

GENEREX



OEM INTEGRATION CONCEPT

SMARTBATTERY / iBACS

From embedded lifecycle data (SMARTLOGGER)
to active integrated battery management (iBACS)

GENEREX · SMARTBATTERY (Pat.) · September 2026





PROJECT FRAME

Creating a new Battery Type – SMARTBATTERY

The goal is to establish a new battery type that combines proven battery technology with integrated offline and online battery monitoring and management, including cradle-to-grave lifecycle data to support EU Battery Passport requirements where applicable – a SMARTBATTERY.

USE CASE

What should the SMARTBATTERY actually solve for OEM customers?

- Easy integration of battery
- Reduced installation effort compared with retrofit monitoring
- Lifecycle data from production to end of life – supporting traceability and EU Battery Passport workflows where applicable
- PRO versions add impedance measurement for advanced battery condition assessment and documentation

FEASIBILITY

How can BACS intelligence be integrated safely and serviceably ?

IMPLEMENTATION

What needs to change in mechanics, electronics, firmware and production?

BUSINESS CASE

What are the cost, timing, value and partnership options?

Decision output

Target output: architecture, prototype scope and industrialization plan



WHY SMARTBATTERY

The blind spot: preserving battery history through failure

“Sudden death”

SMARTBATTERY can retain operating data independently even after total battery failure.

01

Production & storage

02

Installation & operation

03

Failure & warranty

A SMARTBATTERY with a SMARTLOGGER inside makes that lifecycle visible instead of treating the battery as a data black box.





SMARTBATTERY ARCHITECTURE

One battery. Three layers of intelligence.



1

LIFECYCLE DATA

Built-in SMARTLOGGER records the battery history locally and remains accessible via NFC.

2

ACTIVE MANAGEMENT

Plug-in iBACS adds voltage regulation / balancing and richer battery condition data.

3

SYSTEM INTEGRATION

BACS bus and Webmanager connect the battery to the wider critical-power ecosystem.

PATENT EP 18726032.8

The mechanical integration can be adapted to the OEM battery design; the intelligence remains modular.

MODULAR DEPLOYMENT PATH

Start standalone. Scale into active battery management.



Built a SMARTBATTERY with a Slot for the integration of a SMARTLOGGER or BACS or any other Sensor

Autonomous lifecycle logging



PLUG-IN iBACS

Active regulation / balancing



BACS

Networked string-level communication



BACS WEBMANAGER

System view, alarms and integration

The same battery platform can support different market offers: data-first, active management, or full BACS system integration.

PROPOSED OEM INTEGRATION CONCEPT

Recessed, protected and serviceable – not buried electronics

BASE with SMARTLOGGER

PLUG-IN



Dedicated recessed compartment

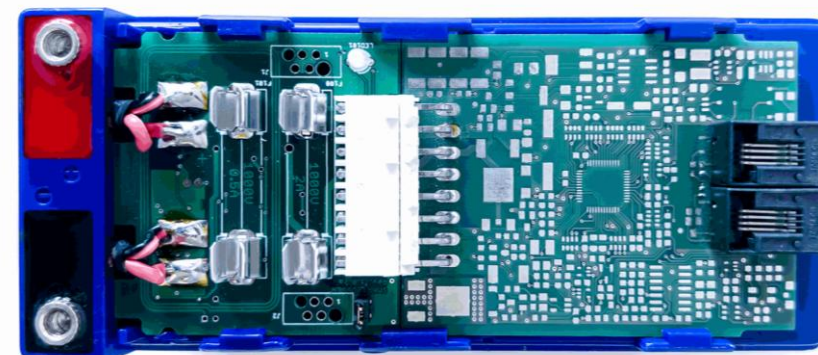
The battery housing provides a defined protected space and interface for the electronics.

Plug-in module with its own protection

A separate module housing adds a physical barrier and creates a replaceable service unit.

iBACS

PLUG-IN



OEM assembly & service path

The selected module can be installed at production or serviced later without redesigning the whole battery.

Final geometry is project-specific

Housing, interfaces and assembly sequence are project-specific and need to be defined during engineering.



TECHNICAL CAPABILITY

iBACS adds active care — not just monitoring

VOLTAGE REGULATION

Active equalizing / balancing around the charger target voltage.

STATE OF HEALTH

Condition indication based on balancing behavior and battery data.

TEMPERATURE

Per-battery temperature monitoring and alarm logic.

IMPEDANCE / CAPACITY

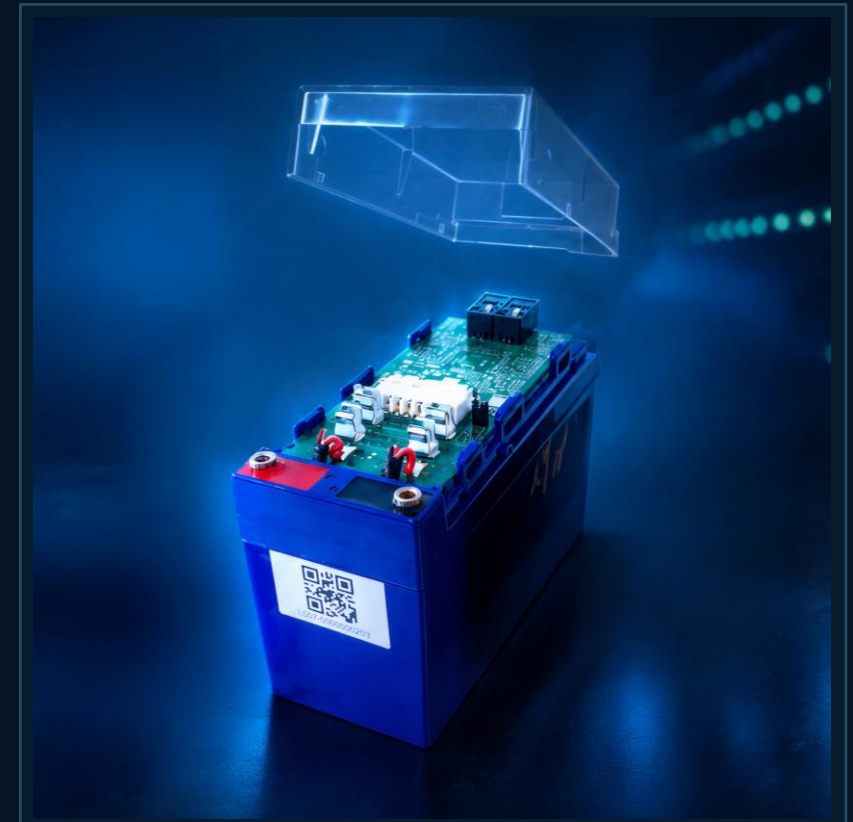
Extended SMARTLOGGER PRO (and iBACS) include resistance and capacity/SOC-related data.

BUS & IMMUNITY

Fast communication and galvanic isolation concept.

AC RIPPLE

Detection of AC content on the DC bus as an indicator for charger / rectifier condition.



Current BACS 4 development provides the technology baseline. Exact hardware and firmware scope for an OEM implementation needs to be validated during the project.

COMPANION APP & NFC

Local service access – even without permanent online infrastructure



01

STATUS AT A GLANCE

Battery identity, voltage, temperature and operating status. At SMARTLOGGER PRO also with impedance trends

02

HISTORY & LOGS

Retrieve stored lifecycle data and inspect trends over time.

03

CAPACITY TEST

Support controlled discharge workflows and capacity evaluation.

04

GROUPS & EXPORT

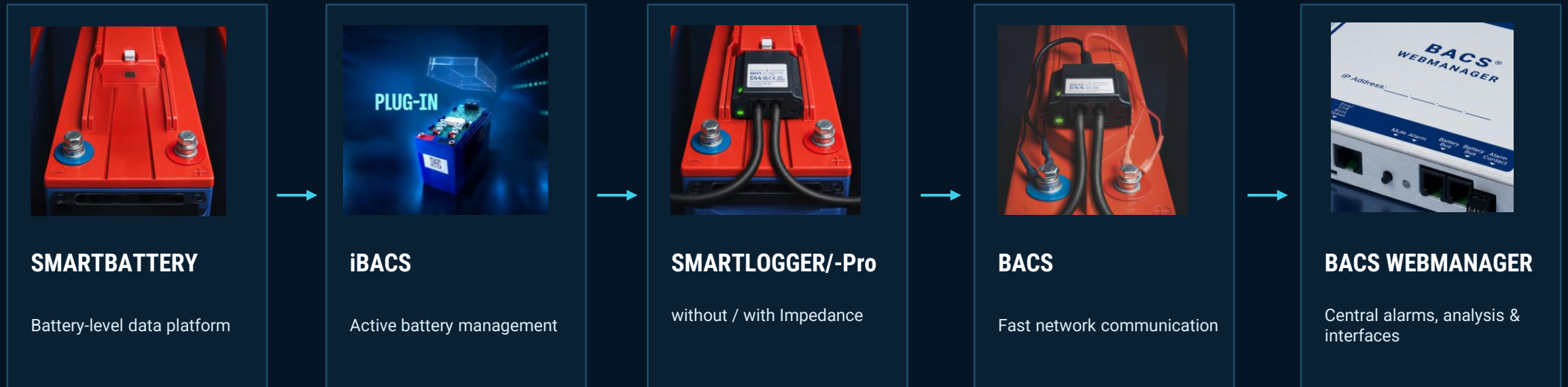
Organize batteries, share datasets and support off-site analysis.

Offline-capable

NFC is needed for reading/writing; stored app data can still be viewed without an active NFC connection.

COMPATIBILITY & SYSTEM INTEGRATION

Designed to fit the GENEREX ecosystem you already know



OPTIONAL LOCAL ACCESS

Companion App / NFC can coexist with networked BACS. Local history remains valuable for field service and offline analysis.

PROJECT-SPECIFIC INTERFACES

Final cable set, BACS routing, connectors and Webmanager configuration need to be defined for the selected battery platform during engineering.



OEM VALUE

What this can create for FIAMM

DIFFERENTIATED PRODUCT

Move from a conventional battery to a measurable, serviceable SMARTBATTERY platform.

BETTER SERVICE EVIDENCE

Lifecycle history gives technicians and warranty teams a stronger factual basis.

LOWER FIELD INSTALLATION

Factory-integrated data capture reduces the need for add-on mounting work in the field.

MODULAR UPSELL PATH

Offer data logging with the SMARTLOGGER as a baseline and active iBACS/BACS capability where the application justifies it.

DIGITAL TRACEABILITY

Serialised battery data, history and export workflows support transparent lifecycle documentation.

BACS ECOSYSTEM ACCESS

Connect the battery directly into GENEREX monitoring and management infrastructure used in critical power.

Strategic point: SMARTBATTERY is not a single gadget – it is a platform that can support different OEM product tiers and service models.



DEVELOPMENT SCOPE

A joint OEM project would define six workstreams

01

MECHANICAL

Slot geometry, lid, sealing, service access, connector location.

02

ELECTRICAL

Battery terminals, measuring points, fusing, power supply, wiring.

03

HARDWARE / FW

iBACS variant, SMARTLOGGER behavior, update path, diagnostics.

04

DATA / APP

Battery identity, NFC workflows, handover logic, exports and access rights.

05

VALIDATION

Thermal, electrical, EMC/noise, reliability, service and system testing.

06

INDUSTRIALIZATION

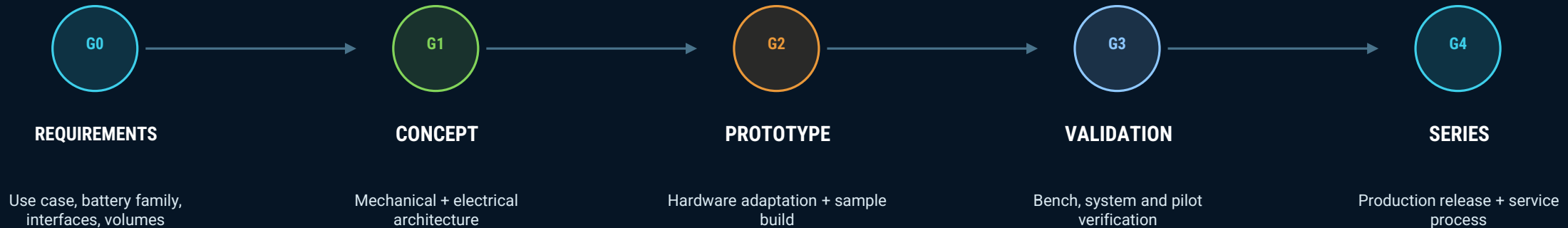
Assembly sequence, supplier parts, QA, production test and replacement process.

The existing prototype demonstrates the integration concept. The project work is to turn that concept into a OEM-ready battery series architecture.



FEASIBILITY, SCHEDULE & PRODUCTION

Time and cost are outputs of scope – these are the drivers ...



What determines the effort?

- Extent of required battery-housing changes
- Required validation / certification depth
- Prototype quantity and production tooling needs
- Whether SMARTLOGGER, SMARTLOGGER PRO (with Impedance) or iBACS or both are in scope
- Target battery families and voltage / capacity variants
- Software, data and system-integration scope

Schedule and NRE depend on the scope defined during G0/G1.



COMMERCIAL CONCEPT FOR DISCUSSION

A pioneer model can reduce the cost of getting started

Develop today. Refinance the integration while you develop.

Optional Pioneer Deal for battery manufacturers and OEM partners.

IMMEDIATE MODULE CREDIT

From license signature: €1.00 / US\$1.20 credit per purchased BACS or SMARTLOGGER module — subject to final agreement.

UP TO 24 MONTHS

Credit runs until the SMARTBATTERY reaches market or for a maximum of 24 months, whichever comes first.

DEVELOPMENT PHASE OFFSET

The concept is designed to offset patent / license burden while engineering and prototype work are still underway.

LICENSE

DEVELOPMENT

LAUNCH



NEXT STEP

Turn the prototype into a SMARTBATTERY

Recommended working session

- 01 Confirm target battery family and market use case
- 02 Review mechanical / electrical integration with engineering
- 03 Define prototype scope and validation plan
- 04 Size timeline, NRE and production concept
- 05 Evaluate pilot + commercial partnership model

GENEREX brings the technology platform. The OEM brings the battery platform.



APPENDIX

Capability matrix

CAPABILITY	SMARTLOGGER	SMARTLOGGER PRO	BACS	iBACS
Voltage measurement	•	•	•	•
Temperature	•	•	•	•
Lifecycle / offline log	•	•		•
NFC local access	•	•		•
Active balancing / equalizing	—		•	•
SOC capacity / SOH indication	•	•	•	•
Internal resistance	—	•	•	•
EU Battery Pass	•	•		•
AC ripple	—		•	•
BACS / system network	—		•	•