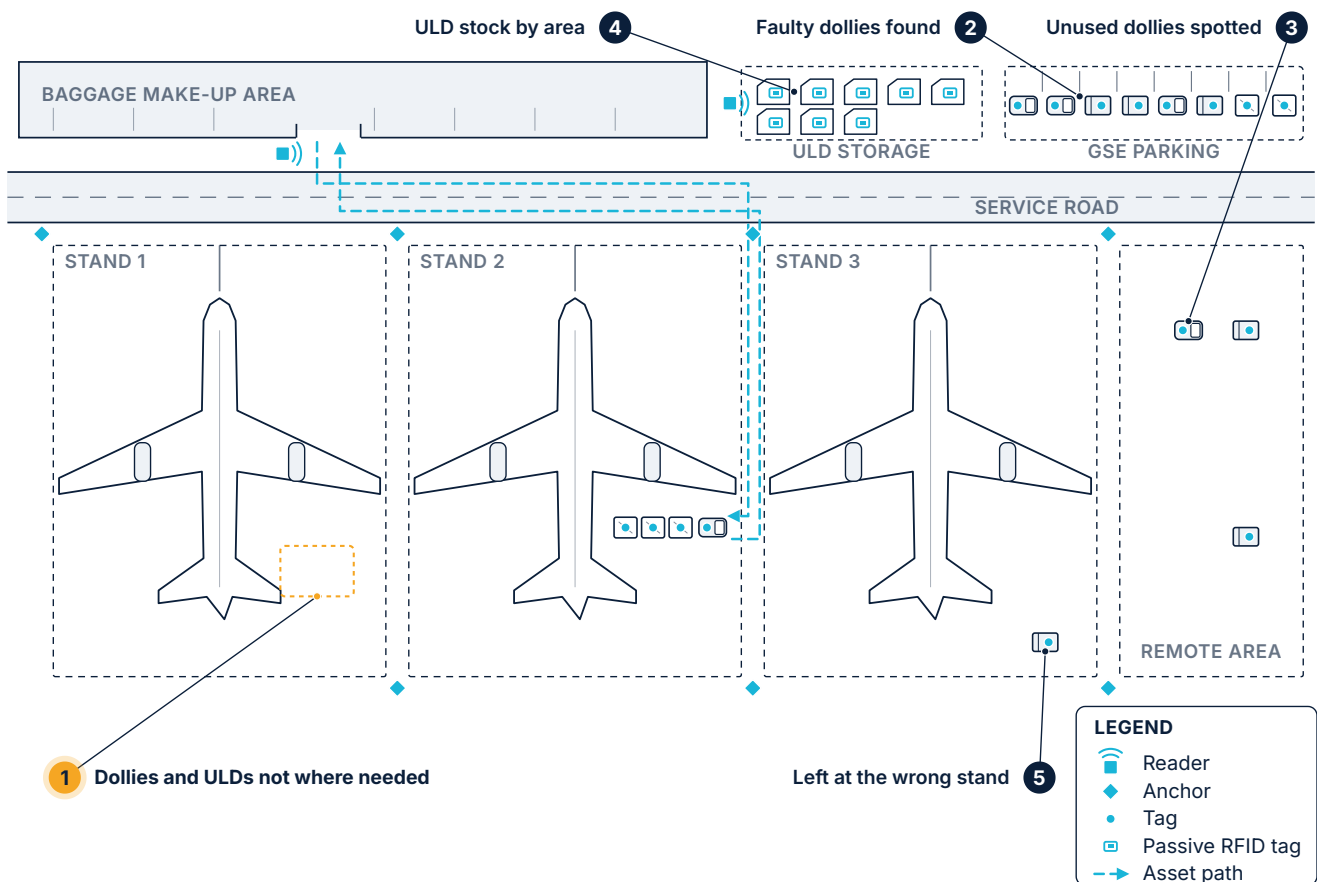


GROUND HANDLING · UNPOWERED GSE, BAGGAGE DOLLIES AND ULDs

The aircraft is on stand. The dollies are on the other side of the apron.

A plain guide for ground handlers on unpowered equipment: baggage dollies, ULD dollies and carts, and the ULDs themselves. ULD means unit load device: the containers and pallets that carry baggage and cargo. GSE means ground support equipment; unpowered GSE has no power of its own, so tags either carry a battery or are read by fixed or handheld readers.



Callouts match the use cases on page 2. Legend: a **reader** reads passive RFID (radio-frequency identification) tags with no battery; a **tag** is a battery radio tag; an **anchor** here is a fixed receiver (gateway) that picks up battery tags. Terms used: UHF RFID: ultra-high frequency RFID, passive tags read at longer range; BLE: a common low-energy radio standard, used in small battery tags; GNSS: global navigation satellite system, for satellite positioning; 2D code: a square barcode.

WHO SHOULD READ WHAT

KPI: key performance indicator, a measure you track. Everyone: your own row and KPI are in the table on page 4.

Station and ramp managers

Page 2 use cases, page 3 payback.

Ramp shift leads and dispatchers

Page 2: use cases 1 and 5 and the KPIs you would own.

GSE fleet and maintenance managers

Page 2: use cases 2 and 3, faulty and unused units.

ULD controllers and airside safety

Page 2: use cases 4 and 5.

IT and OT, finance, procurement, leadership

Page 3: technology, links and payback. OT: operational technology, the systems that run the operation.

One next step: book a free 30-minute call to talk through your site and your use case.

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Book a free 30-minute call

What goes wrong today

Dollies out of place

Dollies and ULDs pile up in one area while another stand waits.

Faulty units back in use

A damaged dolly is reported, but nobody can find it to repair it.

Units nobody uses

Some dollies sit unused while others are short, so more are hired.

Left at the wrong stand

Dollies left at one stand are missing at the next, and get in the way.

USE CASES

Numbered to match the floor plan on page 1. Each card ends with the technology that usually fits.

1 Dollies and ULDs not where needed

Pain: Staff drive round the apron looking for free dollies and ULDs.

What good looks like: Dispatch sees units free in its records and their last known area, and sends staff to a likely nearby unit. Staff check each unit before use.

Usually fits: BLE tags with gateways (fixed receivers), or GNSS, confirmed in the survey

2 Faulty dollies found

Pain: A unit reported faulty goes back into use because nobody can find it.

What good looks like: Units reported faulty are marked out of use under your fault process, and maintenance sees where they are.

Usually fits: BLE or GNSS tag, plus a fault report by 2D code scan, confirmed in the survey

3 Unused dollies spotted

Pain: Use per unit is a guess, so fleet size is a guess.

What good looks like: Recorded movement flags units that have not moved for a long time, for a check before reuse.

Usually fits: BLE or GNSS tags that sense movement, confirmed in the survey

4 ULD stock by area

Pain: ULD counts are done by hand and are out of date at once.

What good looks like: Stock by area updates at read points, checked against counts. Tags on ULDs need owner approval and must meet airworthiness rules.

Usually fits: UHF RFID (passive tags), approved by the ULD owner, confirmed in the survey

5 Left at the wrong stand

Pain: After departure, dollies stay on stand or reach the wrong one. Checks are by eye.

What good looks like: An alert may flag equipment left on stand or at the wrong stand, if the pilot shows it can tell stands apart. The visual check stays.

Usually fits: BLE or GNSS, linked to stand and flight times, confirmed in the survey

ALSO COVERED

- **Motorised GSE:** location and engine hours of tugs.
- **ULD returns:** loans logged; tags need owner approval.
- **Apron tools:** issue and return logged; stand checks stay.
- **ULD handovers:** transfer and receipt logged.
- **Terminal equipment:** wheelchairs and trolleys found.
- **Airside zones:** staff location, alongside access control.

KPIS TO TRACK

A KPI is a number you track before and during the pilot.

KPI

WHO OWNS IT

Time to find free dollies or ULDs

Ramp shift lead

Turnarounds delayed by equipment

Station manager

Faulty units used before repair

GSE maintenance manager

ULD stock match by area

ULD controller

Equipment left at the wrong stand

Airside safety lead

We agree how each KPI is measured, and the baseline, in the pilot plan.

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Technology fit

Pick the simplest option that answers the question you have

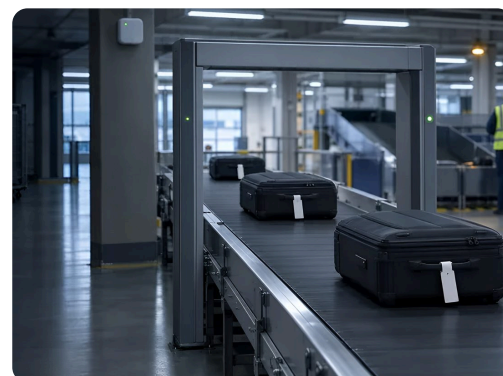
Technology	Where it fits here	Watch for
Barcode or 2D code (square barcode)	ULD and dolly IDs at check points, and fault reports.	Needs someone to scan. No location between scans.
Passive RFID (radio-frequency identification, no battery)	ULDs and dollies passing fixed gates, or handheld spot checks.	Reads only at gates or when scanned by hand. Weather and metal affect reads.
BLE (low-energy radio tags with a battery)	Unpowered dollies and carts, by area.	Needs gateways on the apron. Batteries need replacing.
GNSS with LPWAN or cellular	Battery trackers on dollies across the wider apron. LPWAN means low-power wide-area network.	Weaker under terminal piers. Check coverage on your site. Batteries need replacing.

The right mix depends on your site. We confirm it in the survey.

Integration

Equipment status can reach dispatch, under your change control

- **Dispatch:** once a link is agreed, location and status feed your resource and dispatch system. Until then, the pilot can use a separate view.
- **Maintenance:** fault reports and last known area reach your GSE maintenance system.
- **Airport rules:** gateways and antennas airside need the airport's approval, so plan for it early.
- **People:** check local privacy and employee-consultation rules, such as works councils or unions, before tracking people, or tools and equipment linked to people.



ROI AND PAYBACK

ROI (return on investment) compares what you gain with what you spend. Payback is the time until the savings cover the cost.

What drives payback here

- Search and driving time on the apron
- Turnaround delays caused by equipment
- Hire costs to cover shortages

If the benefit is not bigger than the running cost, there is no payback.

Bring to the call

- Any supplier quotes you already have
- Rough fleet size: dollies, ULDs and tugs
- Today's search time, hire costs and equipment delays, from your records

We work out payback with you from your own pilot data, not technology provider averages. **Bring rough figures to a free 30-minute call.**

One next step: book a free 30-minute call to talk through your site and your use case.
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Book a free 30-minute call

What it means for you: find your role and your KPI

YOUR ROLE	WHAT IT MEANS FOR YOU	YOUR KPI
Station or ramp manager	Fewer turnarounds held up by equipment.	Turnarounds delayed by equipment
Ramp shift lead or dispatcher	Free dollies and ULDs found without a search.	Time to find free dollies or ULDs
GSE fleet and maintenance manager	Faulty units found for repair; units not moved flagged for review.	Faulty units used before repair; units not moved in a week
ULD controller	ULD stock by area from read points, checked against counts.	ULD stock match by area
Airside safety lead	Equipment at the wrong stand is flagged for a check. The visual stand check stays.	Equipment left at the wrong stand
IT and OT teams	Data into dispatch and maintenance, under your change control.	Events reaching dispatch
Finance, procurement and leadership	Payback on your numbers from one stand group, then a go or no-go.	Payback months, go or no-go

Events reaching dispatch: the share of updates that arrive without manual entry.

How a TRACIO project works: five stages

1 Discovery Your pain points, site, process and KPIs.	2 Assess and shortlist Site survey, then the options that fit compared.	3 Pilot with KPI baseline KPIs measured first. Pass marks agreed in writing before set-up.	4 Integrate If useful, one agreed link into your dispatch system, under your change control.	5 Multi-site roll-out After a go decision, one stand group or station at a time.
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How a pilot runs: set-up, then live weeks in normal use, then a short written report with a go or no-go.

Questions we hear

"We already have a system."

We give a free second opinion and check how it performs against your KPIs, using your live data and a site visit.

"How do we know it will work here?"

Judge us on method: a pilot, KPIs measured before and during it, and a written go or no-go.

"Can you bid with us, or for us?"

Yes. We team with integrators, or act as the buyer's independent adviser, but never both on the same bid.

"Do you sell or resell hardware?"

No. We don't sell hardware, so our advice stays independent. We rent pilot equipment and offer survey and installation support.

Free second opinion

Send us your technology provider's quote or spec for a free second opinion. What to send: the quote or spec, a floor plan or site photos, item counts and your current process. Bring it to the call or send it via tracio.com/contact.

TRACIO consultancy fees

- **UK:** £3k to £30k per project, £1,200 a day
 - **Europe:** €3.5k to €35k per project, €1,400 a day
 - **US and Canada:** \$4k to \$40k per project, \$1,600 a day
 - **Middle East and Australia:** \$4k to \$40k per project, \$1,600 a day
 - **Rest of the world:** \$3.5k to \$35k per project, \$1,400 a day
- Scoped per project, no packages. Fees cover our work only; hardware, software licences and other supplier costs are separate. \$ = US dollars. Travel extra.

Why TRACIO: we work for you, not for the technology providers. We compare the options across the market that fit your site, provide site surveys and installation support, and work worldwide under your change control.

One next step: book a free 30-minute call to talk through your site and your use case.

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