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St Athan ILS ACP Step 1B

Design Principles

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1 Introduction

St Athan Airport was issued with a CAA Aerodrome Ordinary Licence on 31st March 2019. Two ILS procedures, published in the Mil AIP and utilised by MRO customers, have been withdrawn pending their inclusion in the UK AIP, which requires application of the CAP 1616 process. A scaled approach to this process has been accepted in principle, the rationale for which is described.

1.1 Background

St Athan Airport is owned by the Welsh Government (WG) and operated by Cardiff Airport (under a Joint Venture with WG since 31st March 2019). On 31st March 2019, St Athan transitioned from Military Aviation Authority (MAA) oversight to Civil Aviation Authority (CAA) oversight with the issue of a CAA Aerodrome Ordinary Licence and the aerodrome identifier changing from EGDX to EGSY.

St Athan is equipped with an Instrument landing System (ILS) to runway 25 and has two procedures, previously published in the Military Aeronautical Information Publication (Mil AIP). The MAA and CAA (Aerodromes and ATM) had liaised closely when the procedures were developed to ensure the safety argument for the ILS met both military and civil regulatory requirements. An Article 205 Approval has been issued and CAA (Aerodromes and ATM) has confirmed that the Safety Assurance Documentation underpinning the instrument approach to a non-instrument runway was approved as part of the Aerodrome Licensing process[1].

The ILS procedures at St Athan have been suspended pending approval by the CAA Airspace Regulation Department to republish the approaches in the UK AIP. This approval is dependent upon the submission of a successful Airspace Change Proposal (ACP).

Although the number of aircraft movements involved is small, the ILS nevertheless contributes to the safety of the St Athan operation and the availability of published ILS procedures is an important consideration for the Maintenance, Repair and Overhaul (MRO) operations based at St Athan, who are significant local employers.

1.2 Aim

The sole and exclusive aim of this proposed airspace change is to enable the publication of the CAA approved St Athan ILS procedures, previously published in the Mil AIP, in the UK AIP. This would allow aircraft operators using the MRO facilities at St Athan to conduct an ILS approach procedure. It specifically does not seek to increase, change or in any way alter the use of the ILS procedure as previously published in the Mil AIP.

[1] Minutes of Assessment Meeting held 21st March 2019.

The proposed change relates to an existing published design and, as will be demonstrated, has no safety, operational or environmental impact. There would be no change to air traffic control procedures, or to the design of UK airspace, and there would be no change for other airspace users, adjacent airports or to the general public living beneath the procedures. In addition, the change would see no increase in the volume, frequency or distribution of aircraft movements at St Athan.

1.3 Progress to Date

The CAA utilise Civil Aviation Publication (CAP) 1616, 'Airspace Design: Guidance on the regulatory process for changing airspace design including community consultation requirements', to manage airspace changes. In accordance with the CAA's advice to use the airspace change process to affect the publication of the existing St Athan ILS procedures in the UK AIP, a Statement of Need was submitted to the CAA Airspace Regulation Department on 24th May 2018.

On the 4th October 2018, the CAA Airspace Regulation Department informed St Athan that an Assessment Meeting would be required to discuss the steps required to meet the CAA's requirements.

On the 20th March 2019, the CAA Airspace Regulation Department conducted an initial ACP Assessment Meeting with representatives of St Athan and made a provision assessment that a Level 1 ACP, in accordance with CAP 1616, was required to publish the two ILS procedures in the UK AIP.

On the 4th June 2019 the CAA Airspace Regulation Department again met with representatives of St Athan to discuss an appropriately scaled ACP submission, in proportion to the changes being considered. Subsequent to this meeting, the CAA agreed[2] to a scaled ACP submission with a combined Define, Develop and Assess Gateway in July 2019. To meet this combined Gateway, the WG as airspace change sponsor, working with Osprey CSL, is required to make the following submissions:

- Step 1A: Statement of Need (previously submitted)
- Step 1B: Design principles;
- Step 2A Options development;
- Step 2B Options appraisal.

This document, together with separate Step 2A Options Development and Step 2B Options Appraisal documents, forms the basis of the submission to that Gateway.

1.4 General Rationale

Acknowledging that the proposed change is greater than a change to UK AIP nomenclature or qualifying remarks (and therefore would not be considered a Level 0 change), this proposal takes advantage of the opportunity to scale the submission and concentrate only on those elements that are specifically relevant. The airspace sponsor welcomes the CAA's flexible, proportionate approach.

Given the nature of the change proposed, this application has taken into account all of the elements required by CAP 1616. However, where justified, a case has been

[2] Email [redacted] (CAA) to [redacted] (Osprey) RE: 71299 - St Athan ILS Procedures ACP-2018-35 (sent 13:18 on Fri 14/06/2019)

made as to how they should be applied in a proportionate manner, while still meeting the CAA's requirements that any proposed change is transparent, consistent, proportionate and evidence-based.

1.5 Step 1B Rationale

Step 1B requires St Athan to produce a set of design principles that address safety, environmental and operational criteria and policy objectives impacted by the change. Meeting the requirements of Step 1B is achieved by analysis of the previously published ILS procedures against these criteria. Whilst it considers each of these factors and provides justification where their application can be scaled, this submission addresses only those impacts which are relevant to the proposed change.

Routinely, design principles are developed through discussions between the change sponsor and those stakeholders who are potentially affected. However, as the analysis below demonstrates that the proposed change has no impact on stakeholders nor would they influence the development of Design Principles for an already established procedure, stakeholder engagement has only been conducted with the MRO companies based at St Athan (see Annexes 2 and 3). Further engagement is planned in advance of formal consultation (Stage 3), including with local Air Navigation Service Providers (ANSPs), adjacent airports (Cardiff and Bristol) and the Cardiff Airport Consultative Committee. The latter because the St Athan ILS procedures are almost wholly contained within controlled airspace managed by Cardiff Airport.

2 Previously Published ILS Procedures

2.1 ILS Procedures at St Athan

The two previously published ILS procedures at St Athan, operated under MAA oversight until 31st March 2019, are:

- ILS/DME Rwy 25
- LOC/DME Rwy 25

To ensure compatibility with civil requirements, during the design process these procedures were overseen by the CAA Aerodrome Standards and ATC Standards departments. The procedures, shown at Annex A1, were published in the Mil AIP, which has been publicly available since March 2018. As mentioned previously, on 31st March 2019, and in accordance with CAA requirements, the St Athan aerodrome identifier changed from the military EGDX to the civil EGSY.

Each procedure is designed for a straight-in approach along the runway's extended centreline from 12 nautical miles (nm), maintaining a height of 2400 feet Above Mean Sea Level (AMSL) (2270 feet Above Aerodrome) until 7nm from the runway, when a 3-degree descent begins. This provides aircraft with guidance to achieve a stabilised approach to St Athan runway 25.

This approach path is fixed due to ground-based infrastructure and the need to integrate with Cardiff Airport operations. This ACP proposes no change to these procedures.

2.2 Approach Areas

The two approaches have been published in the Military AIP and flown, without incident, by aircraft whilst St Athan operated under MAA regulation. The straight in approach (for both procedures) comprises the following ground segments:

2.2.1 At 2400 feet AMSL or above:

- Commencing over the Bristol Channel at 12 nm
- Passing over Cardiff Docks (not over the city) from 10.4 nm to 9 nm
- Passing over University Hospital Llandough from 9nm to 8.5nm
- Passing over open countryside 8.5nm to 7nm

2.2.2 Descent on 3-degree glidepath:

- Descending over open countryside from 7nm to the runway.

2.3 Instrument Flight Procedures (IFP) Assessment

A detailed assessment of the ILS procedures has been conducted against Pans-Ops Doc 8168 and UK CAA requirements. From an IFP perspective, with regard to tracks over the ground and slopes, there is no difference between the Mil AIP and proposed UK AIP entries and these have been assessed as fully compliant.

Subject to any feedback from subsequent consultation (Stage 3), the two procedures will be submitted unchanged with regard to track and slope, although redrawn to UK AIP standards, and presented with a checklist of key features for comparison between the military and civil procedures for the CAA to review (Stage 4).

3 Analysis of airport movement statistics and aircraft types

3.1 Maintaining the status quo

As previously stated, the purpose of this airspace change is to re-establish the status quo which existed before the aerodrome transferred to CAA oversight; this would be achieved by publishing the extant procedure in the UK AIP. It is not intended to increase aircraft movements or have any impact on aircraft types which use St Athan; third parties will therefore experience no difference from when the procedure was published in the Mil AIP.

3.2 Stability in movements 2014-18

As detailed in Table 2, with an average of 12,551 movements per year over the 5-year period 2014-18 (inclusive), aircraft movements at St Athan are low by comparison to many other airports.

Categorised by type of operation, these movements comprise:

- University of Wales Air Squadron (UWAS);
- Maintenance Repair and Overhaul (MRO);
- General Aviation (GA);
- Military;
- Helicopters (Heli) – combining Bristow Search and Rescue and National Police Aviation Services.

Year	UWAS	MRO	GA	Military	Heli	TOTAL
2014	5,106	93	1,573	1,025	3,280	11,077
	46.1%	0.8%	14.2%	9.3%	29.6%	100%
2015	4,852	118	1,815	791	571	8,147
	59.6%	1.4%	22.3%	9.7%	7.0%	100%
2016	7,302	110	4,621	750	2,532	15,315
	47.7%	0.7%	30.2%	4.9%	16.5%	100%
2017	7,464	41	4,670	659	2,200	15,034
	49.6%	0.3%	31.1%	4.4%	14.6%	100%
2018	7,385	117	3,651	201	1,830	13,184

Year	UWAS	MRO	GA	Military	Heli	TOTAL
	56.0%	0.9%	27.7%	1.5%	13.9%	100%
Average	**6,422**	**96**	**3,266**	**685**	**2,083**	**12,551**
Average %	**51.8%**	**0.8%**	**25.1%**	**6.0%**	**16.3%**	**100%**

Table 1 Aircraft Movement Statistics at St Athan

Approximately 50% of St Athan aircraft movements are by UWAS, who operate 3 x Grob Tutor aircraft from the airport. GA movements comprise approximately 25% of the total and the remainder comprise Military aircraft (although their proportion has fallen from 9.3% to 1.5% of the total), helicopters (these too have fallen from 29.6% to 13.9%) and lastly MRO which, on average, consistently comprise approximately 1% of total movements. It is significant to note that when available, all aircraft utilising St Athan's MRO facilities fly an ILS procedure on arrival.

Therefore, while the relative number of ILS movements may be low, the importance of the ILS to MRO operations and, in turn, the importance of MRO operations to the airport, is disproportionately high. Aircraft using MRO facilities at St Athan tend to be of the A320 and B737 type, operated by AOC-holding airlines such as TUI and ASL Airlines France. As described in more detail in Section 4.7 below, these operations form the predominant revenue stream for the airport, part of the St Athan – Cardiff Airport Aerospace Enterprise Zone.

3.3 No change in aircraft types

The types of aircraft operated at St Athan are not planned to change as a result of the proposal; any changes would result from routine changes in the aviation industry as older aircraft are withdrawn from service and new aircraft enter service.

3.4 No change in aircraft numbers

Aircraft movements at St Athan are not planned to increase. Any increases in annual activity levels would be solely from normal growth that any airport might expect to see. MRO facilities at St Athan have a finite capacity to manage aircraft through their facilities and these operated a full capacity in 2018. This assessment is supported by statements from the two MRO operations at St Athan, shown at Annexes A2 and A3.

4 St Athan ILS ACP Design Principles Analysis

This section provides an analysis of the proposed change against typical ACP design principles, to demonstrate than it will have no impact on third parties.

4.1 Scope for development of Design Principles

The Sponsor is committed to the application of both the letter and spirit of the CAP 1616 process. Nevertheless, in terms of Design Principles, it should be recognised that there is very little practical scope for variance. The in-line ILS provides a fixed approach path; the 3 degree approach angle is set; the approach altitudes are fully integrated into Cardiff Airport arrival and departure procedures and, although the procedure notionally begins at 12nm, interception points are dependent on radar vectoring by Cardiff Airport which equally take into account other airspace users (both Cardiff traffic, Bristol traffic and aircraft transiting controlled airspace).

There is therefore little latitude to develop Design Principles which would have any impact on the solution. Nevertheless, in this section we will justify why, on Safety, Environmental, Operational, Technical and Economic grounds, there is no requirement to develop Design Principles. Indeed, re-introduction of the ILS will address many of the very issues which Design Principles are intended to identify and address.

4.2 Typical ACP Design Principles

An analysis of the design principles listed in Table 1 demonstrates that the proposal to publish the St Athan ILS procedures in the UK AIP, has no impact on stakeholders. The list has been adapted from a recent successful Stage 1B ACP submission and includes safety, environmental, operational, economic and technical principles that could potentially impact on an airspace change. As with any airspace change, the safety of operations is the paramount consideration. Although it is routine practice to give each principle an importance weighting and priority ranking, this has not been done in this case as the analysis that follows demonstrates that none of the design principles identified has an impact on the proposed change, nor on potential stakeholders.

No (a)	Category (b)	Design Principle (c)
1.	Safety	Procedures must be designed to meet acceptable levels of flight safety.
2.	Environmental	Procedures must be designed to minimise aircraft emissions to reduce air pollution
	Environmental	Procedures must be designed to minimise the impact of noise below 7,000ft.
	Environmental	Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.
	Environmental	Procedures should be designed to provide respite, planned and notified periods where overflight or noise impact are reduced or halted to allow communities undisturbed time.
3	Operational	Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCO) workload.
	Operational	Procedures should be designed to ensure predictability of tracks for consistency of operations.
	Operational	Procedures should be designed to alternate routes to avoid other aviation operators.
4.	Technical	Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.
	Technical	Procedures should be designed to fit within existing airspace boundaries.
	Technical	Procedures should be designed to enable continuous descents.
	Technical	If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.
5.	Economic	Procedures should be designed to enable uninterrupted aviation operations in IMC/IFR in support of wider business objectives.

Table 2 Typical ACP Design Principles

4.3 Safety Analysis

From these exemplar Design Principles we have considered the St Athan ILS ACP.

Procedures must be designed to meet acceptable levels of flight safety.

The existing ILS procedures and their supporting safety argument and Safety Assurance Documentation have been approved by CAA (Aerodromes and ATM). The proposed change does not change the procedure design. Indeed, it could be argued that the procedures are a significant contribution to safety (in terms of cockpit and air traffic control workload); their re-instatement therefore enhances safety. **No impact/Positive impact**.

4.4 Environmental Analysis

Procedures must be designed to minimise aircraft emissions to reduce air pollution; Procedures must be designed to minimise the impact of noise below 7,000ft; Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites; Procedures should be designed to provide respite.

The procedure is based on an ILS approach therefore deviation from the final approach path is not possible. The proposal will not result in any change in aircraft types, numbers, flightpaths or airspace than that previously experienced. The proposal will effect no change relating to noise below 7,000ft, overflight of sensitive areas, track miles flown, fuel burn, emissions, air quality, or in provision of respite. **No impact**.

4.5 Operational Analysis

Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCO) workload; Procedures should be designed to ensure predictability of tracks for consistency of operations; Procedures should be designed to alternate routes to avoid other aviation operators.

The proposal would allow the previous air traffic procedures to reinstated, which minimise the need for aircraft vectoring and reduce ATCO workload and ensure the predictability of tracks for consistency of operations. Indeed, the current withdrawal of the procedure means that ATCOs at Cardiff Airport must radar vector aircraft into St Athan rather than place them on the ILS at 12nm; with the attendant risk of increased cockpit and controller workload and potentially diversion, if aircraft can only operate VFR. Furthermore, as [redacted] one of St Athan's MRO operators state in Annex 2, "larger 'national carrier' customers are very reluctant to operate to a VFR-only location, since their crews have limited experience with these kind of operations [redacted] Airways recently refused to bring aircraft to the St Athan facility). Re-instating the ILS procedures therefore, in itself, fulfils this Design Principle. As there is no change planned to the procedure design, alternate routes to avoid other aviation operators have already been taken into account. The procedure is almost entirely contained within the controlled airspace associated with Cardiff Airport and aircraft can be radar vectored so as to intercept the ILS within controlled airspace if required. The proposal would not affect airspace efficiency, indeed by returning a

degree of predictability to operations within Cardiff's airspace, it will enhance it. **Positive impact**.

4.6 Technical Analysis

Procedures should be designed to: be technically flyable and maintain existing operational performance, and capacity; be designed to fit within existing airspace boundaries; enable continuous descents; alter airspace design or classification for the benefit of other airspace users.

The proposed change will not result in any change to the already approved procedure design, which operations have proved is technically flyable, maintains existing operational performance and capacity, fits within existing airspace boundaries and enables continuous descents. There would be no change to airspace design or classification and therefore offer no additional benefit or dis-benefit for other airspace users. Measures are already in place to re-introduce these procedures once published in the UK AIP. **No impact**.

4.7 Economic Analysis

Procedures should be designed to enable uninterrupted aviation operations in IMC/IFR in support of wider business objectives.

The proposed change will allow continued uninterrupted IMC/IFR operations by MRO customers into St Athan; providing a significant economic benefit to the wider business objectives of the airport. Without it, reliable access to MRO facilities at St Athan is diminished, potentially reducing the airport's attractiveness as a MRO hub.

MRO operations tend to be seasonal and the companies based at St Athan, [redacted] currently employ 200 personnel peaking during the winter months, when meteorological conditions are more likely to make ILS approaches a necessity rather than a preference. When promoting its MRO facilities, St Athan is in competition with other suppliers in Europe and worldwide and the availability of an ILS procedure is a potentially significant differentiator when airlines make their business decisions. At Annex 2, [redacted] stress their genuine concern of the reputational damage, both for themselves and the airport, caused by the withdrawal of the ILS procedures. This is echoed by the [redacted] who states (at Annex 3) that the unavailability of ILS procedures could result in a loss of business 'worth millions of pounds'. In economic terms, the success of the proposal would be significant. Such statements directly relate to the requirement for uninterrupted aviation operations in IMC/IFR. **Positive impact**.

4.8 Stakeholder Engagement

As described in Section 3.1 above, there is no latitude to develop Design Principles which will influence the re-introduction of a pre-existing ILS approach from 12 nm, with a 3 degree glidepath from 7 nm. As a result we feel that there is no benefit to be gained in undertaking significant stakeholder engagement in the development of Design Principles. Nevertheless, using exemplar Design Principles, we have sought to demonstrate that the CAP 1616 principles have still been applied; the outcome being that re-introduction of the ILS has no adverse impact, and in a number of areas a

positive impact, when considered from Safety, Environmental, Operational, Technical and Economic perspectives. We therefore feel that both the letter and spirit of considering Design Principles has been met.

5 Conclusion

Following the issue of a CAA Aerodrome Ordinary Licence on 31st March 2019, the sole aim of the proposed airspace change is to enable the publication of the CAA-approved St Athan ILS procedures in the UK AIP.

A proportionate analysis of the proposed change against exemplar ACP Design Principles demonstrates that it would have no impact on third party stakeholders. This provides justification for the change sponsor's decision not to engage with other interested parties at this stage.

As the Step 2A and Step 2B submissions will further illustrate that the proposed change will result in no change to:

- The extant airspace arrangements and therefore there will be no impact on other airspace users;
- The existing CAA-approved procedures. The proposal does not alter traffic patterns below 7000ft, nor change lateral aircraft tracks or dispersion, nor change aircraft heights over inhabited areas. Therefore there will be no change in the effect of the procedure to people on the ground;
- Environmental considerations, relating to noise, track miles, fuel burn, emissions and air quality will not change;
- The number of aircraft using the procedures will not change;
- The effects on third parties of the procedure will not change;

Existing users of the procedures will experience only an administrative change to their use of the procedures.

However, if the proposal is unsuccessful, it will have a negative impact on the operational and therefore economic attractiveness to potential customers of MRO facilities at St Athan airport, which provide a major revenue stream for the St Athan – Cardiff Airport Aerospace Enterprise Zone. It could equally result in increased cockpit and controller workload.

The Sponsor believes they have met the requirements of the Define Gateway in that:

- A Statement of Need has been produced;
- An Assessment Meeting and follow-up to agree a scaled approach have been held;
- The CAA has agreed to the sponsor's timescales for Stages 1 and 2 (July 2019 Gateway);
- The change sponsor has produced abbreviated Design Principles (this document) proportionate to meet the scaled requirement and, recognising that as the ILS provides a fixed approach path, there is little scope for variance in design;
- At the Discussion meeting between the Sponsor and the CAA on 4 June 2019, the CAA:
  - Agreed to the scaled approach.
  - Accepted the process and approach used to develop design principles;

A1 St Athan ILS Approaches

A1.1 ILS/DME Rwy 25 (UK Mil AIP)

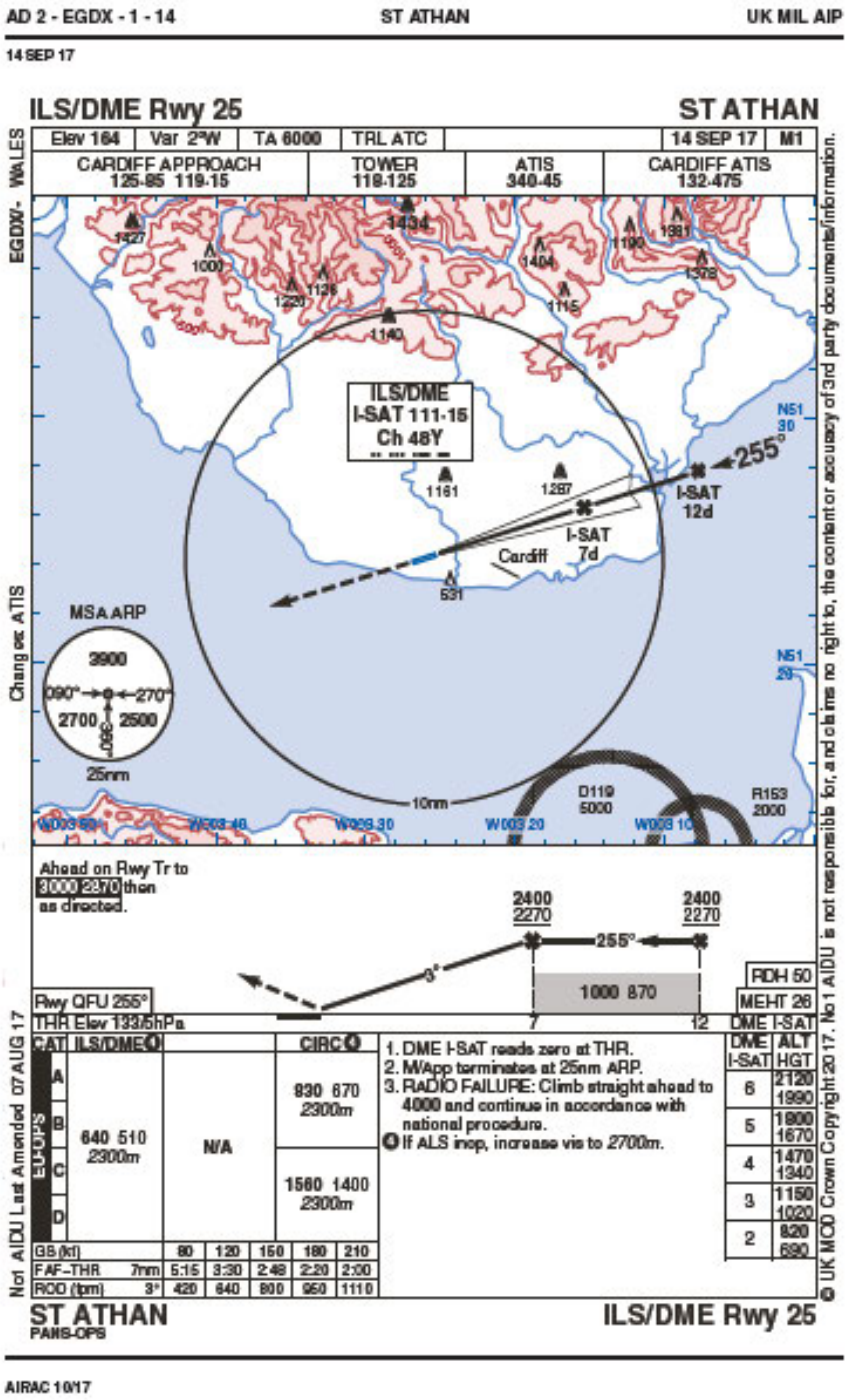

Figure 1 ILS/DME Rwy 25 (UK Military AIP)

A1.2 LOC/DME Rwy 25 (UK Mil AIP)

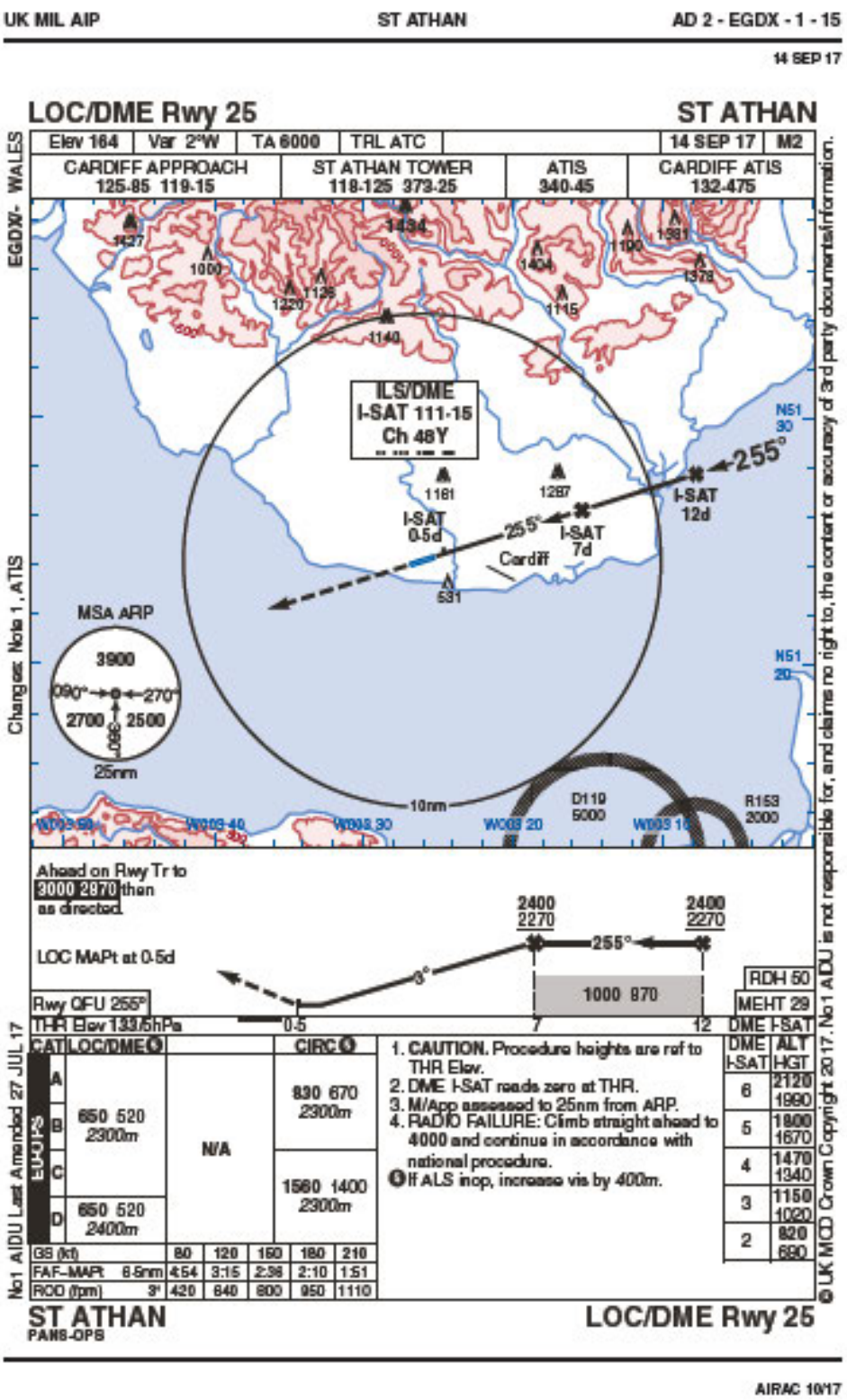

Figure 2 LOC/DME Rwy 25 (UK Military AIP)

A2 Statement on St Athan ILS from [redacted]

From: [redacted]
Sent: 08 July 2019 10:53
To: [redacted]
Cc: [redacted]
Subject: ILS

[redacted]

This is an extraordinary situation that is genuinely impacting our business, both in terms of the practicalities of airfield operation, and the credibility of EGDX/EGSY as an airfield - the repeated activation and de-activation of this ILS is impossible to explain to our customers and does not create a professional image of this location. Furthermore, many of our larger 'national carrier' customers are very reluctant to operate to a VFR location, since their crews have limited experience with these kind of operations [redacted] Airways recently refused to bring aircraft to our facility). Obviously the risk of diversion is increased with VFR approaches, and our customers are not only impacted with the direct costs of the ATC/Nav charges and fuel, but suffer significant effects of crew re-scheduling - which can be economically very substantial. The reputational damage to both [redacted] and St. Athan of VFR diversions is not possible to tangibly estimate, but is a genuine concern for us.

After 7 years of operation at St. Athan our business has matured to a point where the throughput is relatively stable. We received 46 aircraft arrivals in 2018 with three departures, and do not expect that will change - we are budgeting approximately 50 movements per year for the next couple of years.

Best Regards,

[redacted]

A3 Statement on St Athan ILS from [redacted]

From: [redacted]
Sent: 08 July 2019 16:02
To: [redacted]
Subject: ILS at St. Athan
Importance: High

Dear [redacted]

[redacted] operation is dependent on a constant ILS availability.

We would lose substantial business worth millions of pounds, if we can't prove to our clients, that we have an ILS available. This would have a knock on effect, because our investors wouldn't continue to invest in our company, which would jeopardize our restructuring and growth plans.

At this stage, our main customers are reluctant to sign any GTA (General Terms Agreement) unless we can give green light on the ILS.

We really hope that a solution can be provided asap.

With kind regards,

[redacted]