lines.
Alt-text: Screenshot showing three monitors. Infrared, corona sensor and HD footage.

“We have a legal requirement, determined by our license, to conduct environmental monitoring post-construction, especially if they go through sensitive habitats that could impact protected plant and animal populations,” said James. “It’s much easier to fly over these areas than it is to drive, and we’re able to notice any issues very quickly and efficiently.”

Using Geomedia also removes any guesswork since every piece of infrastructure is georeferenced. Prior to the Full Motion Video (FMV) technology, teams could only point out an area of concern, but needed boots on ground to determine the exact location and problem.

The Man Behind the Maps and Apps

The importance of continuously learning the technical aspects of his profession is not lost on James. He is, unsurprisingly, a self-proclaimed tech junkie. Adapting the software for new and emerging issues affecting Manitoba Hydro, as well as adapting for climate change and its combined threats, is what James considers to be the most interesting part of his job.

“My industry changes so fast that the technical information I learned in school was already nearing obsolescence, or was obsolete by the time I graduated,” said James. “So much of the GIS technology that we use at Manitoba Hydro is either significantly changed or completely replaced after just a few years.”

But outside of work, he coaches his three boys’ soccer teams and plays in a senior’s league of his own, to “relive the glory days” but also to make a difference at the grassroots level in various administrative roles.

“I was born on the Pacific Ocean, raised on the Atlantic Ocean, and living the dream on the Prairies. There’s absolutely no better way to see Canada than a 6,000 km coast to coast road trip… multiple times,” said James.

James loves to travel and has recently fell in love with Mexico, he’s determined to be fluent in Spanish by the end of the year!

Are you planning to learn any languages this year? Let us know in the comments.