CyberFalcons soar from Novices *to* National Champions

By Kathy Jorgensen

In its very first year in the CyberPatriot competition, team CyberFalcon Millennium 360 from Oak Valley Middle School in San Diego, coached by Avionics and Tactical Networks operating unit cyber systems engineer Paul Johnson, earned the title of National Champion in their division.

You could assume that a team competing for the first time in CyberPatriot would have little chance to take first place at the national competition, or even qualify for the finals. Don't tell that to the members of team CyberFalcon Millennium 360. These five cyber warriors went head-to-head against teams with far more experience to soar to the top of the middle school division at the CyberPatriot National Finals in Baltimore April 11-13.

To reach the finals, they placed first nationally among 460 middle school teams from the U.S., Canada and five other countries. Once there, the team took first place for the Network Security Master Challenge, where the students defend servers against attackers. They also won the Cisco Networking Challenge, a test of students' ability to understand and configure networks.

"We rocked!" said team coach Paul Johnson, a cyber systems engineer at the Avionics and Tactical Networks operating unit, part of the Airborne C4ISR Systems Division's

Photo by David Keith Photography

Communications business unit. "The team demonstrated the collaboration, critical thinking skills and technical knowledge to achieve this incredible accomplishment. It was a huge team effort with 40 other students contributing to the success of these five." Johnson coaches the CyberFalcons as well as four other Oak Valley teams, plus four teams at Del Norte High School in San Diego.

Jeannie Hilger, vice president of the Communications business unit, praised the team and its coach on their success. "Congratulations for winning first place at the CyberPatriot National Finals! CyberPatriot is a fabulous opportunity for these students to work together to successfully defend servers against attackers," she said.

Team in training

To prepare for the competition, the team met almost every Sunday for four hours from mid-June 2015 through early April 2016. Days with qualification rounds lasted six hours.

Since Johnson was mentoring multiple teams, the students met together as one large group for classroom training and collaboration. "I assigned presentations that students would sign up for, including trying out new tools and strategies," explained Johnson. "For the first half of the season I taught Windows and the high school students taught Linux and networking, since they were far ahead of me in these areas.

"By mid-season, students started presenting in Windows as well, and my primary role was to pick advanced topics for the students to present and continue with the Windows test images and networking quizzes. We had practice tests and quizzes and the top teams would present how they went about getting their scores. The students were so advanced in networking that I started using Cisco Certified Network Associate (CCNA) Routing and Switching certification questions. Four or five students could probably get their CCNA, which is what companies require for their network administrators. As students saw which tools and strategies worked the best, they put together plans of attack for subsequent images. The top teams spent a lot of time outside of class on these plans."

Students and their coaches from Team CyberFalcon Millennium 360, Oak Valley Middle School, San Diego. The award was presented April 13 by Chris Jones, second from left. Also pictured are Bernie Skoch, CyberPatriot Commissioner, far left, Northrop Grumman mentor Paul Johnson, second from right, and Scott Van Cleef, far right, AFA chairman of the board.

Let the games begin

The competition consisted of hardening Windows and Linux operating systems and being tested on networks with a quiz and a network design tool called Packet Tracer. The images have an application that assigns points when a pre-configured vulnerability is found.

During the qualification rounds, the middle schools were told they wouldn't need to compete in networking, but shortly before the national finals it was announced that there would be a networking component for middle schools. The team had to scramble to prepare.

That preparation was rewarded with a perfect score on the networking quiz at the national finals.

"Having previously coached FIRST Lego League and Science Olympiad STEM competitions for five years with multiple state first-place finishes, and with a hefty dose of irrational exuberance, I've thought from the start that we could reach the CyberPatriot national finals," said Johnson. "However, with having coached CyberPatriot teams for the first time last year, I realized that we had to shift our focus from general cybersecurity to the challenges presented at the competition. So this year we've been able to go much further and were far better prepared, with one team going to the national finals and three other teams painfully close."

Season reflections

Oak Valley Middle School Principal Casey Currigan recalls the day that he agreed to have his school participate for the first time in the CyberPatriot program. "Paul did a hard sell to get the program up and running at Oak Valley," he said. "He came to see me here with the claim that within three years he was going to have a national championship. He did it in one year, with the support of some amazing kids and a lot of weekends and evenings. Their season was beyond my wildest dreams as a principal."

The students summarized their thoughts in this statement: "The CyberPatriot program provides us with new opportunities and real-life skills. We've gained confidence in technology and feel inspired to aim for a career in this field. We are learning leadership, grit and determination, collaboration, team spirit, how to work as a team to excel in competitions and to make smarter decisions in our high-tech world. We have grown as people. We now want to pursue a major in this fun, exciting and fascinating field. This experience has made a great impact on our future careers and will help us for a lifetime."

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and an elementary school education component thanks to support from the foundation and the AFA. The company also offers internships to CyberPatriots across the country. "We're reaching students as early as possible and making an impact on their STEM and cyber decisions," remarked Miller.

On the heels of CyberPatriot came the second annual CyberArabia, April 18 and 19 in Riyadh. Miller and AFA representatives made the journey to King Saud University to host the two-day cybersecurity awareness and training session, which included a hands-on training workshop and a cyber defense competition modeled after CyberPatriot. This year's competition doubled in size from 2015 and included students from several universities.

With just days to spare, Miller and AFA representatives traveled to London April 26 to join the UK-based team for the second annual CyberCenturion, a competition for 12- to 18-year-olds sponsored by Northrop Grumman and Cyber Security Challenge UK. Like CyberPatriot, CyberCenturion finalists survived two virtual rounds to compete at nationals, appropriately held at the National Museum of Computing, Bletchley Park (home to British codebreakers during World War II who famously cracked the German Enigma Code). Here students were asked to defend a fictitious Internet of Things business that was vulnerable to cyber attack.

"This year's competition more than doubled over 2015," said Andrew Tyler, chief executive Europe, Northrop Grumman. "There is a huge pool of untapped talent and enthusiasm for STEM [science, technology, engineering and math] subjects among young people and we believe we can use our world-leading expertise in cyber to help dramatically boost the UK's STEM skills base."

For more information about CyberPatriot, go to www.uscyberpatriot.org.