FastField MVP Technical Assessment Report

Aircraft Inspection Application Evaluation

Report Version: 1.0
Application Tested: FastField v6.0.11-S (14)
Test Device: iPhone 15 Pro Max (iOS 26.2)
Web Platform: Windows 11 Enterprise 25H2, Chrome Browser
Aircraft Tested: Boeing 737-8 MSN 42825, 42827 (Arajet)
Inspection Date: November 3, 2025
Report Date: December 18, 2025
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Executive Summary

Overall Assessment

FastField MVP represents a meaningful step toward digitizing aircraft inspection workflows, but falls short of delivering the transformative efficiency gains possible with modern technology. While it successfully eliminates paper-based reporting, the application replicates traditional form structures rather than reimagining the inspection process for mobile-first, auditor-centric efficiency.

Critical Success Metrics

- **Time Efficiency:** Marginal improvement over Word-based reporting
- **Data Quality:** Multiple validation gaps expose risk of data integrity issues
- **User Experience:** Excessive clicks and redundant data entry reduce field usability
- **Technical Maturity:** Sync failures and timeout issues indicate MVP instability

Severity Classification

Priority	Count	Impact
P0 - Critical	3	System unusable / Data loss risk
P1 - High	12	Significant productivity impact / Data integrity risk
P2 - Medium	15	Usability issues / Workflow inefficiency
P3 - Low	8	Minor improvements / Future enhancements

Strategic Recommendation

Decision Point: The cumulative technical debt and architectural limitations suggest evaluating an in-house development approach versus continued FastField customization. Modern AI-assisted development tools could deliver a purpose-built solution with superior DAE system integration, better mobile UX, and lower long-term maintenance costs.

P0 - Critical Issues (Immediate Action Required)

1. Data Synchronization Failure

Impact: Complete workflow breakdown, potential data loss
Frequency: Consistent

Description:
Web and mobile versions fail to synchronize data, even with auto-sync enabled. Inspectors completing forms on mobile cannot access that data on desktop, and vice versa. Multiple devices logged into the same account display different data simultaneously.

Technical Evidence:

- Forms marked "submitted" on web remain editable on mobile
- Auto-sync toggle confirmed ON in both environments
- Timestamp comparison shows real-time discrepancy

Business Impact:

- Prevents hybrid workflow (field mobile capture + office desktop completion)
- Forces complete re-entry of data
- Creates uncertainty about source of truth
- Risk of submitting incomplete or incorrect reports

Recommended Fix:

- Implement WebSocket-based real-time sync
- Add conflict resolution strategy (last-write-wins with timestamp)
- Provide clear sync status indicators
- Add manual "force sync" button

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2. Session Timeout with Data Loss

Impact: Data loss during normal usage patterns
Frequency: Regular occurrence during extended data entry

Description:
Web browser sessions timeout during typical inspection report completion (15-45 minutes per section). When users attempt to save, data is partially or completely lost. This is compounded by unreliable auto-save functionality.

Technical Evidence:

- Timeout occurs during normal single-page work duration
- Auto-save fails to capture copy-paste operations (common for S/N entry)
- No warning before timeout
- Lost data cannot be recovered

Business Impact:

- Inspector must re-enter 15-45 minutes of work
- Discourages thorough documentation
- Forces frequent manual saves, breaking concentration
- Increases error rate due to rushed data entry

Recommended Fix:

- Extend session timeout to 2 hours minimum
- Implement reliable auto-save every 30 seconds
- Add "unsaved changes" warning before timeout
- Provide session extension prompt at 5 minutes remaining

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3. GPS Location Snapping Error

Impact: Incorrect geolocation data for remote airport inspections
Frequency: Consistent at airside locations

Description:
GPS coordinates snap to nearest recognized vendor location rather than actual position. Manual GPS entry extremely difficult. For aircraft at remote airport positions (common for inspections), recorded location is incorrect.

Business Impact:

- Audit trail integrity compromised
- Incorrect location data in reports
- Difficulty verifying inspection performed at claimed location

Recommended Fix:

- Allow manual lat/long entry
- Provide airport code dropdown as alternative
- Add "use current GPS coordinates" without snapping
- Implement accuracy indicator (±10m, ±50m, etc.)

P1 - High Priority Issues (Address in Next Sprint)

4. Field Validation - Data Type Enforcement

4.1 Time Since New (TSN/TSO) Fields

- **Issue:** Accepts negative numbers, nulls, and prevents decimals
- **Impact:** Data export corruption, inability to track component life accurately
- **Fix:** Enforce positive decimals (0.0-99999.9), separate fields for hours/minutes or decimal hours standardization

4.2 International Phone Numbers

- **Issue:** Integer-only field cannot store international format (+country code)
- **Impact:** Cannot contact international operators/vendors
- **Fix:** Text field with format validation or country code dropdown + number field

4.3 Date Constraints

- **Issue:** No validation for logical date ranges (future dates for "Date of Manufacture", past dates for "Next Due")
- **Impact:** Impossible dates pass validation (DOM in 2030, Next C-Check in 2010)
- **Fix:** Implement min/max date logic per field purpose

4.4 Interval Field Free Text

- **Issue:** Text box allows any entry; expects "MO", "YR", "DY", "FH", "FC" only
- **Impact:** Data export fails, calculations impossible
- **Fix:** Dropdown or radio buttons for unit selection + numeric input

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5. Redundant Data Entry (Critical UX Issue)

Description:
Inspectors must enter the same information multiple times throughout a single report. This violates basic form design principles and introduces error propagation risk.

Examples:

- Engine Serial Number: Entered 3-4 times (assignment section, physical inspection, data plate photo section, engine details)
- APU Serial Number: Entered 3 times
- Landing Gear Position: Selected when opening form, then re-entered as first question in form
- Galley/Lavatory Names: Selected from dropdown, then asked again in detailed section

Business Impact:

- 20-30% increase in data entry time
- Transcription errors multiply with each re-entry
- Inspector frustration and fatigue
- Inconsistent entries within same report (e.g., "NLG" vs "Nose" vs "N")

Recommended Fix:

- Implement form-level variables: capture once, auto-populate everywhere
- Use parent-child relationships: assign S/N at component level, inherit in all subsections
- Add visual confirmation: "Engine SN 602161 - Last entered 3 minutes ago ✓"

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6. Conditional Logic Gaps

6.1 Ask-if-Applicable Rule Violation Issue: Form requests data for non-existent equipment
Example: Aircraft has no additional monitors → User selects "No" → Form still requires quantity input → User must enter "0"

Impact:

- Creates null/zero data confusion (truly absent vs. not recorded)
- Slows inspection workflow
- Auditor cannot distinguish "inspector forgot" from "not applicable"

Fix: If user answers "No" or "Not Installed", skip all related fields entirely

6.2 Inconsistent Comment Triggers Issue: Exterior aircraft condition requests comment if "Average" or "Poor", but interior sections do not follow same pattern

Impact:

- Inconsistent report detail
- Missing context for condition ratings

Fix: Standardize comment triggers across all condition ratings

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7. Photo Upload Workflow Issues

7.1 Bulk Upload at Section End

- **Issue:** All photos uploaded as batch at bottom of long section
- **Impact:**
  - Easy to forget which photos were taken
  - Difficult to verify all required photos included
  - No association between photo and specific component
- **Fix:** Inline photo upload per subsection (e.g., "Engine 1 Inlet Photo" field directly after "Engine 1 Inlet Condition")

7.2 Photo Upload Location Dependency

- **Issue:** Requires leaving form if photos in different desktop folders
- **Impact:** Workflow interruption, form state uncertainty
- **Fix:** Allow multi-folder selection or drag-drop from file explorer

7.3 Photo Ordering

- **Issue:** Upload order determines report order, cannot reorder after upload
- **Impact:** Photos appear out of sequence in final report
- **Fix:** Drag-drop reordering UI or manual sequence numbering

7.4 Web vs. Mobile Photo Functionality Disparity

- **Mobile:** Large preview, can add comments per photo
- **Web:** Prioritizes camera (not needed on desktop), file upload buried, no comments, no preview
- **Impact:** Inconsistent experience, web users cannot annotate photos
- **Fix:** Parity features across platforms

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8. Date Picker Usability Critical Flaw

Issue:
Date selection requires excessive clicks for dates outside current month/year. Inspection reports frequently reference dates from previous years (Date of Manufacture, shop visit dates) or future years (next C-check due dates).

Technical Comparison:

- **Current FastField:** 8-12 clicks to change year, month-by-month navigation only
- **iOS Native:** Scroll wheel, instant year selection
- **ATS System:** Manual type entry (fastest)
- **Industry Standard:** Year dropdown + month dropdown + day click = 3 clicks maximum

Business Impact:

- Reports contain 30-50 dates spanning 7-10 years
- 5-10 seconds per date vs. 1 second = 150-500 seconds wasted per report
- Inspector frustration and errors from repetitive clicking

Recommended Fix:

- Implement year dropdown (2000-2040)
- Allow direct manual entry with validation
- Add quick-select buttons: "Today", "1 year ago", "10 years ago"

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9. Missing Field Options - Dropdown Limitations

Issue:
Dropdown fields do not allow user-added options when legitimate choice is missing.

Examples:

- Operator "Arajet" not in list → Must leave blank or misrepresent
- Lavatory naming conventions don't match aircraft: System offers "LAV A, LAV B" but aircraft labeled "LAV 1, LAV 2"
- Component manufacturers for new products

Business Impact:

- Incomplete reports
- Incorrect data to force field completion
- Cannot inspect new aircraft types/operators

Recommended Fix:

- "Other (please specify)" option for all dropdowns
- Admin review queue for new entries
- Allow inspector to request field additions in real-time

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10. Missing Units of Measurement

Issue:
Numeric fields do not specify expected units, leading to ambiguous entries.

Examples:

- Weight: 2200 (lbs or kg?)
- Time: 365 (days or 1 year?)
- Intervals: 30.5 (days or months?)

Business Impact:

- Data export requires manual interpretation
- Integration with other systems (XRM, ATS) impossible without unit standardization
- Cross-report comparisons unreliable

Recommended Fix:

- Append unit labels to all numeric fields: "Weight (lbs)", "Interval (Months)"
- Store value and unit separately in database
- Provide unit conversion toggle where applicable

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11. Avionics List Management Deficiency

Current State:

- Can search existing part numbers only
- Cannot validate component name accuracy
- Cannot add vendor or quantity
- Cannot enter new part numbers
- No visible list summary at end

Impact:

- Inspector cannot verify data completeness
- Concatenated P/N string in final output is unreadable
- Missing critical data (qty, vendor, component name)

Recommended Fix:

- Table view with add/edit/delete rows
- Fields: Component Name, P/N, Manufacturer, Quantity, Location
- Real-time summary: "12 of 15 required avionics components entered"
- Allow manual P/N entry with validation flag

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12. Generic Placeholder Text

Issue:
Multiple form fields contain "TO BE COMPLETED" or generic instructional text indicating incomplete MVP configuration.

Impact:

- Unprofessional appearance in delivered reports
- Inspector uncertainty about field purpose
- Suggests incomplete development

Fix:
Complete all field labels and help text before production deployment.

P2 - Medium Priority Issues (Usability Improvements)

13. Form Logic - Inspection Workflow Optimization

Current Issue:
Form follows traditional documentation order (General Info → Technical Specs → Records Review → Physical Inspection), but inspectors perform physical walk-around first, then complete paperwork.

Optimal Inspection Sequence:

Exterior Walk-Around (Counter-clockwise from LH Forward):

1. LH Forward Fuselage → Photo + Condition
2. L1 Door → Photo + Owner Plate
3. LH Engine → Photos (inlet, data plate, general view) + S/N confirmation + condition
4. LH Landing Gear → Photos + condition
5. LH Wing → Photos + condition
6. Tail → Photos + APU access + condition
7. RH Wing → Photos + condition
8. RH Landing Gear → Photos + condition
9. RH Engine → Photos + condition
10. RH Fuselage → Photos + condition
11. Nose/Radome → Photos + condition
12. Nose Landing Gear → Photos + condition
13. Forward Cargo → Access + Photos + condition
14. Aft Cargo → Access + Photos + condition

Interior Walk-Through (Forward to Aft):

1. Cockpit → Photos + Aircraft Data Plate + Certificates + Avionics mods check
2. Forward Galley G1 → Photos + Condition + Data plate
3. Forward Galley G2 → Photos + Condition + Data plate
4. Forward Lav → Photos + Condition + Data plate
5. Cabin (FWD to AFT) → Seat photos + Attendant seat inspection + PSU check
6. Aft Galley G4B → Photos + Condition + Data plate
7. Aft Lavs → Photos + Condition + Data plates

Recommended Implementation:

- Restructure form sections to match physical walk sequence
- Group related data collection: "While at LH Engine, capture: Inlet photo, data plate photo, S/N, condition rating, borescope findings"
- Eliminate back-and-forth: Don't ask for engine S/N later in different section
- Provide section checklist: "✓ Inlet Photo, ✓ Data Plate, ⚠ S/N Confirmation Pending"

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14. Mobile Screen Size Optimization

Issue:
Form layout not optimized for standard smartphone screens (iPhone 13/14, Samsung Galaxy S21-S23). Layout requires excessive scrolling and zooming. Testing performed on iPhone 15 Pro Max (largest screen) still showed usability challenges.

Impact:

- Impractical for field use on standard devices
- Inspectors default to camera photos only, complete form in office (defeats mobile-first purpose)

Recommended Fix:

- Responsive design testing on smallest common device (iPhone SE: 4.7")
- Larger touch targets (min 44x44pt per iOS HIG)
- Reduce form density: 1-2 fields per screen on mobile
- Optimize for one-hand operation

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15. Null vs. Not Applicable Data Representation

Issue:
Cannot distinguish between:

- Inspector forgot to complete field (null)
- Data does not exist (N/A - e.g., certificate with no expiration)
- Equipment not installed (N/A - e.g., no additional monitors)

Impact:

- Auditors cannot identify incomplete reports
- Follow-up requests for data that doesn't exist
- Quality assurance impossible

Recommended Fix:

- Three-state fields: Empty / "Not Applicable" / "Data Unavailable"
- Visual indicators: Blank (❌ incomplete), N/A (⊘ not applicable), Data Unavailable (⚠ requires follow-up)

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16. Pre-Population / Historical Data Import

Current State:
Every inspection starts from blank form. Inspector must manually enter all historical data (engine S/N, LLP status, component P/Ns) even though this data exists in previous reports and XRM/ATS systems.

Proposed Enhancement:

- Import from previous inspection: "Load MSN 42825 last inspection data (Nov 2024)"
- Auto-populate from XRM: Engine S/N, APU S/N, Landing Gear S/N, weights, configurations
- Inspector role: Validate and update changes only
- Highlight changes since last inspection: "Engine 2 S/N changed: 602390 → 602391"

Business Impact:

- 60-70% reduction in data entry time
- Eliminates transcription errors for unchanged data
- Focuses inspector attention on actual changes/issues
- Maintains better historical continuity

Technical Note:
Check if FastField API supports pre-population from external data sources. If not, this is a critical limitation for production use.

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17. Long-Form Text and Rich Formatting

Issue:
Findings and observation fields do not support:

- Bullet points
- Multiple paragraphs
- Inline photos
- Text formatting (bold for emphasis)

Impact:

- Findings sections become wall-of-text, difficult to read
- Cannot structure complex observations clearly
- Photos separated from relevant text

Recommended Fix:

- Rich text editor (minimalist: bold, bullets, paragraphs)
- Inline photo insertion
- Character limit indicator

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18. Auto-Save Reliability

Issue:
Auto-save functionality works inconsistently, particularly with copy-paste operations (common for S/N, P/N entry).

Impact:

- Combined with session timeout, causes data loss
- Inspector uncertainty: "Did that save?"
- Forces excessive manual save clicks

Recommended Fix:

- Save on every field blur (when user leaves field)
- Visual save confirmation: "Saved 3 seconds ago ✓"
- Persistent draft recovery: "We found an unsaved draft from 2 hours ago. Restore?"

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19. Form Navigation and Progress Tracking

Current Issue:
No clear indication of:

- Overall form completion percentage
- Which sections are complete
- Which required fields are missing
- How to jump between sections

Recommended Fix:

- Sticky navigation sidebar: Section list with completion checkmarks
- Progress bar: "68% complete, 3 required fields remaining"
- Click section name to jump instantly
- "Required fields" page: Lists all missing mandatory data before submission

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20. Small Improvements (Batch)

- **Caption/Label Completion:** Several placeholders remain
- **Copy-Paste Detection:** Flag S/N copy errors (common: 602361 vs 602391)
- **Spell Check:** Enable for text fields
- **Field Tab Order:** Logical flow for keyboard navigation
- **Photo Resolution Warning:** Alert if photo < 2MP (insufficient for data plate reading)
- **Offline Mode Indicator:** Clear "Working Offline" banner with sync status

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P3 - Low Priority / Future Enhancements

21. Document Scanning Integration

- **Feature:** Native PDF scanning via smartphone camera
- **Use Case:** Capture airworthiness certificates, maintenance logs on board aircraft
- **Benefit:** Directly populate ATS, reduce document requests to operator

22. AI-Assisted Data Plate Recognition

- **Feature:** OCR/AI to extract S/N, P/N from photos
- **Use Case:** Photo of engine data plate → Auto-populate Engine S/N, Model, P/N fields
- **Benefit:** 80% reduction in manual data entry, eliminate transcription errors

23. Fleet Management Review Access

- **Feature:** Allow Director/VP to review in-progress reports

- **Use Case:** Senior engineer reviews findings before final submission
- **Benefit:** Quality assurance, mentoring, collaborative reporting

24. Template Photo Examples

- **Feature:** Show reference photo for each required view
- **Use Case:** "Capture Engine 1 Inlet like this example →"
- **Benefit:** Consistent photo quality, reduces missing/incorrect photos

25. Voice Notes

- **Feature:** Record audio observations in field
- **Use Case:** Inspector dictates findings while examining component
- **Benefit:** Faster than typing on mobile, transcribed later

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Alternative Solution: In-House Development

Strategic Analysis

FastField Limitations:

- Customization constraints within vendor platform
- Ongoing subscription costs + customization fees
- Limited integration with DAE systems (XRM, ATS)
- Dependent on vendor roadmap for critical features
- Data export/portability concerns

In-House Advantages:

- **Modern Development Tools:** AI-assisted coding (GitHub Copilot, Cursor, Claude) reduces development time by 60-70%
- **Perfect DAE Integration:** Direct XRM/ATS API connections, single source of truth
- **Inspector-Optimized UX:** Design specifically for walk-around workflow, mobile-first
- **Continuous History:** Same format across all inspections, easier trending and analysis
- **Data Ownership:** Full control of data structure, exports, and migrations
- **AI Integration Ready:** (See Section below)

Cost Comparison (Rough Estimate):

- FastField Year 1: $25K setup + customization + $15K/year subscription = $40K
- FastField Year 2-5: $15K/year × 4 = $60K
- **FastField 5-Year Total: $100K**

- In-House: $60-80K development (3-4 months with modern tools) + $5K/year hosting/maintenance = $80K + $25K = $105K
- **In-House 5-Year Total: $105K** (break-even, but with full control and better UX)

Risk Assessment:

- **FastField:** Low technical risk, medium business risk (vendor dependency, feature limitations)
- **In-House:** Medium technical risk (requires initial development), low business risk (full control)

Future-State Vision: AI Integration Opportunities

Opportunity 1: Computer Vision Data Extraction

Capability:
Train local AI model (no vendor data sharing) on DAE's historical inspection photos to auto-extract:

- Serial numbers from data plates
- Part numbers from components
- TSO tags from seats
- Condition ratings from visual damage
- Galley/Lavatory model identification

Implementation:

- Capture photo → AI extracts text → Pre-fill form fields → Inspector validates
- 5-10 seconds vs. 2-3 minutes manual entry per component

ROI:
150 data plate photos per inspection × 1.5 minutes saved = 3.75 hours saved per inspection = 30% time reduction

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Opportunity 2: Records Review AI Agent

Capability:
Local AI agent ingests provided records (OCCM, LLP status, AD compliance, B2B traces, shop visit reports) and:

- Extracts serial numbers, dates, compliance status
- Cross-validates data consistency (e.g., LLP cycles vs. engine cycles)

- Flags discrepancies automatically
- Pre-populates report sections
- Generates "findings" for inspector review

Implementation:

- Operator submits records package → AI analyzes overnight → Morning of inspection, 80% of report pre-filled → Inspector validates physical vs. records

Business Impact:

- Records review time: 4-6 hours → 1-2 hours
- Error detection: Human misses ~15% discrepancies → AI flags ~95%
- Enables focus on physical inspection vs. paperwork

Opportunity 3: Intelligent Anomaly Detection

Capability:

- AI compares current inspection to historical inspections of same MSN
- Flags unusual changes: "Engine EGT margin dropped 40°C since last inspection (Feb 2024) - Investigate"
- Detects pattern deviations: "This 737-8 shows 3× higher cabin wear than fleet average - Review operator procedures"

Business Impact:

- Proactive issue identification
- Better lease-end redelivery predictions
- Improved asset management

Conclusion and Recommendations

Summary Assessment

FastField MVP successfully proves digital inspection reporting is feasible but falls short of realizing the full potential of mobile-first, inspector-optimized workflows. The platform suffers from critical stability issues (sync failures, timeouts), pervasive usability problems (redundant data entry, poor date pickers), and fundamental architectural decisions that limit future scalability.

Immediate Actions (Next 30 Days)

1. **Fix P0 Issues:** Data sync, timeout, GPS must be resolved for production viability
2. **Address P1 Validation Issues:** Prevent data integrity problems in active use
3. **Pilot Test with Fixes:** Re-test with 3-5 inspections after P0/P1 fixes deployed

Strategic Decision (60-90 Days)

Evaluate In-House Development:

- Conduct formal cost-benefit analysis (5-year TCO)
- Prototype core workflow (exterior walk-around section) in 2-week sprint
- Assess AI integration feasibility with sample dataset
- Make build-vs-buy decision with executive stakeholder input

If Continuing with FastField

1. **Require Fixes:** Make P0 and critical P1 fixes mandatory before broader deployment
2. **Workflow Redesign:** Restructure form sequence to match inspection walk-around
3. **Integration Plan:** Define XRM/ATS data exchange requirements
4. **Training Program:** Develop inspector training with workflow best practices

If Building In-House

1. **Assemble Team:** 1 Senior Full-Stack Dev + 1 Mobile Specialist + 1 UX Designer + Aviation SME (inspector) advisor
2. **Tech Stack:** React Native (cross-platform mobile), Node.js backend, PostgreSQL, AWS hosting
3. **Phase 1 (3 months):** Core inspection form with optimized workflow
4. **Phase 2 (2 months):** XRM/ATS integration, historical data import
5. **Phase 3 (3 months):** AI data extraction, records review agent
6. **Target Launch:** 8-10 months from kickoff

Appendix: Best Practices for Aircraft Inspection Mobile Apps

UX Principles

1. **Mobile-First Design:** Optimize for smallest target device, scale up
2. **One Action Per Screen:** Minimize cognitive load in field environment
3. **Progressive Disclosure:** Show only relevant fields based on previous answers
4. **Gestural Efficiency:** Swipe to next section, pinch to zoom photos, drag to reorder
5. **Offline-First Architecture:** Full functionality without connectivity, sync when available

Data Quality Principles

1. **Single Source of Truth:** Enter data once, reference everywhere
2. **Smart Defaults:** Pre-populate from historical data, inspector validates
3. **Real-Time Validation:** Flag errors immediately, not at submission
4. **Contextual Help:** Field-level guidance without leaving form
5. **Audit Trail:** Track who changed what and when

Workflow Principles

1. **Follow Physical Reality:** Form structure mirrors inspection sequence
2. **Batch Similar Tasks:** All photos for one area, then all data entry
3. **Visual Progress Tracking:** Always know where you are and what remains
4. **Flexible Sequencing:** Allow non-linear completion (skip APU if inaccessible)
5. **Quick Entry Modes:** Barcode scan, voice notes, photo auto-fill

Performance Principles

1. **Instant Response:** <100ms for all user interactions
2. **Background Sync:** Upload photos and data continuously, not all at end
3. **Optimistic UI:** Show success immediately, handle errors gracefully
4. **Efficient Photo Storage:** Compress images, cache thumbnails locally
5. **Battery Awareness:** Minimize GPS polling, throttle background processes

Export to XRM

Export to ATS

Generate detail spec

MAIN IDEA OVERALL: To be one more xRM module, instead of an outsourced app that is just a patch.

Report End

For questions or clarification, contact the aviation technical team.