

## **From Surfer to Scientist: Designing a Canadian Remote Sensing Service for the Internet Audience**

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### **Abstract**

The World Wide Web site at the Canada Centre for Remote Sensing (CCRS) is much more than a passive, electronic brochure. With its long tradition and expertise in developing training materials for a variety of knowledge levels, CCRS is ideally placed to exploit the store front medium that the Internet provides for raising public awareness of remote sensing technology. The CCRS Web site is a multi-faceted didactic tool: providing information to the remote sensing specialist on the latest research; and to the surfer who wants to learn about applications that promote a sustainable future.

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### **Introduction**

The World Wide Web site at the Canada Centre for Remote Sensing (CCRS) began as an implementation project in December 1994 with a team of six people. The guiding principle behind the CCRS Web site is to provide service to the Canadian remote sensing community, namely knowledgeable geomatics professionals. A secondary, but still important goal is to foster an interest in, and an appreciation of remote sensing outside our traditional community, whether it is high school students, resource managers or the casual surfer. Our opening date was June 1, 1995. Ten months after the site opened, it is receiving over 3,000 "hits", or requests per day.

Planning the site has always encompassed a two-pronged objective: to inform and educate people about remote sensing. Initial content was culled from the Centre's extant materials, all of which had to be structured in a meaningful way to take advantage of the dynamic nature of the Web. We focused on information design as well as ease of navigation to construct "chapters" around specific themes:

- Tell them who we are: ("This is CCRS" and "The Remote Sensing Community")
- Tell them what we do: ("Images & Products" and "Satellites & Sensors")
- Kindle an interest in remote sensing: ("What is Remote Sensing?" and "In the Spotlight")

The navigational buttons and layout were designed to create a sense of corporate identity and contribute to the overall look and feel of the site. Following a strict policy on the usage of these buttons helps create a sense of continuity and improves the user's ability to navigate through the Web site.

### **Informative Reference Materials**

Last year was a very important year for Canada because RADARSAT, our first operational earth observation satellite, was launched. While awaiting the November 8, 1995 launch, we were able to build a RADARSAT chapter which catered to all interest levels - from the photos of the satellite under construction, with tongue in cheek captions - to detailed specifications, examples of our R&D with RADARSAT image simulations as well as the abstracts of published papers on RADARSAT. New research opportunities and programs related to RADARSAT are also highlighted in this chapter.

Remote sensing scientists are, of course, already hooked. How could we sustain their interest to make sure that the CCRS site is a well thumbed bookmark? We decided to offer our existing glossary of general remote sensing terms and, for the radar specialist, a technical radar glossary. We offer a searchable contacts list of Canadian companies involved in the remote sensing side of the geomatics industry, which has proven very popular. Our list of international conferences complete with hyper links to e-mail and Web site addresses of future conferences is a particularly handy tool. CCRS conducts a seminar series on various aspects of remote sensing research and the Web site contains not only the seminar schedule, but a full abstract of each presentation. Over 5,000 copies of the CCRS newsletter are printed and distributed three times a year. It appears almost simultaneously on our Web site. These on-line issues of printed newsletters continue to be dynamic and informative because we can update the research findings and amend the material by adding new links within the articles. On the lighter side, there are some amusing items such as our “unconventional” definitions of remote sensing where readers are invited to contribute their own definitions.

Information regarding remote sensing applications and our research and development is always in demand and the Web offers a way of delivering the most up-to-date results, complete with data examples, in a way that paper copy never can. We present overviews of most of the CCRS programs and short “Spotlights” on specific items of interest. Our scientists have reported a definite increase in feedback from interested colleagues as a direct result of publishing their work on our Web site. By constantly updating news on interesting applications and innovative R&D, we keep the specialist informed and show the newcomer our areas of expertise.

## **Educational and Training Materials**

Remote sensing is blessed with eye-catching images that draw the attention of the casual surfer and leave one with a thirst to learn more. Once we were convinced that our site had sufficient depth of informative content, we had some time to catch our breath and concentrate on the potential of our site for delivering some educational material. We decided to target high school level students as well as the ever present, interested surfer. Remote sensing is not usually part of most Canadian high school curricula, unless students are fortunate enough to have a teacher with a background or particular interest in this field. As part of planning for this section, we knew that educators should be involved in the development of materials.

A high school geography teacher evaluated our Web site over the summer and provided feedback and suggestions for material that would be suitable for students. Armed with this information and input from colleagues who had produced educational materials for Canada’s School Net, we designed our first educational tool.

*Images of Canada*, a remotely sensed tour of the country, was designed to appeal to students, really to anyone who wanted to learn more about interpreting remote sensing images and it could serve as a resource tool for geography teachers. Different images from across the country were selected to show various elements of remote sensing - at least one for each province and territory. The images covered a wide variety of satellite and airborne sensors including different image enhancements. Each image is fully described, points of interest within the image are highlighted, and the viewer is challenged by a skill testing question related to the image. Figure 1 shows an example of an *Images in Canada* page.

	Larger, more detailed image here: <a href="#">101k.jpg</a>	<b>Rocky View, Alberta A Western Canadian Rural Landscape</b>
		The <b>regular shapes</b> of agricultural fields can clearly be seen in this 10 metre resolution SPOT (panchromatic) image. Some of the fields have very <b>distinctive patterns</b> , which can indicate farming techniques, or <b>surface topography</b> . It is possible to determine if a field has been <b>harvested</b> , or if it is still in <b>crop</b> , although the identification of exact crop types is better served through multispectral data and the use of additional information such as "ground truth". <b>Vegetation stress</b> and <b>soil degradation</b> problems can be detected at an early stage, which can allow remedial action to begin. <b>Farm houses</b> and <b>wind breaks</b> are visible, as are the road and <b>larger drainage networks</b> .
Question: <b>(Answer)</b>	Can you determine the area covered by this image just by looking at it?	

IMAGES OF CANADA WEB

### About this Image

Location:	Rocky View, Alberta
NTS Map:	82 CV1 (1:50,000), see an <a href="#">overview map</a> (1:1M) of the region
Image Date:	September 5, 1991
Satellites/Sensors:	SPOT/Panchromatic mode (FLA)
Resolution:	10 m <a href="#">pixels</a>
Image Area:	Approximately 10km by 10km for overview (7km by 7km for detailed image)
Image Features:	Agriculture, cultivated field patterns, soil conditions, homesteads, wind breaks, Western Canadian rural landscape patterns
Related Images:	A Western Canadian Urban Centre - <a href="#">Calgary Alberta</a>
Additional Information:	As with many Prairie farming operations, the field sizes are very large, with wheat, barley, canola, mustard, pasture, peas and oats being the dominant crop types. Soil salinity is a significant problem in the Prairies and often manifests itself in areas of high saline concentration as salt on the surface of the ground or as poor, stressed crops. There are some examples of such soil problems in this image. High winds are again typical of much of the region, being very significant in the southern portion of the province. Wind breaks, outlining the main farm house and often much of the outlying buildings, make these features quite easy to pick out. Natural features, such as bush areas or vegetation along minor drainage routes are usually easy to identify as they are darker in tone on this type of imagery (i.e. indicating vegetation) and have uneven boundaries. The artificial features (i.e. crop boundaries) are very straight. Field size and crop yield are often calculated from satellite imagery for purposes of crop management, insurance and marketing. The darker fields in the imagery represent areas still under crop, pasture or grass lands. Most of the area has been harvested, which is not surprising as the imagery was acquired on September 5.
Image Credits:	Received by the Canada Centre for Remote Sensing Processed by and provided courtesy of RADARSAT International Inc. © CNES 1991

IMAGES OF CANADA WEB

Question/Answer:	<b>Can you determine the area covered by this image just by looking at it?</b> Yes! When the Canadian Prairies were surveyed for settlement, a 1 mile grid design was used. Full sections are one mile on each side. The road system is laid out along the same grid and while a road does not occur every mile in the east/west or north/south direction, the agricultural fields seldom overlap these sections. This distance is very easy to measure. You can see 4 sections in the east/west and almost 4 sections in the north/south and know the area is 4 miles by 4 miles. (One mile equals approximately 1.6 km.)
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Feedback regarding *Images of Canada* has been extremely positive. Shortly after its Web debut, *Images* was selected as "Canuck Site of the Day". It is also listed on the Canadian Science Web's Hall of Fame page and under the Canadian School Net's section on Science, where it is receiving rave reviews from teachers:

"I have to admit first that the Tour of Canada is the best satellite image page on the web. Congratulations on a job well done. It is extremely well organized as a learning tool. I am using the page(s) for a grade 13 assignment on satellite imaging and the web. Each student has only 25 minutes to complete the exercise..."

Buoyed by the positive response to *Images of Canada*, we decided to develop a more focused educational tool to cater to our visitors who want a more substantive introduction to remote sensing, image analysis and remote sensing applications. Working with an internationally known geomatics company that has a strong background in remote sensing training, a series of modules will be constructed that cover topics from the electromagnetic spectrum to radar applications. Included in these modules will be evaluation tools that will allow the user to gauge their understanding of the materials.

### Future Prospects

Plans are already underway to make the internationally recognized RESORS database (1971-1995) of over 90,000 bibliographic citations in remote sensing searchable from our Web site. Over the years, CCRS scientists have provided image interpretation and radar training workshops to resource managers all over the globe and in several languages - we still have much valuable training material that can be redesigned for distance learning. Another objective will be to offer some elementary training in image enhancement and data manipulation.

By using site-access statistics to gather intelligence about our visitors and which topics are most popular, we can clarify the requirements of our audience. This will result in improved design of multi-media learning materials to target diverse client needs. Further, by exploiting developing Web technologies (e.g. Java applets) we will be strategically placed to maximize the potential of our Web site to inform and educate.

Figure 1. Example screen from *Images of Canada*

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