DIRECT ANSWER

A PAPI inspection verifies that each of the four units of a precision approach path indicator changes from white to red at the angle it was set to. TarmacView flies the approach by drone, measures every unit's transition angle, chromaticity, intensity balance and surveyed position, and returns a protocol in ICAO, EASA or FAA format the same day.

FLAGSHIP SERVICE · ICAO DOC 9157 PART 4

PAPI lights inspection, by drone

A fully managed service with certified operators. Regulatory-grade measurement of angle, photometric intensity, beam transition and position, built to ICAO, EASA or FAA, with same-day reports.

Scope a PAPI inspection

How the visit works

±3′
setting-angle tolerance the protocol is judged against

< 20 min

	capture per PAPI, flown between movements
RTK ±1 cm surveyed position of every unit	same day protocol in ICAO, EASA or FAA format

FIT

Who this is for

This service is bought by the person who has to sign that a precision approach path indicator is showing crews the right slope. It fits an aerodrome that has just had the units installed or re-aimed and needs the setting proven before the aid goes back into service, and it fits the maintenance manager who owes a periodic protocol and would rather not wait for the next flight inspection slot to get one.

FOR

- ✓ Aerodrome operators whose PAPI has just been installed, re-aimed or relamped and who need the setting verified before the runway is released with the aid in service.
- ✓ Airfield electrical and maintenance managers who owe their authority a periodic visual aids protocol and currently wait for a flight inspection slot to get one.

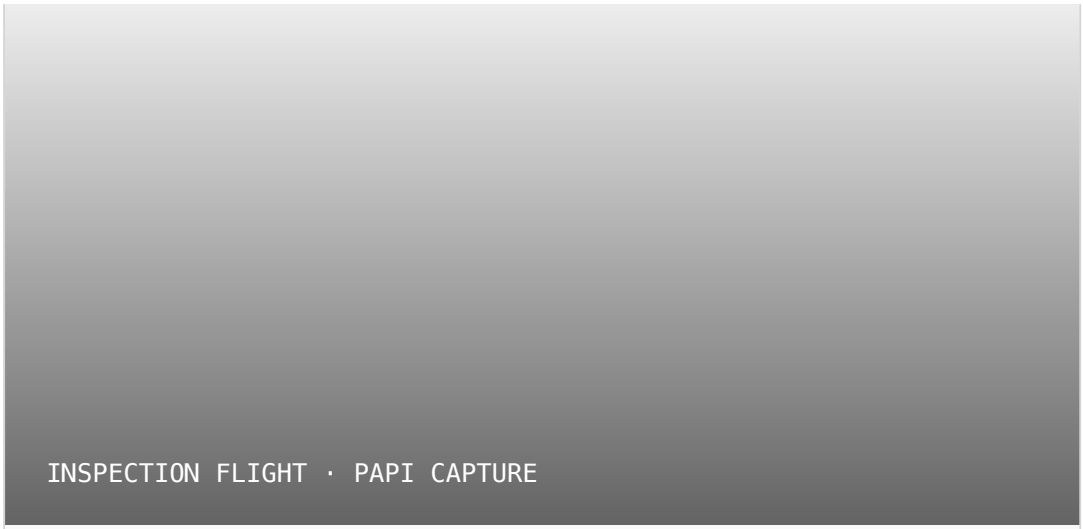
- ✓ Aerodromes where the ILS glide path was adjusted or a threshold was moved, so the PAPI and the ILS have to be shown to agree again.

NOT FOR

- × Certification of the ILS or any other radio navigation aid, which stays with the flight inspection organisation and its aircraft.
- × Re-aiming the units. The protocol gives the adjustment value per unit and the aerodrome's electrical contractor turns it.
- × A check of the obstacle protection surface on its own, which the approach obstacle clearance check delivers as a separate service.

WE COME TO YOU

One service, both halves handled



ON THE AIRFIELD

Our crew, our equipment

Certified operators bring the drone, the camera and the positioning gear to your aerodrome. No drone purchase, no training, nothing for your staff to set up beyond the airside access.

IN THE REPORT

Measurements, not impressions

Footage goes straight into the measurement pipeline, and the protocol comes out the same day in the format your authority

expects, with the adjustment value for every unit that needs one.

- ✓ Angle, intensity balance, colour and position per unit
- ✓ Protocol in ICAO, EASA or FAA wording
- ✓ Exact correction for every unit out of tolerance
- ✓ Same-day delivery, with the flight record attached

JUDGED ON DELIVERY

Outcomes and acceptance criteria

Three outcomes are what the service is judged on, and each has a state you can check on delivery rather than a promise you have to trust.

01

A pass or fail per unit, with the angle behind it

Every unit of every PAPI in scope comes back with its measured transition angle, the nominal it was set to, the difference, and the tolerance it was judged against. The pattern's on-slope sector

02

An adjustment value for every unit out of tolerance

Where a unit fails, the protocol says by how much and in which direction, in the units your electricians set the box in, so the correction can be made without a second

is stated from the four angles together.

ACCEPTANCE

Open any unit's row, and the measured angle, the nominal and the frames it was read from are there.

measurement to find out what to do.

ACCEPTANCE

Your contractor can adjust the unit from the protocol alone.

03

A protocol the authority recognises as evidence

The rows are the PAPI rows of the visual aids protocol your inspector already uses, in ICAO, EASA or FAA wording, with the flight record and the source frames attached to every finding.

ACCEPTANCE

The document files as the periodic check without being retyped into another form.

What the service does not undertake to do is adjust the units or certify the ILS. The first is the aerodrome's work on equipment it owns, and keeping it separate from the measurement is what makes the measurement independent. The second is a radio navigation aid certified under different rules by the flight inspection organisation, and the comparison of drone and flight inspection says where the line sits.

A check of the obstacle protection surface alone is the approach obstacle clearance check , which shares a visit with this one when both are wanted.

VERIFIED PARAMETERS

What the protocol answers

The glide slope rows of the visual aids protocol, each with the tolerance it is judged against.

12 PARAMETERS | ICAO ANNEX 14 VOL I

01 Glide path angle

The angle each unit is set to, and the nominal glide path the four units produce together.

TOLERANCE ± 0.15°

02 Colour transition angle

The angle at which a unit changes from white to red, measured across the transition rather than read off it.

TOLERANCE 3′ / 0.05°

03 Transition angles between units

The angular spacing between neighbouring units, which is what sets the width of each signal step in the pattern.

TOLERANCE ± 0.10°

04 ILS harmonisation

An aircraft flying the ILS glide path stays inside the on-slope sector the PAPI indicates.

TOLERANCE ± 0.10°

05 Chromaticity

Each unit emits the correct colour, and no red filter has faded to the point where the beam is out of specification.

TOLERANCE Per ICAO Annex 14

06 Intensity

Light intensity per unit and the ratio between units are correct, with all four set symmetrically.

TOLERANCE Symmetric across units

07 Horizontal coverage

The signal stays visible across the sector either side of the runway axis.

TOLERANCE min ±12°

08 Vertical coverage

The signal stays visible on the runway axis through the whole approach elevation band.

TOLERANCE `1° to 16.5°`

09 Dimming steps

Every unit changes intensity together and by the commanded step, in step with the rest of the airfield lighting.

TOLERANCE `3 of 3 steps`

10 Minimum eye height

The signal seen over the threshold matches the published minimum eye height for the runway.

TOLERANCE `Correct sector indication`

11 Obstacle clearance

The obstacle protection surface is clear, so visual contact with the runway is kept all the way down the approach.

TOLERANCE `Unobstructed`

12 Misleading lights

No light near the approach can be mistaken for the glide slope signal, and none dazzles the crew.

TOLERANCE `None recorded`

- Tolerances per ICAO Annex 14 Vol I and ICAO Doc 9157 Part 4. Protocols are issued in your authority's format for ICAO, EASA or FAA.

DELIVERY · 6 STEPS

From runway geometry to verified setting

01

Scoping call

You name the runway ends, the published glide path and threshold data, and whether the units were just installed, re-aimed or relamped. We agree whether a verification flight after adjustment is included and which protocol template your authority wants. Output is a scope note. If the published data is missing, the inspection waits for it, because an angle measured against an unknown nominal is a number without a verdict.

02

Mission build

The passes are generated from the runway geometry, the surveyed unit positions and the nominal setting angles. The climb through the transitions, the approach descent and the coverage arc are computed so that every unit is framed at the distance and elevation the measurement needs. Output is a validated mission and a capture window request to your tower.

03

Capture

Flown between aircraft movements, under twenty minutes per PAPI. The drone

04

Measurement

Each unit is tracked through the footage and its colour is read frame by frame. The

holds on the extended centreline and climbs through each unit's transition, then flies the approach on the nominal glide path and sweeps the coverage sector. Every frame carries the RTK position. If a movement interrupts a pass, the pass is reflown unchanged.

transition angle is the elevation at which the colour changes, computed from the drone's position at those frames. Chromaticity, intensity balance, coverage and position come from the same passes. Frames the tracker is not confident about are held for review rather than dropped.

05

Protocol

The PAPI rows of the visual aids protocol are filled in your authority's wording, with a measured value, a nominal and a verdict per unit, and the correction for every unit outside tolerance. Delivered the same day, with the flight record and the source frames attached.

06

Verification flight

Once your contractor has adjusted the units, the same passes are flown again and the protocol is reissued with the new angles. Where the adjustment can be made on the day, the verification is the same visit. Anything disputed is re-examined against the retained footage first.

OUTPUT · MEASURED TRANSITION ANGLES PER UNIT

EVIDENCE AND CAPABILITY

The claim worth checking is the angle

A PAPI unit shows white above its setting angle and red below it. The inspection therefore comes down to one question per unit: at what elevation, seen from the approach, does the colour change. The drone answers it by climbing through the transition at a known distance on

the extended centreline while the camera records the unit and the receiver records the drone's position. The frames in which the colour changes fix the transition angle , and because the change is read as a ratio of red to white across many frames rather than as a single judgement, the angle carries an uncertainty that can be stated.

That is also why the method does not depend on the camera being a photometer. A ratio between two colours from the same unit is independent of the absolute response of the sensor, so the angle holds whatever the camera's calibration. The intensity rows are a different matter. What the passes give directly is the light intensity of each unit relative to its neighbours and relative to its own dimming steps, which is what the symmetry and dimming rows of the protocol ask for. An absolute value in candela needs an external reference, and where an authority requires one, it is arranged at scoping.

The chromaticity of each unit is read from the same footage, which is how a faded red filter is caught. The unit's position comes from RTK positioning and is checked against the surveyed layout, because a unit that has been moved shows the right angle from the wrong place. The glide path the four units produce together is compared with the published ILS geometry for the harmonisation row, and the obstacle clearance row is filled from the approach descent, on which anything rising into the protection surface crosses the sightline on camera.

Retained footage is what makes a disputed angle checkable. If your inspector questions a unit's figure, the frames it was read from are still there, with their positions, and the angle can be recomputed in front of them. A figure in a protocol with nothing behind it cannot be re-examined at all, which is the difference between a measurement and an opinion.

HOW THE ANGLE IS READ

4 of 4

units measured individually on every pass

every frame

carries the drone's RTK position and elevation

relative

intensity, unit against unit and step against step

HOW THE PRICE IS BUILT

Four things move the quote

There is no published rate for this service, because a visit that measures one PAPI at an aerodrome an hour away and a visit that measures four and the rest of the lighting are different days of work off the same method. The cost guide gives the shape of the market, and the quote gives your figure.

EUR · PER AERODROME PER VISIT · EXCL. VAT · EU

CHECKED 2026-09-08

Cost driver 01

PAPI installations

Cost driver 02

Verification flight

Each runway end with a PAPI is its own set of passes. Two ends on one runway share the setup and the tower coordination.

A re-measurement after adjustment is included or not, and it is cheaper on the same day than as a return visit.

Cost driver 03

Combined visit

Measuring the runway edge and approach lights, or scanning the pavement, in the same visit costs less than buying each separately, because the travel and the access are paid once.

Cost driver 04

Travel

Shows up as travel and not as a different inspection.

Tell us the aerodrome and the runway ends and you get a figure and a date back. The PAPI calibration cost guide sets out what the market charges for the same work by other methods, and the pricing page describes the combined visit that covers every light and every surface.

EACH WITH AN OWNER

Risks and dependencies

Three things can stop or degrade an inspection, and each has an owner.

OWNER · WEATHER

Visibility and wind

The colour of a unit has to be read cleanly from the approach, so fog, precipitation and low sun on the axis stop the capture. Wind above the drone's limit stops it too. The mission is flown when the window opens rather than measured through the weather. This is the most common reason a date moves.

OWNER · OPERATOR

Access and the published data

The capture needs tower coordination and, at most aerodromes, an escort. It also needs the nominal setting angles, the published glide path and the threshold data, because the verdict is a comparison against them. Both sit with the aerodrome operator and are worth confirming before travel is booked.

OWNER · BOTH, AT SCOPING

Unit state

A unit with a failed lamp has no transition to measure, and a unit under adjustment during the visit gives an angle that is true for a moment. We agree at scoping that the units are in the state to be measured, and a unit found otherwise is reported as such rather than scored.

Accountability sits with TarmacView for the capture, the measurement and the protocol, and with the aerodrome operator for access, for the

published data and for the adjustment of the units. Nothing on this page is a compliance statement. Whether a given protocol satisfies a particular authority is a question for that authority, and the regulatory acceptance page collects what is known so far.

Frequently Asked Questions

Does a drone measurement replace the flight inspection aircraft?

For the PAPI, it measures the same thing the aircraft measures, the angle at which each unit changes colour, and it does so from more positions and closer in. Whether your authority accepts it as the periodic check is a question for that authority, and the answer differs between states. Many accept a drone protocol for the PAPI while keeping the ILS with the flight inspection organisation, because the two aids are certified under different rules. The comparison guide sets the two methods side by side, and the regulatory acceptance page collects what authorities have said so far.

How long is the runway affected?

It is not closed. The capture for one PAPI takes under twenty minutes and is flown between aircraft movements in coordination with the tower. The drone holds on the extended centreline, well inside the aerodrome boundary, and clears the runway strip when the tower asks. Budget about an hour on site per runway end for setup, the passes and a repeat if a movement interrupts one. A verification flight after adjustment is a second visit of the same length, or the same day if your contractor can adjust the units while we wait.

What exactly is measured on each unit?

The angle at which it changes from white to red, seen from the approach. The drone climbs through the transition on the extended centreline at a known distance while every frame records the colour of the unit and the drone's RTK position, so the angle is computed from the frames in which the colour changes rather than estimated. From the same passes come the unit's chromaticity, its intensity relative to its neighbours and to its own dimming steps, the sector in which it stays visible, and its surveyed position. The four angles together give the on-slope sector the pattern shows to a crew.

Do you re-aim the units?

No. The protocol states, for every unit outside tolerance, the measured angle, the nominal angle and the correction to apply, in the units your maintenance staff work in. Adjusting the box is the aerodrome's work, usually done by its own electricians or its lighting contractor, because it touches equipment the aerodrome owns and certifies. Once the units have been adjusted, a verification flight measures them again and the protocol is reissued with the new figures. Keeping the two jobs separate is what lets the measurement be independent of the adjustment.

Which format does the protocol come in?

The visual aids protocol your inspector already uses. The rows are the PAPI rows of that protocol, transition angle per unit, angles between units, harmonisation with the ILS, chromaticity, intensity balance, coverage, dimming steps, minimum eye height, obstacle protection surface and misleading lights, each with the tolerance it was judged against. The template follows ICAO, EASA or FAA wording as your authority requires. The flight record and the frames the angles were read from are attached, so a disputed figure can be checked against the evidence rather than re-flown.

Can you check the PAPI against the ILS glide path?

Yes, against the published glide path angle and the reference datum height. The check is whether an aircraft flying the ILS glide path stays inside the on-slope sector the PAPI indicates, which is a comparison between the measured PAPI angles and the published ILS geometry. It is not a measurement of the ILS signal itself, which needs the flight inspection aircraft and its receiver. If the ILS has just been re-certified, send us the new figures and the harmonisation row is computed against them.

What happens if a unit has a failed lamp or a faded filter?

It is reported as such rather than scored as out of tolerance. A unit that does not light cannot have a transition angle, and the protocol says so and names the unit. A red filter that has faded shows up in the chromaticity row, because the transition is measured from the colour of the light and a faded filter shifts it. Both cases are reported on the day of capture, before the full protocol, because they are serviceability findings rather than calibration findings and the aerodrome may want to act on them at once.

References

`icao-annex-14-v1` Annex 14 to the Convention on International Civil Aviation, Volume I: Aerodrome Design and Operations
International Civil Aviation Organization

`icao-doc-9157-p4` Doc 9157, Aerodrome Design Manual, Part 4: Visual Aids
International Civil Aviation Organization

`easa-cs-adr-dsn-7` Certification Specifications and Guidance Material for Aerodrome Design, CS-ADR-DSN Issue 7
`(https://www.easa.europa.eu/en/document-library/certification-specifications/cs-adr-dsn-issue-7)`
European Union Aviation Safety Agency

faa-ac-150-5345-28	AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems (https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentnumber/150_5345-28) Federal Aviation Administration
tarmacview-pricing	Pricing: one visit, every light and every surface (https://www.tarmacview.com/pricing/) TarmacView

---

https://www.tarmacview.com/products/papi/ · 2025-11-17