# SpeakUp

## A Systems-Engineering Demonstration

Bruce Dombrowski

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Repository: `https://github.com/brucedombrowski/SpeakUp`

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# About This Document

**Purpose:** This briefing is designed for asynchronous review by managers and customers. It can be read independently without a presenter.

**What SpeakUp Is:**

- A response to organizational calls for constructive feedback
- A response to customer requests for process improvement ideas
- A demonstration of systems-engineering discipline applied to knowledge work
- Vendor-neutral at the requirements level—no specific tool is proposed

**Repository:** All artifacts, verification evidence, and this briefing are available at:

`https://github.com/brucedombrowski/SpeakUp`

# Problem Statement

The current operating environment has systemic constraints that limit effectiveness:

| **Constraint** | **Impact** |
|---|---|
| Fragmented workflows | Disconnected mobile, desktop, execution |
| Limited AI in trusted boundaries | Workflow degradation to stay compliant |
| Broadcast email as work proxy | Reduced signal-to-noise; interrupts focus |
| Untracked coordination | Limited traceability and auditability |
| Knowledge attrition risk | Personnel transition loses institutional knowledge |

# Governing Principle

## Core Principle

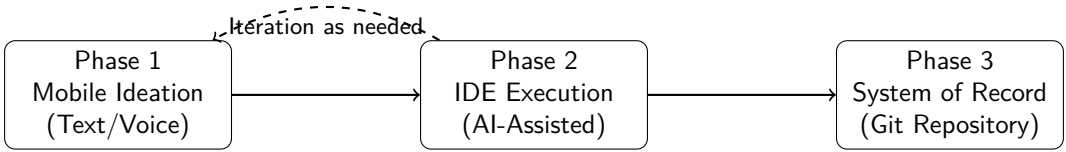
**Thinking is necessary and expected.**
**Accountable work begins when thinking is captured.**

This principle guides the proposed workflow. Work performed in structured, tracked systems maximizes:

| Principle | Benefit |
|---|---|
| Work in structured systems | Enables automation support and reduces manual overhead |
| Capture in tracked systems | Provides traceability for audits and reviews |
| Git as system of record | Creates authoritative, version-controlled history |
| Email for notification only | Preserves email for time-critical coordination, not as work artifact |

# Proposed Workflow Model

The workflow has three phases that can iterate:




**Phase 1: Ideation**

- Smartphone-based reasoning
- Text input always available
- Voice input when possible
- No controlled data required

**Phase 2: Execution**

- Modern IDE environment
- AI assistance (modular)
- Within trust boundaries
- Produces artifacts

**Phase 3: Record**

- Git version control
- Captures history
- Captures rationale
- Lifecycle management

# Functional Requirements (Solution-Agnostic)

These requirements define *what* is needed, not *how* to implement it:

| ID | Type | Requirement |
|---|---|---|
| FR-1 | Mandatory | Mobile ideation capability (smartphone, text/voice input) |
| FR-2 | Mandatory | IDE-centric execution with integrated, replaceable AI assistance |
| FR-3 | Mandatory | Git-based system of record capturing artifacts, history, and rationale |
| FR-4 | Mandatory | Identity and trust boundary alignment (security at identity and device) |
| FR-5 | Recommended | High-signal communication model (email for notification only) |

# Security and Compliance

SpeakUp maintains existing security posture—no rules are relaxed:

**Trust Boundary Alignment**

- Security enforced at authenticated identity
- Security enforced at managed device
- AI operates in-boundary as assistive tool
- Classification and handling rules unchanged

**Information Handling (This Project)**

- No sensitive PII included
- No CUI included
- No proprietary information included
- No classified information included
- Verified by inspection (see repository)

Verification evidence: `verification/Compliance-Statement.md`

# Value Proposition

## The Core Point

**With the right environment, one person can do the work of an entire team.**

**Example:** This briefing—IDE, AI agent, LaTeX documents, professional PDFs, version control—all produced by one person. The constraint is not capability. It is environment.

| **Capability** | **Current State** | **Proposed State** |
|---|---|---|
| Work capture | Fragmented, untracked | Structured, version-controlled |
| AI assistance | Outside boundary or unavailable | In-boundary, modular |
| Knowledge preservation | At-risk | Durable artifacts |
| Automation readiness | Limited | Maximized |
| Auditability | Manual effort | Built-in traceability |

# Implementation Approach

This project demonstrates the pattern by being the pattern:

- **Concrete enough to execute**
  - Working repository with all artifacts
  - Defined outputs and verification evidence
  - Reproducible workflow documented in `artifacts/Workflow-Log.md`
- **Abstract enough to remain vendor and environment neutral**
  - Requirements specify *what*, not *how*
  - Implementation choices documented separately
  - Alternative tools and environments can satisfy same requirements
- **Self-demonstrating**
  - This briefing was created using the proposed workflow
  - Ideation on mobile, execution in IDE, artifacts in Git

**Example project using this workflow:**

`https://github.com/brucedombrowski/OpenSourceHouseProject`

# Repository Contents

All project artifacts are available for review:

| File | Purpose |
|---|---|
| `README.md` | Authoritative requirements and project specification |
| `briefing/SpeakUp-Briefing.pdf` | This document |
| `verification/Compliance-Statement.md` | Information handling verification evidence |
| `verification/Requirements-Traceability.md` | Requirements to evidence mapping |
| `verification/PII-Scan-Results.md` | Automated PII scan test results |
| `verification/scripts/check-pii.sh` | Automated verification script |
| `artifacts/Workflow-Log.md` | Execution workflow documentation |

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# Handling Constraints and Blockers

When a constraint is encountered, the workflow captures it explicitly:

## Example: Export Control Constraint

During BPv7 implementation, NASA TReK was identified as ideal tooling—but is export-controlled (EAR ECCN 9D515.B.5). Rather than stop, the constraint was documented and alternatives evaluated.

| Option | Trade-off | Decision |
|---|---|---|
| NASA TReK | Export controlled (EAR) | Future path |
| NASA JPL ION-DTN | Open source | Selected default |
| Clean-room Python | Full control | Learning/customization |

**Key Principle:** Constraints become traceable decisions, not invisible blockers.

**Artifact:** `artifacts/Decision-Log.md`, `src/bpv7/simulation/EXPORT_CONTROL.md`

# Requirements Anti-Patterns

**Bad specifications cost billions and cause project failures:**

| Failure | Cost | Root Cause |
|---|---|---|
| Mars Climate Orbiter | $320M | Metric/imperial unit mismatch |
| FBI Virtual Case File | $170M | Vague requirements, scope creep |
| Ariane 5 Rocket | $370M | Reused incompatible code |

| Anti-Pattern (FAR 11.104: "least acceptable") | Better: Performance Spec |
|---|---|
| "Shall use Microsoft Word" | "Shall produce PDF/A archival format" |
| "Shall be written in Java" | "Shall execute on target platform" |
| "Shall use Oracle database" | "Shall persist data with ACID guarantees" |

**SpeakUp approach:** LaTeX source (diffable, traceable) → PDF output (portable, archival)

# Verification Summary

This project produces verification evidence as first-class artifacts:

| Method | Application | NIST Control |
|---|---|---|
| Manual Inspection | Document review | — |
| PII Pattern Scan | Phone, SSN, IP detection | SI-12 |
| Malware Scan | ClamAV detection | SI-3 |
| Secrets Scan | API keys, credentials | SA-11 |
| MAC Address Scan | Hardware identifiers | SC-8 |
| Host Security | OS configuration | CM-6 |
| File Integrity | SHA-256 hashes | SI-7 |

**Security Attestation:** All automated scans **PASS**
**Policy:** Only passing results are published. Vulnerability details are never exposed.

# Recommendation

**Adopt the SpeakUp workflow model as a pattern for:**

- Converting thinking into durable, reviewable artifacts
- Preserving institutional knowledge as personnel transition
- Enabling automation and reducing manual audit effort
- Maintaining security and trust boundaries while using AI assistance
- Improving signal-to-noise in organizational communication

**This pattern is applicable to:**

- Engineering work
- Analytical work
- Knowledge work generally

# Commit History (Evidence of Work)

**30 commits in 8 person-hours** — demonstrating AI-assisted productivity:

| Hash | Commit Message |
|---|---|
| 9e5aca8 | Update documentation and scan handling |
| f1f386e | Add master build script |
| 8855611 | Add long-duration DTN test with LOS/AOS |
| 4090a0a | Add BPv7 tests and Wireshark demo |
| f5d1959 | Update TCPCL to RFC 9174 wire format |
| 1f3cb42 | Add constraints slide |
| cd86850 | Add decision log |
| 6015094 | Add Docker DTN simulation |
| 0aecf3c | Add TCPCL v4 (RFC 9174) |
| 318800a | Add BPv7 core (RFC 9171) |
| acc6be5 | Add security verification suite |
| 2b27e68 | Strengthen value proposition |
| 35a13c7 | Add lifecycle management |
| 79ac56e | Add LaTeX briefing deck |
| 76bd5bc | Initial commit |

# Next Steps

1. **Review this briefing** and the repository contents
2. **Identify a pilot application area** where the workflow could be applied
3. **Establish repository and workflow** for the pilot
4. **Iterate** between ideation and execution phases
5. **Measure and refine** based on results

*This briefing was produced using the SpeakUp workflow model it describes.*

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**Contact:** Bruce Dombrowski (Creator)