Excella

AFATDS: MISSION-CRITICAL DEFENSE SYSTEM

The Army's Advanced Field Artillery Tactical Data System (AFATDS) is a highly complex platform that allows commanders to plan and execute attacks using optimal weapon-target pairing combinations, integrates and automates control of all fire support assets (field artillery, mortars, close air support, naval gunfire, attack helicopters, and offensive electronic warfare), and executes counterfire, interdiction, and suppression of enemy targets for all fire support operations. Further, AFATDS interoperates with weapon and control systems from other US defense branches and international partners.

A Complex System Leads to a Massive Codebase and High Cost

The Army needs this highly complex and critical system to maintain a competitive advantage on the battlefield. However, because the AFATDS system was initially fielded over two decades ago, it has become increasingly difficult to support. The software has undergone 13 major version releases and the supporting code base has grown to incorporate over 16 different software languages. Its architecture and technology base were in danger of becoming too expensive to maintain and too unwieldy to update efficiently.

In response, in 2017 the Army awarded a $102 million contract to establish a more intuitive software user interface, allow easier user training, and enable migration of the AFATDS software into the Army's software Common Operating Environment by 2020. The primary tasks to accomplish this goal were to upgrade the system architecture and the user interface. However, the massive codebase presented challenges, since its geo-tagged, scientific programming is normally only seen in NASA, FAA, or other DOD programs. Further, its scale exceeded most large web applications by an order of magnitude – AFATDS contains over 1,000 different views compared to an average web application which may only have 100.

The Challenge: Rearchitecting with the Latest Technology

Although the contractor understood the challenges, they still struggled to determine how best to use modern software frameworks like Angular to deliver the capabilities that the AFATDS program required. The contractor developed plans to build a minimum viable product (MVP) and meet the Army's initial expectations, but when the project began in earnest, the situation rapidly deteriorated. The requirements were too complex. Only 115 of the 1,000 views were created, and teams were spending more time reworking code and revisiting architecture decisions than delivering features. Progress, as measured by Agile "velocity", was stalling.

In response, the contractor engaged Excella. Excella Fellow Doguhan Uluca had recently published a book, *Angular 6 for Enterprise-Ready Web Applications*, that seemed to address nearly all the obstacles that the team was encountering. Doguhan and a supporting team from Excella were brought in to assist.

Excella began with an assessment of team objectives, the architecture design, established coding practices, and current challenges. After sessions with the program leadership to understand the high-level goals, Excella reviewed the project's code base and interviewed team members to understand their Agile practices and processes. Doguhan and the rest of the Excella team began to see potential problems that, while not apparent in the short-term, would cause challenges in the long-term. The management team was grateful for the insights and noted that, "Doguhan has been a tremendous help to our team. Our UI development staff was really excited to work with him and we look forward to our continued relationship with Doguhan and Excella."

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The Results: Faster Delivery and Easier Maintenance

By implementing Excella's recommendations, the contractor reduced the overly complex architecture from ten separate projects to just one, identified and prioritized the system's most critical views, and reduced dependencies to accelerate the delivery of functionality. Excella's recommendations simplified what had become a sprawling complex of interdependent projects. Building upon their architectural recommendations, Doguhan and the Excella team improved the contractor's processes by identifying and coaching the development of required skills and governance principles.

After a relatively short assessment and coaching period, the MVP had been completely re-architected and the way the contractor built software was transformed. Leveraging this new approach, they were able to refactor their previous code and deliver their milestones on schedule.

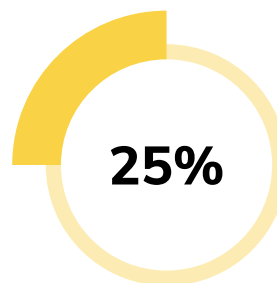## After receiving Excella's support, the team saw these dramatic improvements
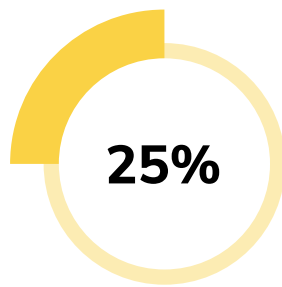
25% reduction in dependencies
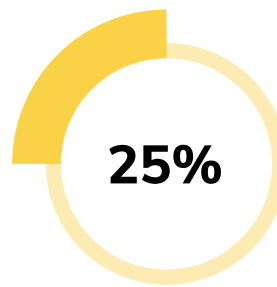
25% reduction in escaped defects

95% acceleration of software build times

25% increase in delivery rate

About Us

Excella is an Agile technology firm helping Washington, DC's leading organizations realize their future through the power of technology. We work collaboratively to solve our clients' biggest challenges and evolve their thinking to help them prepare for tomorrow. Together we transform bold ideas into elegant technology solutions to create real progress.

Learn more at **www.excella.com**.

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