

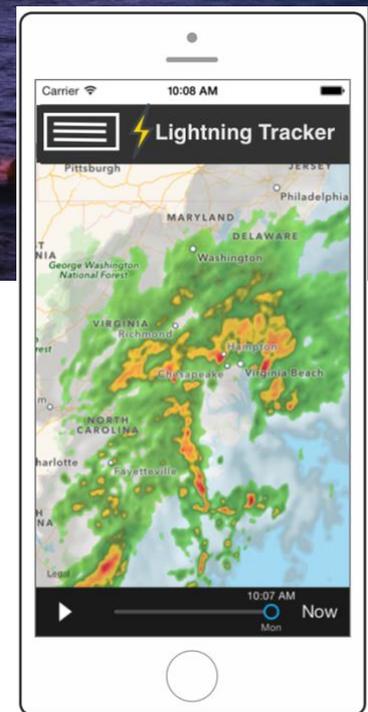
Developing a Location Aware Lightning Monitoring Mobile App

Using APIs to develop warnings for cloud-to-ground and cloud-to-cloud lightning data to cell phones based on a user's GPS via RIVA's "**Lightning Tracker**" mobile application

Written By

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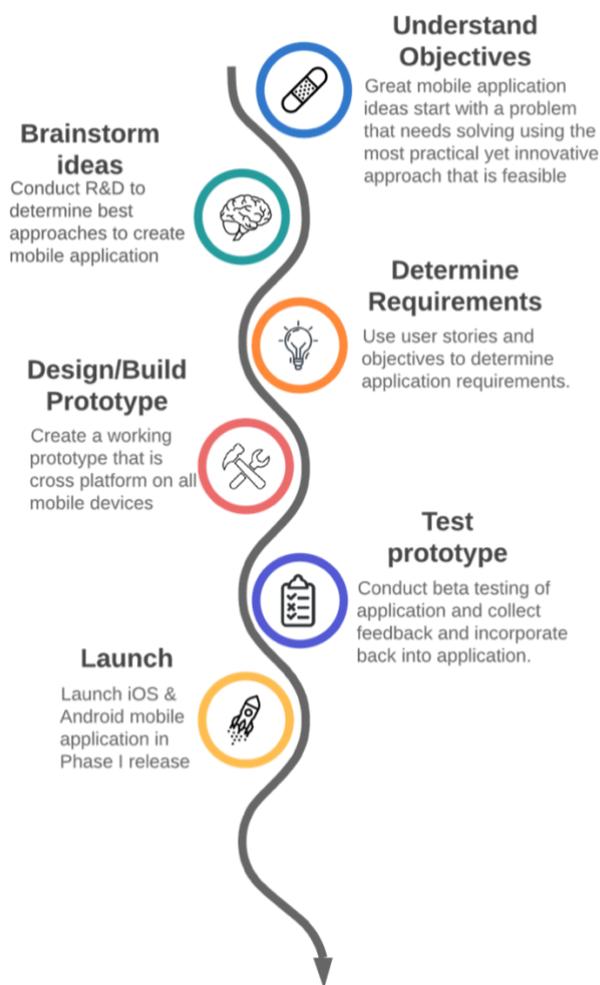
RIVA Solutions, Inc. (RIVA) is a SBA-certified 8(a) Small Disadvantaged Business providing innovative best practices to the federal government in IT and Management Consulting, Program Support Services, and Emerging Technologies. RIVA brings a federal social media and web engagement portfolio and mobile development with 20+ projects supporting the Department of Commerce, Department of Health and Human Services, and Department of Education prime contracts.

Our team has a successful history of developing citizen facing mobile applications for Health & Human Services (HHS) and the Substance Abuse and Mental Health Services (SAMHSA) as well as weather and climate change applications for National Oceanographic and Atmosphere Agency (NOAA). For example, we enhanced the SAMHSA Disaster Knowledge mobile application to allow for social sharing of critical content in low (or no) bandwidth scenarios by leveraging Bluetooth peer to peer transfer of data between smartphones.

Our team leverages proven and tested federal and agency development standards, operational requirements, compliance requirements and embrace a mission to develop a collaborative, and efficient set of mobile services across the enterprise. Our mobile application process encompasses the full application lifecycle, including application design standards and tools, flexible development environments, test automation, developer and quality assurance workspace management, and maintenance and monitoring. Our mobile approach included the following elements:

- Development Processes and Tools
- Governance Processes
- Software Development Kits
- Web Services & Code Reuse Library

Specifically, for our Rapid Mobile Application Development process, our team tailored an ITIL aligned multi-phased approach that includes Discovery, Strategy, Information Architecture, User Experience, Prototype, Design and Quality Assurance to guide our customers from the requirement phase through an agile



development phase and finally through to delivery and *Figure 1. RIVA Rapid Mobile Development Process*

publishing of the Mobile Application as shown in Figure 1.

Objective: Provide lightning warnings for cloud-to-

ground and cloud-to-cloud lightning data to individually/personally owned cell phones based on a user's GPS using mobile technologies. To achieve these objectives, RIVA has designed a Lightning Tracker mobile application is an iOS & Android compatible application that will be downloaded from the Apple or Google Play app store. The application will have the following features:

Push Notifications- The mobile application will provide push notifications as well as configurable text messages for lightning events in the geographic area including cloud to ground and cloud to cloud lightning events based on a user's GPS.

Alerts - The mobile alerts can be customized by the user based on location or type of lightning strike

Weather Maps- The mobile application will provide access to local weather maps including data for basic radar and satellite imagery

Lightning Maps- The mobile application will provide a map interface that will display past and current lightning strikes. The lightning-strikes feature displays lighting strikes that have occurred over the past 5-15 minutes, fading from white (latest strikes) to gray (oldest strikes). The layer will be updated every five minutes and the map can be zoomed out to a full map of the US or a specific area such as Patrick Air Force base. In addition, the mobile application will provide a lightning density Map.

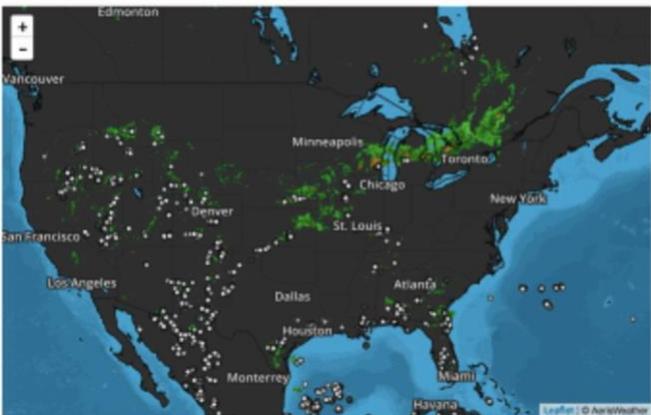


Figure 2. Lightning Density Maps that will be available in Lightning Tracker mobile application

Mobile Friendly Web Application- RIVA has designed a simple Javascript based web application that has an interactive map for those mobile users who not have the application downloaded. RIVA mobile developers will be able to quickly customize

the features on the web app allowing the ability to visual lightning strike layers using a Map Builder tool. In addition, there is a Lightning Strikes layer that is available under the Severe weather category that will allow different visualization for Lightning strikes.

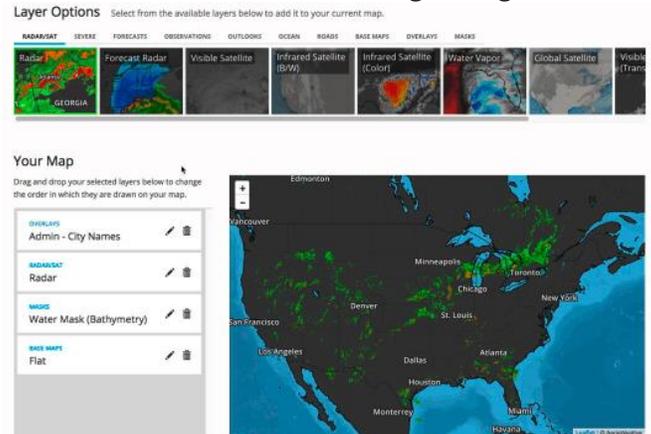


Figure 3. MAP Build Tools to create interactive maps

Technical Approach

The RIVA “Lightning Tracker” mobile application is designed to be a modern native iOS & Android application that is built using the modern mobile frameworks and is designed to be a low latency application architecture with a focus on quickly and reliably getting alerts to end users. In addition, from a design perspective, RIVA has aligned the application using the US Web Design System (USWDS) where feasible to integrate design principles in accordance with The 21st Century Integrated Digital Experience Act (P.L. 115-336). At a high level the components we use are as follows



- **Ionic V4 Mobile Framework** – Mobile Application UI Framework that can be compiled as a native app on iOS and Android devices
- **AerisWeather Mobile SDK** – Integration of Aeris lightning strike data that is accessible via API calls from mobile apps.
- **Amazon Web Services** – FedRAMP compliant hosting for server-side components including storage of weather data in DynamoDB
- **AppScan** – For security scanning of mobile

application in accordance with Federal Security Requirements (FISMA)

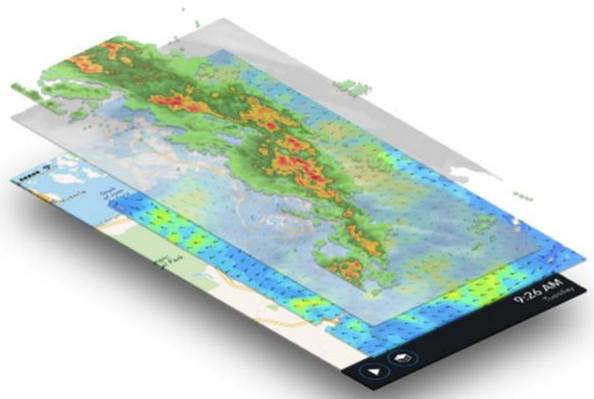
We leverage a modern Ionic Framework as it is a trusted and widely used open source UI toolkit for building performant, high-quality mobile and desktop apps using web technologies (HTML, CSS, and JavaScript). Ionic Framework is focused on the frontend user experience, or UI interaction of an app (controls, interactions, gestures, animations). We leverage the AeriWeather Mobile SDK to interface with Weather APIs to get the appropriate lightning tracker data. The AeriWeather Mobile platform is currently being used by the US Department of Defense (Weapon Testing and Flight Take-Off). With the help of an interactive map, the base is able to see their physical assets in the field and weather impacts to each. Lightning is a critical feature to this mapping application to ensure that it is not impacting any of their weapon tests or flights. With cloud to ground being the most important dataset to this division, leveraging the map layer for that data is preferred as it allows for quick contextual relevance and animation. The AeriWeather SDK is broken up into multiple modules, including access to lightning data which is inclusive of cloud to cloud and cloud to ground data, which will be plotted on a map with GeoJSON output and by leveraging the mapping layers. In addition, RIVA will use the following modules to support the weather alert functionality in the mobile application

- **AeriWeatherKit.framework** - Core weather library used to interact with and parse weather API data.
- **AeriMapKit.framework** -Interactive weather map solution utilizing the Maps (AMP) API.
- **AeriMapboxMapKit.framework** - Extension of the AeriMapKit module to support the Mapbox iOS SDK
- **AeriGoogleMapKit.framework** - Extension of the AeriMapKit module to support using the Google Maps SDK.

We leverage Amazon Web Services including DynamoDB for custom data such as JSON and configuration used by the Mobile Application. In addition, this allows RIVA to take advantage of new cloud services in the future and easily integrate those into future application releases.

Summary

The RIVA Lightning Tracker mobile application can be quickly configured and customized for any agency and be deployed on both iOS Apple App stores as well as Google Play within a 30 day window. Our mobile application approach is innovative because we leverage both open source components as well as SAAS API's to provide a mission ready solution that is cost effective and future proof as it can leverage new cloud based weather services in the future.



For more information on this white paper contact Raj Dasgupta directly at raj@rivasolutionsinc.com or at 240-401-0281.

OUR PROFILE



Founded 2009

Mature SDB with infrastructure built on 10+ years in business



450+ Employees

RIVA consultants provide customer service at Federal client sites nationwide



18+ Locations

Nationwide workforce across 18 states



6 Prime Schedules/IDIQs

Rapid Response Pods and AUTODRRIVE technology in place



24 Federal Clients

Portfolio of Federal Civilian, Defense, Homeland & Intel clients



55 Prime Contracts

Prime past performance reduces risk to clients and partners



The Statistics

700% revenue growth in last 2 years
22% growth with existing clients



Glassdoor Rating

Reputation as a Great Place to Work ensures high retention



Turnover Rate

Investing in employee benefit packages results in low turnover

ABOUT RIVA SOLUTIONS

Headquartered in McLean, Virginia, right outside of our Nation's capital, RIVA Solutions, Inc. (RIVA) is a larger 8(a) small disadvantaged business (SDB) working with the Federal government to provide innovative best practices in Management Consulting, Science and Engineering, Cyber, Agile, Cloud, IT Operations and Modernization, Artificial Intelligence/ Machine Learning, and Robotic Process Automation.

ABOUT THE AUTHOR

Raj Dasgupta is the CTO for RIVA Solutions Inc. and is responsible for providing technical leadership and management of Federal opportunities to drive business growth, and leads RIVA's corporate technology practices to enable innovative solutions and capabilities; and facilitating the implementation of solutions and practices across programs to ensure service delivery excellence