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Reimagining the MeerKAT archive: more than meets the UI

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The South African Radio Astronomy Observatory (SARAO) recently completed a major redevelopment effort to modernize the web-based archive of MeerKAT telescope data. This included resolving long-standing bugs, introducing new features, and realigning the system with current technologies. Although initially scoped as a straightforward port of a list-based search interface, the effort also became an opportunity to rethink the archive's role within SARAO and the broader astronomy community.

This case study shares lessons learned—highlighting new architectural patterns, improved UI capabilities, and a UX journey shaped by surprising user feedback and design flaws.

One example it examines is the shift in authentication architecture. Moving from proxy-based authentication to in-app session logic enabled finer-grained control of feature access. However, cookie size limits forced session state into a database, requiring batched lookups to reduce load. This subtle change—replacing cookie parsing with a session-loading function—introduced a critical new code path, where bugs could silently assign users the wrong session data.

Small infrastructure decisions can have serious UX consequences. These findings underscore the importance—and challenge—of justifying tasks like logging and observability, which surfaced this and other issues. It also illustrates how modernization efforts can reveal assumptions, uncover hidden workflows, and strengthen the human/system interface.

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Footnotes

The system is accessible at archive.sarao.ac.za

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