Action research framework protocol

Usage configurations, territorial comparison and citizen learning

Partnership working document

1. Question, purpose and scope

In which cases, for which groups and under what infrastructure, safety, maintenance and governance conditions can light intermediate vehicles meet mobility needs without shifting burdens or excluding certain uses? MOBILAB Greater Region investigates this question in three complementary projects: ZFT Sud, ZFT Nord and TNT Chiers-Alzette.

The unit of analysis is a complete usage configuration: a task, user group, journey, time, vehicle or combination of modes, infrastructure, rules and maintenance arrangements. One vehicle may serve several configurations; a configuration may compare several solutions.

The research combines case studies, usage measurements, observations, targeted interviews and decision analysis. It seeks transferable mechanisms, conditions and limitations. Purposive selection and the limited number of cases do not justify claims to represent all groups, municipalities or vehicles.

Contributing to a just ecological bifurcation guides the questions asked. Empirical conclusions remain open: usefulness limited to one task, a necessary adaptation, abandonment or insufficient evidence are complete results when documented.

The LTC-PSP educational strand examines a complementary question: to what extent does a pathway of inquiry, co-design and peer facilitation help pupils assess a decision using partial, contradictory and socially differentiated data? Endorsement of VLI is not an indicator of educational success.

2. Hypotheses and competing explanations

Working hypothesis	Observation sought	Counter-test
H1. Useful substitution	Certain tasks performed by car or van can be completed with fewer resources.	Identify the mode actually replaced and induced trips; compare with walking, cycling, public transport or service reorganisation.
H2. Territorial capacity	Training, maintenance, access and governance make use more continuous.	Observe novelty effects, exceptional support, the work of a key person and dependence on intensive assistance.

Working hypothesis	Observation sought	Counter-test
H3. Differentiated usefulness	The same solution may be practicable for some groups and inaccessible to others.	Look for refusals, withdrawals, time constraints, load, disability, resource or safety issues that challenge a favourable average.

The worlding framework used in the source documents proposes studying how habits, skills, infrastructure, rules and responsibilities make a solution practicable day to day. It is used as an interpretive framework to be tested. A simpler explanation based on price, time, law, infrastructure or technical quality must be retained when it better accounts for observations.

Each conclusion distinguishes the finding, its interpretation, the preferred explanatory framework and its uncertainty. An activity's success, adoption of a vehicle and the relevance of a theoretical explanation remain three different questions.

3. Case selection and inquiry process

Cases are selected to vary tasks, user groups, territories, alternatives and constraints. Favourable situations are compared with difficult or unfavourable ones. People unfamiliar with VLI, refusals and absent groups are documented. The portfolio is prioritised with the sites and partners concerned.

The six cases in the historical South framework remain a target to confirm for that territory. Nord and TNT objectives are set after assessing tasks and monitoring capacity; they do not result from multiplying the South target. Vehicle numbers, sites and commitments are confirmed for the selected configurations.

Time	Stage	Minimum record
T0	Initial situation	Task, user group, constraints, usual solution and reference source before lending.
T1	Familiarisation	Training, initial exposure, first difficulties and support provided.
T2	Supported use	Tasks, availability, feedback, incidents and support time.
T3	Less-assisted use	Repetition after learning, only if conditions allow; remaining support stays visible.

Time	Stage	Minimum record
T4	Decision	Comparison of records, challenge, scope of validity and verdict.
T5	Possible follow-up	Continuity, adaptation or abandonment when resources, agreements and schedule allow.

Exposure duration, success criteria and stopping reasons are defined in the case plan. Insufficient exposure leads to “insufficient evidence” status, without being equated with usage failure. A substantial plan change is dated, explained and distinguished from the initial version.

4. Participation and territorial inquiry

Territorial inquiry enables people affected to change the questions, produce records, challenge an interpretation and contribute to decisions. Municipal services characterise tasks and constraints; associations contribute their knowledge of user groups; maintainers document availability and repair work; experts address defined questions.

Group	Contribution to research
GT1. Uses and groups	Needs, baseline situations, alternatives, absent groups and selection criteria.
GT2. Vehicles, safety and maintenance	Configurations, infrastructure, training, availability, repair and withdrawal.
GT3. Governance, funding and law	Responsibilities, ownership, booking, social access, service models and pooling.
GT4. Data, evaluation and transfer	Indicators, evidence quality, privacy, contradictions and transfer conditions.

Expert–citizen forums connect group work to the choices to investigate. The number of sessions is agreed with partners; participation targets do not replace discussion quality. Contradictory contributions and minority positions remain visible in presentations of findings.

Engagement seeks varied experiences. Each review states who participated, who could not and the limits of recruitment. A person may decline a trial, withdraw or contribute differently. Arrangements are explained before the activity, with no adverse school consequence linked to refusal.

5. Differential habitability framework

Habitability here means the possibility of using a configuration practicably in a given situation. It is examined by user group, task and time. Dimensions are documented separately; good performance in one does not compensate for a major obstacle in another.

Dimension	Elements observed
Ecological and material	Actual substitution, energy, resources, lifespan, repairability and limits of available data.
Practical and experiential	Task completed, effort, comfort, weather, load, time, reliability and perceived safety.
Social and distributive	Access by age, gender, resources, disability, care burden, availability and shifted costs.
Territorial and institutional	Routes, parking, charging, storage, insurance, maintenance and responsibilities.
Cultural and democratic	Image, habits, dignity, legitimacy, controversies and ability to challenge or leave.

Eight operations guide observation: enter the scheme; navigate its rules and options; carry out the task; maintain availability; transform the configuration; pass on knowledge; challenge a decision; leave without disproportionate penalty.

A qualitative reading may distinguish: blocking; possible at exceptional effort; possible under conditions; routine within the observed scope; undocumented. These levels structure discussion and are neither an overall score nor a ranking of transport modes. Each judgement is linked to a record, user group, time and confidence level.

6. Minimum data and indicators

The initial sheet specifies project, territory, organisation, case identifier, user group, task, distances, times, loads, usual alternative, preparation time, waiting and route. Identifying information is separated from analysis data. The baseline stated before the trial is checked at the end, distinguishing statements from observations.

Focus	Data to document	Analytical use
Task	Planned and completed task, distance, door-to-door time, load, weather and alternative actually replaced.	Completion, substitution and configuration limits.

Focus	Data to document	Analytical use
Availability	Planned period, ready-to-use time, charging, breakdown, servicing and unavailability.	Service continuity and maintenance workload.
Support	Training, interventions, contact person's time, preparation and exceptional support.	Conditions for repetition and transferred work.
Experience	Difficulties, reasons for refusal or withdrawal, incident, adjustment and continuation condition.	Differences between user groups and explanations of results.
Service	Rental or depreciation, energy, insurance, maintenance, storage, logistics and work involved.	Comparison of full service costs and responsibilities.

- Completion = completed tasks / planned tasks.
- Availability = ready-to-use duration / planned provision duration.
- Substitution = tasks actually replacing the target mode / documented tasks.

Each result states the period, numerator, denominator, exclusions and source. Missing data are not zero. Monetary costs, time contributions and depreciation assumptions are distinguished. Instrumented measurements state device, unit and checking method.

Environmental effects are estimated only for documented tasks. Factors used, energy, occupancy, lifespan and manufacturing scope are explicit. If data are insufficient, the deliverable provides a conditional order of magnitude and its limitations. It does not claim a certified carbon footprint.

Collection remains proportionate to the decision required: short forms, usage logs and targeted interviews. Full transcription and precise location are not systematic. Additional data are collected only when justified by an explicit question and capacity for analysis.

7. Analysis, contradictions and verdicts

The quality table distinguishes structural absence, technical incidents, voluntary withdrawal and collection failures. Analyses report observed denominators and how sensitive conclusions are to missing data. Case-management thresholds are set before the trial; they are not presented as universal standards.

Qualitative analysis combines the framework's dimensions with categories emerging from fieldwork. A second reader examines a sample of extracts and important conclusions;

divergences are retained. Analysis compares an initial cycle with an adjusted cycle and a relevant alternative when the data allow.

Each important conclusion compares several types of records: observation, interview, usage log, task, technical servicing, cost, incident or decision. Convergence increases confidence; divergence calls for an explanation or a more limited conclusion.

Finding	Condition for making the judgement
Continue within the observed scope	Usefulness supported for the tasks and groups described; follow-up responsibilities identified.
Adapt and retest	Difficulty identified and plausible change; the next check is explicit.
Suspend for lack of evidence	Insufficient exposure, completeness or comparability to conclude.
Stop	Unresolved obstacle or cost, unsupported usefulness or no viable continuation conditions.

The final sheet contains results, records, contradictions, limitations, preferred explanation, confidence level, recommendation and decision-maker. Confidence is assessed from completeness, exposure, convergence of records and resistance to competing explanations. An operational decision may be necessary despite limited scientific confidence; this difference is stated.

Factual validation by a partner enables correction of an error concerning their field site. It does not create a right to remove a supported interpretation or unfavourable result. Publication restrictions linked to rights, privacy or an identified risk are justified and recorded.

8. Conditions for opening and resuming trials

Each trial plan documents the exact model, applicable category, required technical documents, owner, eligible drivers, insurance conditions, route, supervision, maintenance, incident reporting and withdrawal. Checks are performed by competent people appointed for the case.

For the North, studying a 45 km/h configuration remains optional. A vehicle's regulatory regime cannot be inferred solely from its speed or from that of a two-wheeled speed pedelec. Vehicle, driver and each cross-border route segment's requirements are examined separately. Derestricting a Karbike is not an option in the programme.

Familiarisation and a handover check are documented. Legal permission to travel does not replace examination of route risks and intended uses. A preliminary feasibility note does not constitute trial authorisation.

Gate	Methodological and operational decision
G0. Opening	Technical, legal, insurance, human and data conditions established before the trial.
G1. First cycle	Data, difficulties and support workload examined before continuation.
G2. Expansion	Evidential value and capacity confirmed before adding a case, site or configuration.
G3. Closure	Reasoned verdict, limitations and follow-up conditions recorded.

A participant may stop their trial. A defect, incident or unresolved doubt about an essential condition triggers stopping and examination of the configuration concerned. Designated people responsible authorise restart after the correction is documented; it does not follow solely from the absence of another incident.

9. Ethics, data and digital tools

Before the first collection, competent people responsible document purposes, legal basis, roles, access, retention, withdrawal and publication. Inquiry participation, trial authorisation, image rights and data processing are explained separately. Permissions appropriate for minors and adult responsibility are arranged with the school.

Data are minimised; identifiers are separated from analytical records. Precise location is collected only when necessary and authorised in the case plan. Retention periods are set according to purpose and applicable obligations. The competent controller examines whether an impact assessment is needed before collection.

The collaborative platform retains authorised records, versions, controversies and decisions. The public portal presents validated resources. Data access is personal and limited to work needs. Publication relies on anonymisation and assessment of reidentification risk; a small territorial category may remain identifiable even without a name.

AI tools may assist preparation, synthesis or writing under human oversight. They establish neither a missing fact, consent nor scientific validation. Personal-data processing by these tools must be authorised in advance within the data-management arrangements; extracts and calculations are checked against their sources.

People receive an understandable presentation of findings before or when external dissemination occurs. Requests for factual corrections and disagreements are recorded. Withdrawal rights and any limits after anonymisation are explained in the initial information.

10. Educational strand and scientific cooperation

The LTC-PSP pathway connects inquiry, dialogue with science, co-design of a game and peer facilitation. In 2027, working targets from the educational dossier are a core of 15 to 20 pupils, 12 to 18 trained, 8 to 14 co-facilitators and 6 to 10 potentially reaching supervised autonomy. Four to eight classes, or 80 to 150 pupils outside the core, are targeted for 8 to 12 sessions. These targets are confirmed with the school and are not achieved results.

Evaluation addresses inquiry, distinguishing facts from opinions, argumentation, cooperation, facilitation and decision revision. Evaluation of the game and scientific dialogue remains identifiable within the pathway. One person may participate several times: unique individuals, participations, classes, co-facilitators and cohorts are counted separately.

Territorial outputs may become source-based cards or game situations, retaining their method, limitations and reuse rights. Educational reinterpretation is an identifiable output; it is not a fictitious second data collection. Production of a kit series depends on tests, receiving organisations and resources actually agreed.

Adult presence remains required in school sessions. Supervised autonomy describes educational progression without transferring school authority or safety responsibility to pupils. The 2028 cohort is prepared from the 2027 review and a renewed agreement on people, objectives and implementation conditions.

The scientific partnership remains to be confirmed. Discussions with LISER do not constitute an agreement, and the University of Luxembourg is no longer presented as a prospective partner on the basis of the August document. Scientific contributions would specify the person, affiliation, expertise, role, schedule, status and any conflicts of interest.

An identifiable critical review is organised before the main analyses are disseminated. The person reviewing a case must be able to discuss its evidence without having been solely responsible for conducting it. A scientific advisory board may complement this arrangement if its members and tasks are confirmed; merely mentioning it in a document does not constitute institutional validation.

11. Governance, schedule and deliverables

Äerdschëff provides the proposed coordination of the methodological foundation; each site is responsible for data it produces and each territorial body for its own decisions. The

responsibility matrix identifies production, contribution and acceptance functions. Shared resources and local contacts are coordinated before simultaneous activities open.

Äerdschëff's practitioner–researcher position provides access to everyday trade-offs and creates an interest in the programme's success. A reflective journal separates observation, operational decision, interpretation and retrospective justification. Conflicts of interest, methodological changes and unfavourable cases are made explicit.

Period	Research stage	Main output
September–December 2026	Inquiry and preparation	Questions, prospective cases, instruments, responsibilities and opening conditions.
January–April 2027	LTC-PSP setup and territorial launch targeted for March	Collection framework, baseline situations and G0 trial plans.
May–December 2027	First cycles, adjustments and deliberation	Registers, interim analyses, cards and 2027 educational outputs.
January–June 2028	Comparison, final counter-tests and ZFT closure	Case dossiers, scenarios, decisions, guide and archiving.
July–December 2028	LTC handover and authorised territorial follow-up	Educational review, toolkit, next cohort and continuity decision.

The consolidated schedule details deadlines. TNT retains its own schedule, to be confirmed; the shared comparison period is limited to activities actually completed and comparable. Educational handover after ZFT closure does not extend territorial trials.

Shared deliverables are indexed COM-D1 to COM-D9: assessment, case selection, trial plan, training, register, analysis, scenarios, decision and transfer. LTC outputs retain codes LTC-D1 to LTC-D8. Templates and methods are shared; data and decisions remain linked to their territory. Historical codes in an existing dossier are retained and linked to this index.

12. Validation, publication and revision

This edition is a framework protocol proposed to partners. Before collection, a dated operational protocol specifies instruments, analysis plan, data access, responsible people and opening conditions for each configuration. Appendices containing personal data, sensitive information or contractual clauses remain restricted.

- Validate the protocol, roles and baseline before opening the corresponding collection.
- Define inclusion criteria, exposure duration, management thresholds and stopping reasons before the trial.
- Archive a dated version of the protocol and analysis plan in an agreed durable location.
- Record every substantial change: date, reason, cases affected, author and consequence for interpretation.
- Link each publication to sources, method version, observed scope and dissemination approvals.

The final presentation distinguishes results, limitations, non-results, recommendations and partners' decisions. Transfer conditions also include failures, work required and situations where the configuration should not be replicated.

13. Sources and associated documents

Main source: 04_Protocole_recherche_action_2026-09-05.pdf, including the protocol of 4 August 2026 retained as an appendix. Associated documents: 02_Matrice_responsabilites_2026-09-05.pdf; 03_Calendrier_consolide_2026-09-05.pdf; updated LTC dossier and pupil facilitator pathway; North preliminary proposal and preliminary feasibility note of 5 September 2026.

The worlding and differential habitability framework is taken from the project's methodological documents as a working interpretive framework. This update is neither external validation of that framework nor certification of the digital tools' technical compliance.

Editorial update based on the project lead's decisions of 5 September 2026: three complementary projects, integrated educational strand, documents for partners, responsibilities and collaborations confirmed separately.