New Robotic Crawler to Assist With Future Dam Inspections

By Karen Goff

The State Water Commission’s Dam Safety Program is responsible for conducting dam safety inspections throughout the state. As part of a thorough dam inspection, it is important to inspect the inside of dam outlet pipes to look for deterioration that could impact the safety of the dam. However, there are numerous dams in the state that have outlet pipes that are either too small in diameter or too hazardous for a person to safely enter to conduct an inspection. As the dams in the state age, many of these pipes are known to be nearing the end of their design life, making it even more important to determine their condition and prioritize repair needs.

To address this issue, the State Water Commission recently purchased a remote pipe inspection system called the Rovver® Robotic Crawler, for the Dam Safety Program. The robotic crawler system will allow dam safety personnel to inspect the inside of small diameter dam outlet pipes without having to physically enter the pipes, greatly increasing safety and efficiency of inspections.

The system consists of a color pan-and-tilt camera mounted on a remote control crawler. A separate control unit allows the operator to remotely drive the crawler and control the camera functions. Video from the camera is fed back through a cable to the control unit where it can be viewed on a monitor and recorded.

The system can optimally inspect pipes ranging from 6 to 36 inches in diameter. And, the entire system is portable enough that the equipment can easily be stored or loaded into a pickup or SUV when needed.

The Water Commission’s new Rovver® Robotic Crawler was purchased from Everest VIT/GE Inspection Technologies, Inc. using funds from a National Dam Safety Program grant administered by the Federal Emergency Management Agency.

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In mid September, State Engineer Dale Frink, released a Draft North Dakota Dam Safety Plan for public review and comment. The State Water Commission staff prepared the robotic crawler for a test inspection.

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“North Dakota’s sovereign lands are some of the state’s most valuable and heavily used public resources,” Frink says. “For that reason, we feel it’s important that North Dakota’s citizens have a chance to weigh in on how these lands should be managed before the plan is finalized.”

The plan includes 21 recommendations and corresponding action strategies that are aimed at improving management of the state’s sovereign lands. Some of the management recommendations pertain to cultural and historic resources, water quality, motor vehicle use, littering, noxious weeds, hunting, boating, and camping.

To facilitate public involvement in the planning process and to encourage public comment on the proposed management changes, a series of five open house public meetings were held in Williston, Minot, Bismarck, Fargo, and Valley City. The meetings were held from Sept. 27 through Oct. 4.

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The State Water Commission does not discriminate on the basis of race, color, national origin, sex, age, or disability in employment or the provision of services.

SE Releases Draft Sovereign Land Plan For Public Comment

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The Draft North Dakota Sovereign Land Management Plan can be downloaded from the Water Commission and Office of the State Engineer’s website at www.swc.nd.gov. Printed copies of the plan can be requested by contacting the Office of the State Engineer at (701) 328-4989, or via e-mail at NDSLMP@nd.gov. Written comments are due by Oct. 30, and can be submitted via the previously mentioned e-mail, or mailed to the Office of the State Engineer, Attn. Sovereign Land Planning, 900 E Boulevard Avenue, Department 770, Bismarck, ND 58505-0850.

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Internships Allow Students to Get Their Feet Wet

By Mark D. Schneider

The purpose of the North Dakota Cloud Modification Project (NDCMP) Pilot and Meteorologist Internship Programs is to provide
upcoming college graduates with operational cloud seeding experience so that they will be hireable as pilots-in-command and field meteorologists for future projects. In addition, the interns are given real world experience and learn teamwork and communication skills before they leave college.

The NDCMP Pilot Internship Program began in 1976 and as of the conclusion of the 2006 season has trained 273 pilot undergraduates. The NDCMP Meteorology Internship Program began in 1996 and has trained 23 meteorology undergraduates. Both internships are made possible through the cooperation of the North Dakota Atmospheric Resource Board, the University of North Dakota, and Weather Modification Inc.

To qualify for a pilot or meteorologist internship, students must meet certain selection criteria. Intern pilots are chosen from students enrolled in the University of North Dakota’s aviation program. Intern pilots must possess multi-engine, commercial, and instrument ratings and have started multi-engine instruction. Intern pilots are also required to complete two semester courses in weather modification (Introduction to Weather Modification and Advanced Weather Modification), have sufficient flight hours for project safety guidelines, and motivation including class attendance, extra credit work, and enthusiasm for field work.

Intern Meteorologists must be undergraduates who are pursuing degrees in meteorology or in the atmospheric sciences. College courses of specific interest for intern meteorologists include Introduction to Weather Modification, Advanced Weather Modification, and cloud physics and radar meteorology courses.

Once hired and assigned to an initial field site at Bowman, Kenmare, Minot, Stanley, Watford City, or Williston Airports, the pilot interns are rotated to Minot and Williston (where top seeding aircraft are based), so they have the opportunity to fly both cloud base and cloud top seeding flights. Cloud top seeding flights allow the pilot interns the opportunity to file instrument flight plans and fly cloud seeding missions at upwards of 18,000 feet!

To learn how to operate the radars and use them as tools to direct pilots during seeding operations. Beginning in 2007 intern meteorologists will be rotated between the Bowman and Stanley radar sites, providing them with the experience of directing cloud seeding operations for two very different locations. Before the completion of each NDCMP season, intern pilots and meteorologists gain the operational knowledge, skills, and experience they will need to return to future projects and be successful in either flying or directing cloud seeding operations.

The value of the internships is best measured using feedback from the interns themselves. Before the conclusion of the NDCMP each season, interns are asked to evaluate the program and share what they’ve learned during field operations. When asked to rate the overall value of their 2006 NDCMP Internship, students had this to say:

“Invaluable”—Geoffrey Billing-sley, “Priceless experience”—Adam Jackson, “Unmatched on-the-job training opportunity”—Keith VanLierop, “This opportunity will help my career in the future and I am very thankful to have been a part of it”—Benjamin Collin.

The NDCMP has been fortunate in the success of the intern program. Interns return as pilots-in-command and field meteorologists the following season. This is in itself proof of the quality of the internship programs and reflects well on everyone involved with them. The NDCMP Internship Programs will continue to produce successful pilots and meteorologists in the future, which will help maintain a quality workforce in North Dakota.

Volume Conversions

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<th>UNIT</th>
<th>CUBIC INCHES</th>
<th>CUBIC FEET</th>
<th>GALLONS</th>
<th>ACRE-FEET</th>
<th>MILLION GALS</th>
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*An acre-foot covers the area of one acre one foot deep.

Rate of Flow Conversions

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<th>UNIT</th>
<th>CUBIC FEET PER SECOND</th>
<th>CUBIC FEET PER DAY</th>
<th>ACRE-FEET PER DAY</th>
<th>GALLONS PER MINUTE</th>
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<th>MILLION GALS PER DAY</th>
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<td>1 gal/day</td>
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<td>1 million gal/day</td>
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Weight Conversions

1 gallon equals 8.3 pounds
1 cubic foot equals 62.4 pounds
1 acre-foot equals 2.7 million pounds or 1,359 tons

The weight of one inch of rain over 1 acre of land would tip the scale at about 226,512 pounds or 113 tons. An inch of rain over the entire United States is equivalent to about 47.7 cubic miles of water and would weigh about 220 billion tons.

Metric Units

1 liter equals 1,000 milliliters = 1 kilogram = 2.2 pounds
1 liter of pure water weighs 1 kilogram
1 milliliter of water weighs 1 gram

The following equivalencies will allow you to convert from metric units to U.S. units: 1 liter equals 0.264 gallons or 0.0353 cubic feet and 1 kilogram equals 2.2 pounds.