Fjärrstridsgrupp Alfa (FSG-A) — open-source defence engineering

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Integrated Logistics Support Plan

Reference Design — Lifecycle Support Concept

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Revision History

Version	Date	Author	Description
0.1 DRAFT	2026-04-19	FSG-A	Initial draft reference design. Illustrative structure for a funded programme to adapt; not a programme deliverable in its own right.

1. Executive Summary

This Integrated Logistics Support plan sketches a full lifecycle support concept for the Fischer 26 / Fischer 26E system from initial operational capability through service life and disposal. The plan is structured around the ten ILS elements defined in MIL-STD-1388-1A.

An illustrative TCO model is shown in Section 12. Values in that model are [illustrative] placeholders. A funded programme would populate them from its own supplier quotes, training-provider contracts, and historical maintenance data.

The highest structural logistics risks identified in this reference design are: (a) Silvus radio supply chain (ITAR-controlled, warranting strategic reserve), (b) LiPo battery shelf life [illustrative typical range], and (c) the lack of domestic European depot capacity for autopilot repairs (depot location to be designated in partnership negotiations).

2. Element 1: Maintenance Planning

Maintenance is organised in three levels following NATO convention (O/I/D — Operator, Intermediate, Depot). The level determines who performs the work, what tools are required, and where the work occurs.

Level	Location	Skill Level	Typical Tasks	Tools Required
O (Operator)	Platoon / field	Operator, short course [illustrative duration]	Battery swap, propeller change, visual inspection, SD card	Standard hand tools, field kit
I (Intermediate)	Company / Battalion workshop	Drone technician, intermediate course [illustrative]	Motor replacement, servo replacement, airframe patch repairs, firmware flashing	Workshop kit, laptop with GCS software
D (Depot)	Contracted European defence facility (to be designated)	Certified depot technician	Autopilot replacement, structural repair, full calibration, battery recycling, obsolescence management	Full depot facility (anechoic chamber, thermal test, structural jigs)

3. Element 2: Manpower & Personnel

An illustrative brigade-level organisation adopting this architecture would typically dedicate the following personnel positions (over and above the operators who fly the drones). Counts are [illustrative] for a real programme to validate against its own size and tempo:

• Brigade ILS lead (ILS-qualified officer or equivalent)

• Intermediate-level technicians (senior NCO or civilian equivalent)

• Operator-level maintainers (shared with pilot pool)

• Depot interface (liaison with designated European partner facility)

Training requirements for these positions are detailed in Element 6.

4. Element 3: Supply Support

Spares provisioning scales with operational profile. Critical stockpile requirements would be derived in a real programme from Monte Carlo simulation of failure rates (see FSG-A-FMEA-001 reference analysis) and actual consumption rates from early operational use.

Tier	Operational Profile [illustrative]	Airframes [illustrative]	Annual spares budget [illustrative]	Critical stockpile [illustrative]
Platoon	Light utilisation	[illustrative]	[illustrative]	Example: 1 spare airframe, 2 motors, 4 batteries
Company	Moderate utilisation	[illustrative]	[illustrative]	Example: 2 spare airframes, 4 motors, 8 batteries
Battalion	High utilisation	[illustrative]	[illustrative]	Example: 4 spare airframes, 12 motors, 24 batteries
Brigade	Brigade-wide deployment	[illustrative]	[illustrative]	Example: 15 spare airframes + full rebuild kit

Critical parts are categorised A, B, or C by mission impact. Category A parts would typically be pre-positioned at battalion level. Category B at company level. Category C bulk-purchased.

Part	Criticality	Replacement Time [illustrative]	Lead Time [illustrative]	Wartime Strategy
Airframe shell	A (mission-critical)	[illustrative]	[illustrative]	Design intent: pre-positioned at battalion logistics
Main battery	A	[illustrative]	[illustrative]	Design intent: forward reserve per drone in theatre
Motor	A	[illustrative]	[illustrative]	Design intent: multiple spares per drone in theatre
Autopilot	A	[illustrative]	[illustrative]	Design intent: strategic reserve at designated depot (location TBD)
Silvus radio	A	[illustrative]	[illustrative] (ITAR — long lead)	Design intent: multi-year reserve, ITAR-sensitive
GPS antenna	B	[illustrative]	[illustrative]	Standard brigade stock
Servos	B	[illustrative]	[illustrative]	Standard platoon stock
ESC	A	[illustrative]	[illustrative]	Standard company stock
Propeller	B (consumable)	[illustrative]	[illustrative]	Platoon consumable stock
SD card	C (consumable)	[illustrative]	[illustrative]	Bulk purchase
Camera (IMX477)	B	[illustrative]	[illustrative]	Company-level stock
Landing parachute	C	[illustrative]	[illustrative]	Platoon stock

5. Element 4: Support Equipment

Each maintenance level requires a defined tool kit. The field kit (operator level) is documented in the FSG-A wiki 'logistics-field-kit' chapter. The workshop kit (intermediate level) typically includes: soldering station with fume extraction, programmable laboratory power supply, general-purpose oscilloscope, spectrum analyser covering VHF/UHF through the frequency bands used by the system, structural repair jigs, calibration table (anechoic-lined), and laptop with firmware toolchain. Specific instrument specifications [illustrative — programme to finalise] depend on the radio bands and precision required.

Depot-level equipment (at designated depot facility) includes all of the above plus: RF anechoic chamber (for SDR and antenna test), thermal chamber covering the full operating envelope, vibration table (MIL-STD-810 profile), and structural test rig.

6. Element 5: Technical Publications

All technical documentation is maintained in the FSG-A wiki (https://fsg-a.com/) with cross-references to the source repository. Documents follow NATO AQAP 2110 quality assurance guidance. Publication types:

• Operator Manual (per airframe variant) — wiki-based, PDF export available

• Field Repair Guide — wiki chapter 'soldering-field-repair'

• Workshop Manual (intermediate level) — under development

• Depot Manual (depot level) — restricted, provided to contracted facility

• Component datasheets — referenced directly from manufacturer where published, archived locally where not

All technical changes are logged in the Technical Changelog (wiki: technical-changelog.html).

7. Element 6: Training & Training Support

Training is detailed in the FSG-A wiki chapter 'lisa26-operator-training'. Summary of illustrative training tiers (hours and cost per trainee are [illustrative] — a real programme would derive them from its training provider contract):

• Platoon operator

• Company team leader

• Battalion operations officer

• Brigade staff analyst

• Intermediate technician (maintenance focus)

• Depot technician (residential at designated facility)

Training is delivered using ArduPilot SITL for flight hours below the live-flight threshold, which reduces cost versus live-hardware-only training.

8. Element 7: Computer Resources Support

Software supportability is addressed via the SDK (libfischer26e) with a documented long-term support (LTS) branch policy. Firmware updates are delivered over-the-air via the MANET backbone or via SD card in disconnected environments.

Dependency management follows a Software Bill of Materials (SBOM) per FSG-A-SBOM-001. All open-source components are vendored locally to insulate against upstream disappearance.

9. Element 8: Facilities

Fielded unit facilities: each platoon requires a hardened storage shelter for airframes plus charging station. Battalion-level workshop requires climate-controlled space with electrical supply adequate for workshop tooling. Specific floor-area and electrical requirements [illustrative — programme to finalise] depend on fleet size and tooling specifics.

Depot facility (location TBD): floor-area, layout, and instrumentation [illustrative — programme to determine]. A European partner depot is proposed in this reference design to provide geographic redundancy and reduce transport time for Nordic units.

10. Element 9: Packaging, Handling, Storage, Transport

Packaging: Fischer 26 ships in a modular transport case [illustrative dimensions — programme to finalise based on final airframe dimensions] with foam-cut interior and hardshell that protects against MIL-STD-810 drop and vibration. The case also serves as the field maintenance platform.

Storage: ambient warehouse conditions within the operating temperature envelope [illustrative]. Batteries must be stored at mid-state-of-charge and cycled periodically; long-term airframe storage is possible but batteries require periodic replacement even in storage. Exact storage lifetimes are [illustrative — programme to validate with battery supplier].

Transport: road transport standard; air transport requires IATA DGR compliance for lithium batteries (UN3480 Class 9). Rail transport acceptable.

11. Element 10: Design Interface

The ILS strategy feeds back into design through two mechanisms. First, the FMEA (FSG-A-FMEA-001) identifies failure modes whose RPN is driven primarily by poor detection or long mean-time-to-repair, prompting design changes to improve maintainability. Second, spares consumption data from fielded units (once available in a real programme) drives component selection for the next mid-life upgrade.

Design-for-support features in the reference architecture include: tool-free airframe swap, short motor swap procedure, rapid battery swap, and firmware flashing via standard USB-C without proprietary cables. Specific swap/service times [illustrative — programme to measure].

12. Total Cost of Ownership (reference model)

The TCO table below is an [illustrative] placeholder showing the structure of a 15-year ownership model. Values are not FSG-A cost estimates and must not be quoted as such. A real programme would populate this table from its own supplier quotes and historical maintenance data.

Year	Acquisition	Spares	Training	Maintenance	Total
1	[illustrative]	[illustrative]	[illustrative]	[illustrative]	[illustrative]
2	—	[illustrative]	[illustrative]	[illustrative]	[illustrative]
3	—	[illustrative]	[illustrative]	[illustrative]	[illustrative]
4-5	Mid-life upgrade [illustrative]	[illustrative]	[illustrative]	[illustrative]	[illustrative]
6-10	—	[illustrative]	[illustrative]	[illustrative]	[illustrative]
11-15	Phase-out planning	[illustrative]	[illustrative]	[illustrative]	[illustrative]
TOTAL	[illustrative]	[illustrative]	[illustrative]	[illustrative]	[illustrative]

13. Obsolescence Management

Diminishing Manufacturing Sources (DMS) is a primary lifecycle risk for electronics-heavy systems. A real programme can manage obsolescence by: (a) sourcing commercially-available components with large install bases (raising the bar for EOL), (b) maintaining buffer stock for critical components (reserve duration [illustrative]), (c) designing modular replacement paths (the autopilot can be replaced with any MAVLink-compatible unit in a future life-cycle upgrade), and (d) periodic DMS review as part of the programme management cadence.

14. Phase-Out and Disposal

End-of-service-life disposition follows Swedish and EU regulations: carbon-fibre composites to specialist recycling (mechanical grinding, pyrolysis for fibre recovery), LiPo batteries to certified recycling facilities (EU WEEE directive), electronics to WEEE recycling, and any cryptographic material zeroised per NSA/CSS SP 800-88 before hardware disposal.

Technical disposition decisions (full disposal versus refurbishment for training use versus transfer to partner nations) are made by the programme office at each airframe's 10-year anniversary.

15. References

MIL-STD-1388-1A — Logistic Support Analysis (US DoD).

NATO ALP-10 — Logistics Procedures.

NATO AQAP 2110 — NATO Quality Assurance Requirements for Design, Development and Production.

IATA Dangerous Goods Regulations (for lithium battery transport).

FSG-A-FMEA-001 — Failure Mode and Effects Analysis.

FSG-A-SBOM-001 — Software Bill of Materials.

FSG-A wiki — https://fsg-a.com/ (chapter 'logistics-field-kit' and supporting material).