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Network Manager - Safety Study

Aerodrome 'Hot Spot' Survey

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Abstract

The EUROCONTROL Safety Improvement Sub-Group (SISG) meeting in February 2014 confirmed an action to carry out a study aimed at understanding how AIP hot spot information is transposed to commercially-produced aerodrome charts and promote any good practices to help improve the accessibility, visibility and quality of the information.

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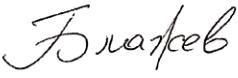
TLP STATUS

Intended for		Detail
Red	☐	Highly sensitive, non-disclosable information
Amber	☐	Sensitive information with limited disclosure
Green	☒	Normal business information
White	☐	Public information

DOCUMENT APPROVAL

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Authority	Name and signature	Date
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1. EXECUTIVE SUMMARY

The EUROCONTROL Safety Improvement Sub-Group (SISG) meeting in February 2014 confirmed an action to carry out a study aimed at understanding how AIP hot spot information is transposed to commercially-produced aerodrome charts and promote any good practices to help improve the accessibility, visibility and quality of the information.

The minutes from the SISG meeting 34 places this work into context and specifies the Action requested.

"Minute 5.1.1 Hot Spots

In accordance with ICAO guidance and EAPPRI recommendations, Brussels Airport - like many others - had compiled a Hot Spot map which is published in the national AIP. However, AIP charts are generally not used in the cockpit and the aerodrome charts produced by commercial providers (which are used by pilots) do not always include any or all of the Hot Spot information from the AIP. Moreover, the AIP versions often only describe the Hot Spot and do not provide any additional explanatory information to help with pilot understanding/awareness of why the Hot Spot is there and what actions they can take to mitigate the associated risk. In addition, it would be useful to investigate and promote good practices on how AIP Hot Spot information is transposed onto commercial products with the intention of trying to improve the accessibility, quality and visibility of Hot Spot information (Action 34/03). It was also important to note that identification and publication of Hot Spots was only the first step; measures should be taken, where possible, to mitigate the risks associated with the Hot Spots and to have a process in place that continually reviews Hot Spots."

Contributing Factors	EUROCONTROL SAF would investigate how AIP Hot Spot information is transposed to commercially-produced aerodrome charts and promote any good practices to help improve the accessibility, visibility and quality of the information.

The Study collected a sample of AIP aerodrome diagrams for 64 EUROCONTROL airports, generally 3 per state. In addition a selection on AIP aerodrome diagrams from Australia, China and USA were reviewed as comparison at a global level. The study analysed the information supplied on runway Hot Spots for each airport and then compared that information and presentation made available on the counterpart chart supplied by "Company A" charts. A second commercial company (Company B) has supplied information limited to the five specific examples used for illustration in the narrative.

The study found that 18/76 (24%) of airport diagrams had no Hot Spot information at all. This included at least three European capital city airports with multi-runway operations.

The SISG Minutes voices the concern that the AIP versions often only describe the Hot Spot and do not provide any additional explanatory information to help with pilot understanding/awareness of why the Hot Spot is there and what actions they can take to mitigate the associated risk. Of those airports that did have Hot Spot information on their AIP charts, only 39% were judged to be effective or very effective. Effectiveness, in this case, being a combination of presentational clarity and usefulness of the information. However 45% of airport AIP charts were judged to be of no or low effectiveness.

Where there is no Hot Spot information on the AIP diagrams, Company A also has no information. Of the 47 Company A European charts, 68% were judged to be of good or very good effectiveness. That measure is however limited by the information supplied on the AIP chart.

Comparing and contrasting Company A's diagrams with the AIP diagrams, it was judged that 57 % of Company A diagrams were of higher effectiveness than the AIP charts. 13% of Company A's diagrams were judged to be of less effective than the relevant AIP chart. The quantity of information supplied by Company B is too small to make a statistical comparison. The SISG Minutes voiced a concern that the aerodrome charts produced by commercial providers (which are used by pilots) do not always include any or all of the Hot Spot information from the AIP. The study found very little evidence to support this statement.

In the vast majority of cases the information shown on the AIP diagram was copied exactly by Company A. There are a few cases where the factual text is different, for example, one AIP chart states "hold at M1" whereas the Company A chart states "hold at M3" which appears to be correct. The small sample of aerodrome diagrams supplied by Company B is also indicative of a high accuracy in reproducing the information from the AIP. It does however appear to be somewhat disjointed.

The study found five examples of suggested best practice that singularly or in combinations may improve the visibility and quality of Hot Spot information and which are recommended for consideration by SISG members.

2. TRANSPOSITION FROM SOURCE TO COMMERCIAL PRODUCT

The SISG Action requested information on how source information is transposed to commercially-produced aerodrome charts.

The European Action Plan for the Prevention of Runway Incursion (EAPPRI) advises that the implementing rule on aeronautical data and information Quality (AQD IR) developed by EUROCONTROL and adopted by the European Commission is now referred to as the Commission regulation (EU) no 73/2010. The regulation lays down the requirements on the quality of aeronautical data and information for the single European sky, in terms of accuracy, resolution, integrity and timeliness. The actual scope goes beyond the ANSPs/AISPs to include non-ANSP entities. In terms of scope, the aeronautical data/information process chain extends from original data sources (e.g. surveyors, procedure designers, AD, etc.), through AIS (publication) to the end use, either by human users or aeronautical applications. Concerning ad operators, it applies for those aerodromes for which IFR or Special-VFR procedures have been published in national AIPs, as such procedures demand higher data quality.

The European AIS database (EAD) enables aeronautical information providers to enter and maintain their data in the repository and enables data users to retrieve and download AIS data and AIP charts in a digital format. The quality of data is enhanced by using international standards and data checking procedures, including validation and verification. EAD performs regular data quality/completeness reviews and reports results to data providers.

Source providers also supply information to commercial organisations for transposition to flight crew information, both on paper and electronically. There are currently three such providers known to be in operation. One company (B) was late in making contact and, in the short time available, was requested to supply detailed information on the five airports that are used for illustration in the study document. The third company (C) declined to contribute towards this study.

Company A provided the following comprehensive information.

Information is supplied by a global network of 246 worldwide providers. A total of around 420,000 source pages are notified for amendment per annum. That is 35,000 for each monthly AIRAC cycle. On initial check the company may refer back to the data source provider any issues for clarification. This happens around 220 times per cycle (around 1 in 2000). The accepted source page is entered into an Electronic Source Library; examined by analysts to identify the changes made and then passed to the appropriate downstream production group. This generates 270,000 database change transactions every cycle.

Before publication each changed data file, be it paper, electronic or text is subject to two sequential peer reviews. However an issue is subsequently flagged up in 1 in 200 new charts. When significant discrepancies are found notification is made by periodic NAV data/chart alerts before the next cycle.

Company A also advised that a team of analysts actively engage with the source and state suppliers to facilitate improvements in working together on new charts, error resolution and common formatting.

3. WHAT IS AN AERODROME HOT SPOT?

3.1 Definition

A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary. (ICAO Doc 9870, Manual on the Prevention of Runway Incursions)
The criteria used to establish a hot spot on a chart and the symbols to be used are contained in ICAO Annex 4, with more guidance provided in Annex 14 and Doc 9870.

3.2 Description

ICAO PANS-ATM Doc 4444 defines a runway incursion as: «Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.»
Many aerodromes have hazardous locations on taxiways and/or runways where incidents have occurred. Such positions are commonly referred to as «hot spots».

Formal definition of hotspots can alert pilots and drivers to movement area design issues which cannot be readily mitigated by signage or lighting or where poor visibility may contribute to reduced Situational Awareness in relation to active runways. It can also alert to potentially critical points where the visual control room (VCR) or other surveillance systems are less effective usual.

ICAO recommends the local generation of AIP charts to show runway hotspots, which, once issued, must be kept up to date and revised as necessary.

All identified hot spots should be examined for short or long term opportunities for mitigation of or removal of the hazard identified. These actions include:

■ awareness campaigns;
■ enhanced visual aids (signs, markings and lights);
■ use of alternative routings;
■ changes to the movement area infrastructure, such as construction of new taxiways, and decommissioning of taxiways;
■ closed-circuit television (CCTV) for critical VCR sight line deficiencies.

4. HOW HOT SPOTS ARE PRESENTED ON CURRENT AERODROME DIAGRAMS

Examples of Current Aerodrome Diagrams, highlighting areas of improvement opportunity and apparent best practice.

4.1 Palma de Mallorca

Figures 1, 2 and 3 compare the aerodrome diagrams from the AIP with Company A and Company B for Palma de Mallorca.
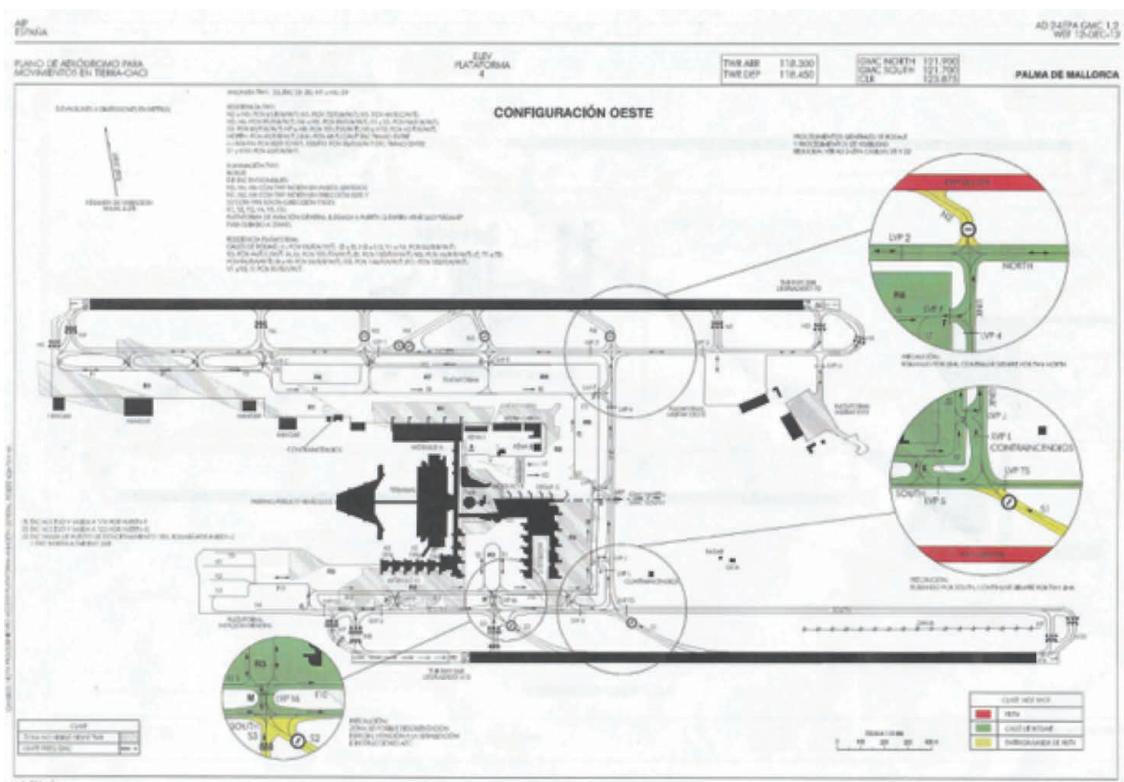
Figure 1: AIP aerodrome diagram for Palma de Mallorca

This AIP chart has some points where improvement could be made, but also some best practice.
What may be best practice is the use of colours to emphasis which parts of the Manoeuvring Area are taxiways, runway entry/holding points and runways. The use of this colour set is standard practice in Portugal and Spain and, if presented well, can be a very effective method.

- Green = Taxiway
- Yellow = Caution Area
- Red = Runway

The main diagram is pale and not easy to read. The Hot spots are marked with circles and lines to larger circles that show the areas in more detail. The Hot Spot text is faint making it difficult to read. It is also in Spanish only.
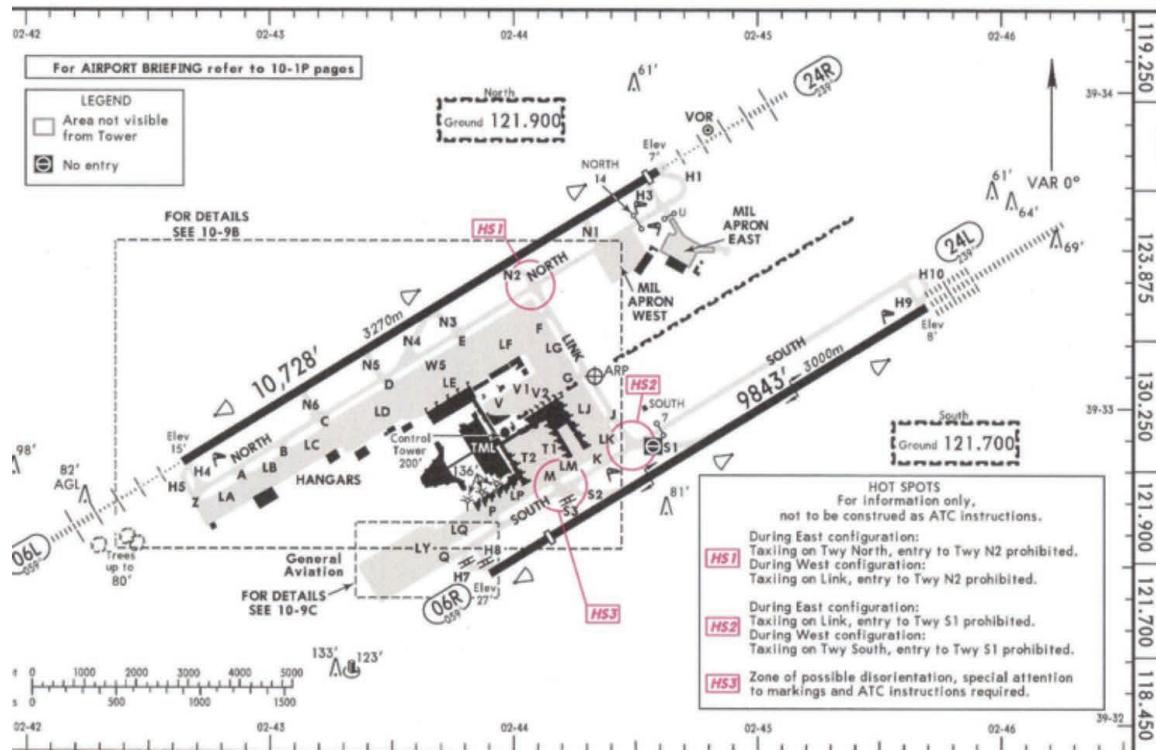
Figure 2: Company A Aerodrome diagram of Palma de Mallorca

This aerodrome diagram has two aspects of best practice.

Firstly, the main chart is clear with well-delineated Hot Spot circles and labels. Secondly, the Hot Spots legend is large and very easy to read.

It does not however make use of any expanded graphic to show the Hot Spot even more clearly. In addition, it does not follow the AIP format of separate diagrams for east and west operations and routings.
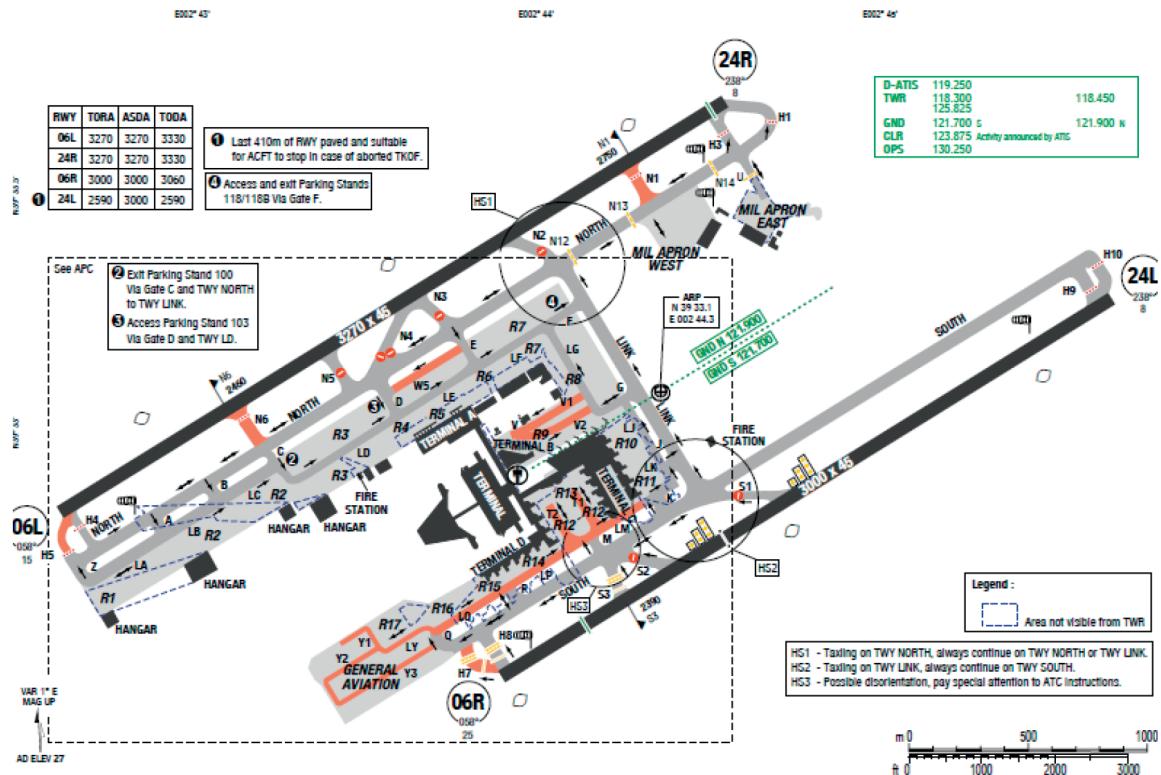
Figure 3: Company B aerodrome diagram of Palma de Mallorca

This aerodrome diagram has two aspects of best practice.

Firstly, the main chart is clear with well-delineated Hot Spot circles and labels. Secondly, the Hot Spots legend is easy to read.

It does not however make use of any expanded graphic to show the Hot Spot even more clearly. In addition it follows the AIP format of separate diagrams for West and East operations.

4.2 Brussels

Figures 4, 5 and 6 compare the AIP Hot Spot chart for Brussels with the Company A and Company B aerodrome diagrams. Neither Company A nor Company B produce a specific Hot Spot charts for Brussels.
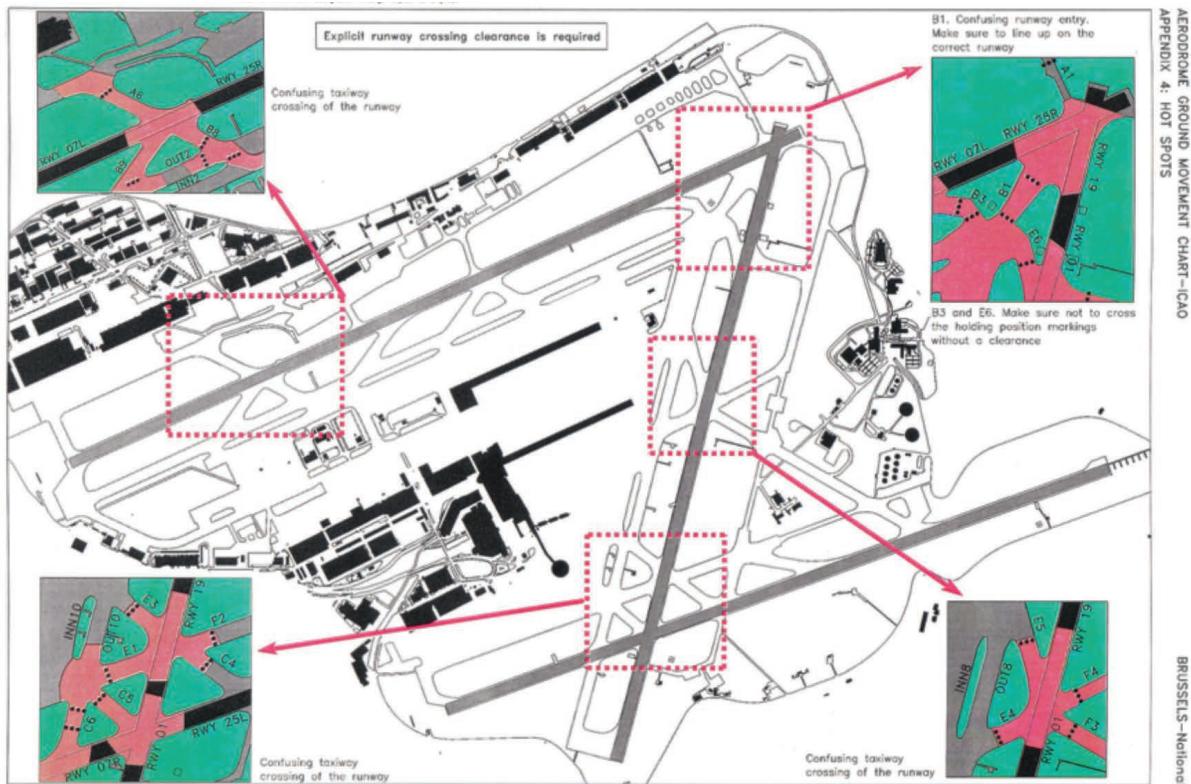
Figure 4: AIP Hot Spots Chart Brussels

Some airports have an additional AIP page for runway Hot Spots. The figure shows a good use of this method. It allows an expanded view of the holding points.

It also makes use of colour, in this case black for runway, grey for taxiway but both overlaid in red for Hot Spot area, and green for grass.
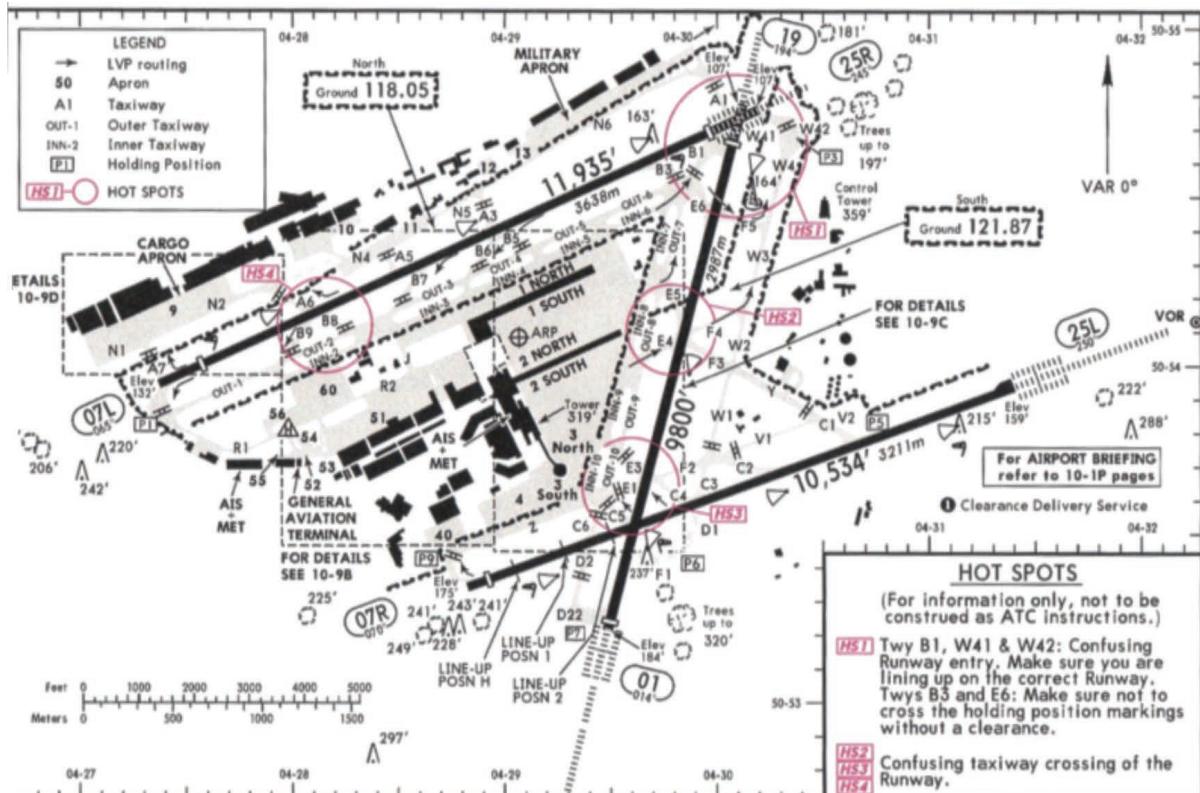
Figure 5: Company A aerodrome diagram for Brussels

This chart is in the standard Company A format. Red Hot spot circles and labels with a Hot Spot text box on the main page. The text is clear, but some use of expanded view of each Hot Spot might be useful.
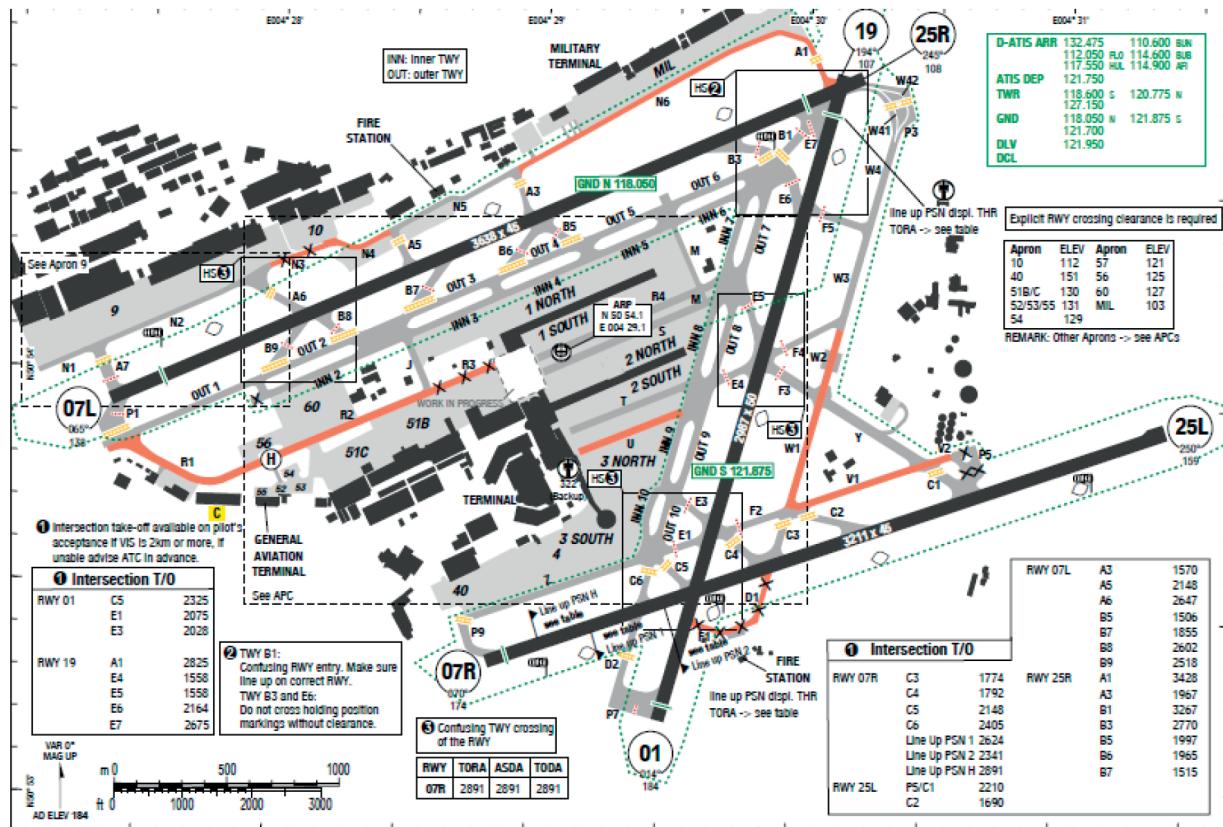
Figure 6: Company B aerodrome diagram for Brussels

This chart is in the standard Company B format. Black squares are generically labelled HS. Instead of identifying the Hot Spot by individual number, there is a number to an information key in a legend box.

Company A shows all four Hot Spots in one tabular information box with HS1 having one explanation and HS2-HS4 having a second explanation:

Company B has the information split into two boxes. The box labelled "2" is just for HS1 and the box labelled "3" is for HS2-HS4. There is no specific "Runway Hot Spot" textbox.

4.3 Prague

Figures 7, 8 and 9 compare a section of the AIP Hot Spot chart for Prague with the same area depicted on the Company A and Company B Hot Spot charts, as for Prague they do both produce a specific Hot Spot chart or Inset.

The figures portray Hot Spot (HS1) at Prague. All three charts are adequate and show the same information. The message is that after landing on rwy 06/24, not to confuse the approved taxiways Delta (landing 24) and Lima (landing 06) with rwy 12/30.
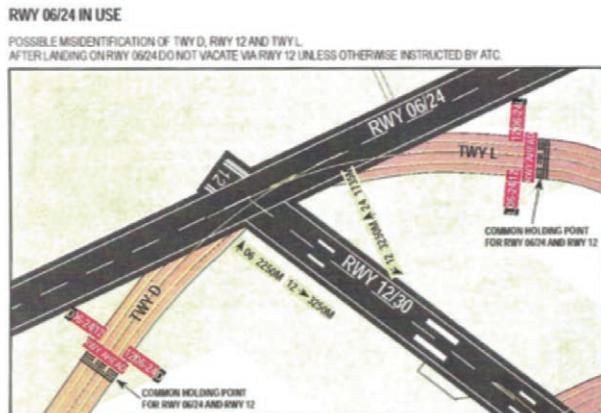
Figure 7: AIP Prague Hot Spot chart
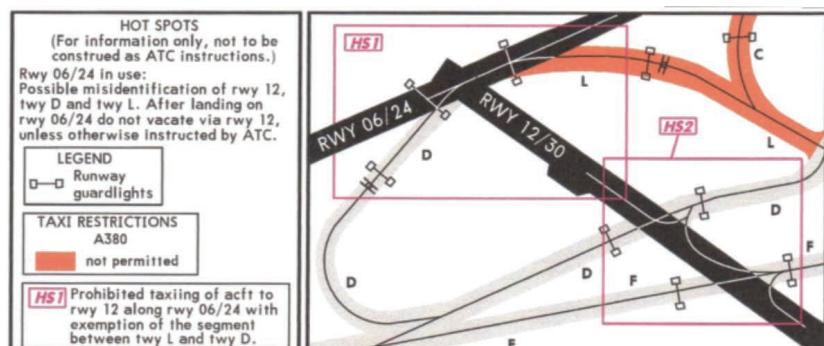
Figure 8: Company A Hot Spot chart for Prague
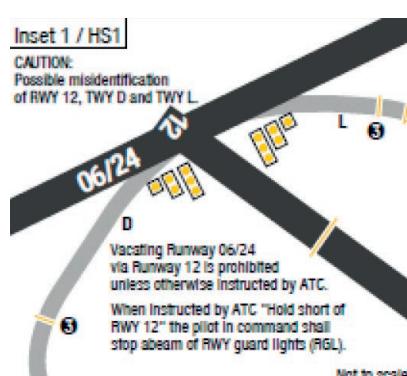
Figure 9: Company B Hot Spot chart for Prague

It may be considered that the message is effectively presented on both Company A and Company B charts.

4.4 Warsaw

Figures 10, 11 and 12 compare the AIP aerodrome diagram with and the Company A and Company B aerodrome diagram for Warsaw.

The AIP chart uses the wording "Extremely Dangerous" for its only Hot Spot. This is the only use of such a high degree warning seen in the study. It is therefore useful to view how it is presented.
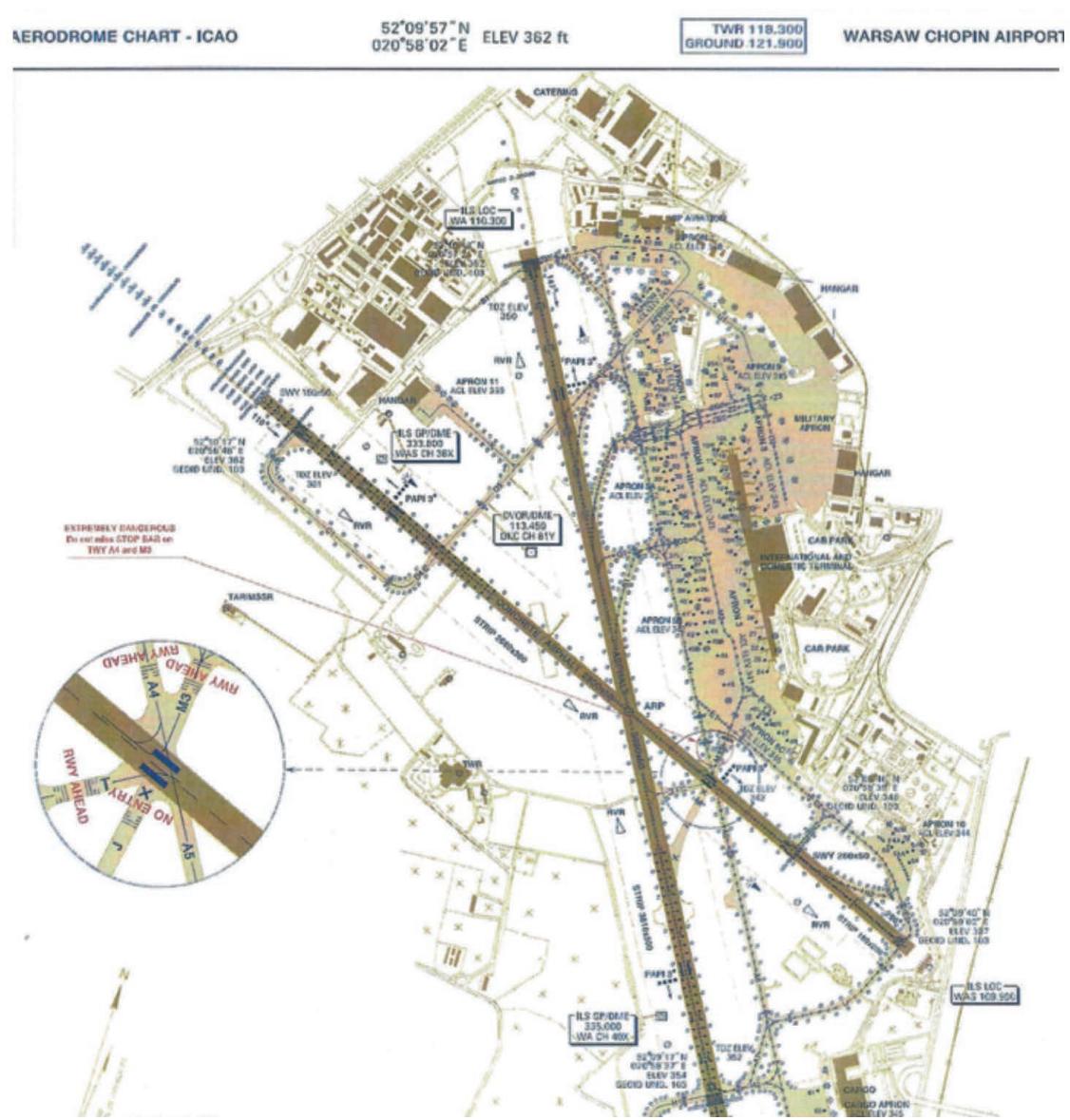
Figure 10: AIP aerodrome diagram for Warsaw

The text "Extremely Dangerous" is written in red and is capitalised. It is accompanied by the message, "Do not miss STOP BAR on TWY A4 and M3". The font is very small and perhaps not in keeping with the severity accorded to the message. There is a thin line and arrow pointing at a fairly faint circle. There is however a very good expanded graphic of the area in a separate circle.
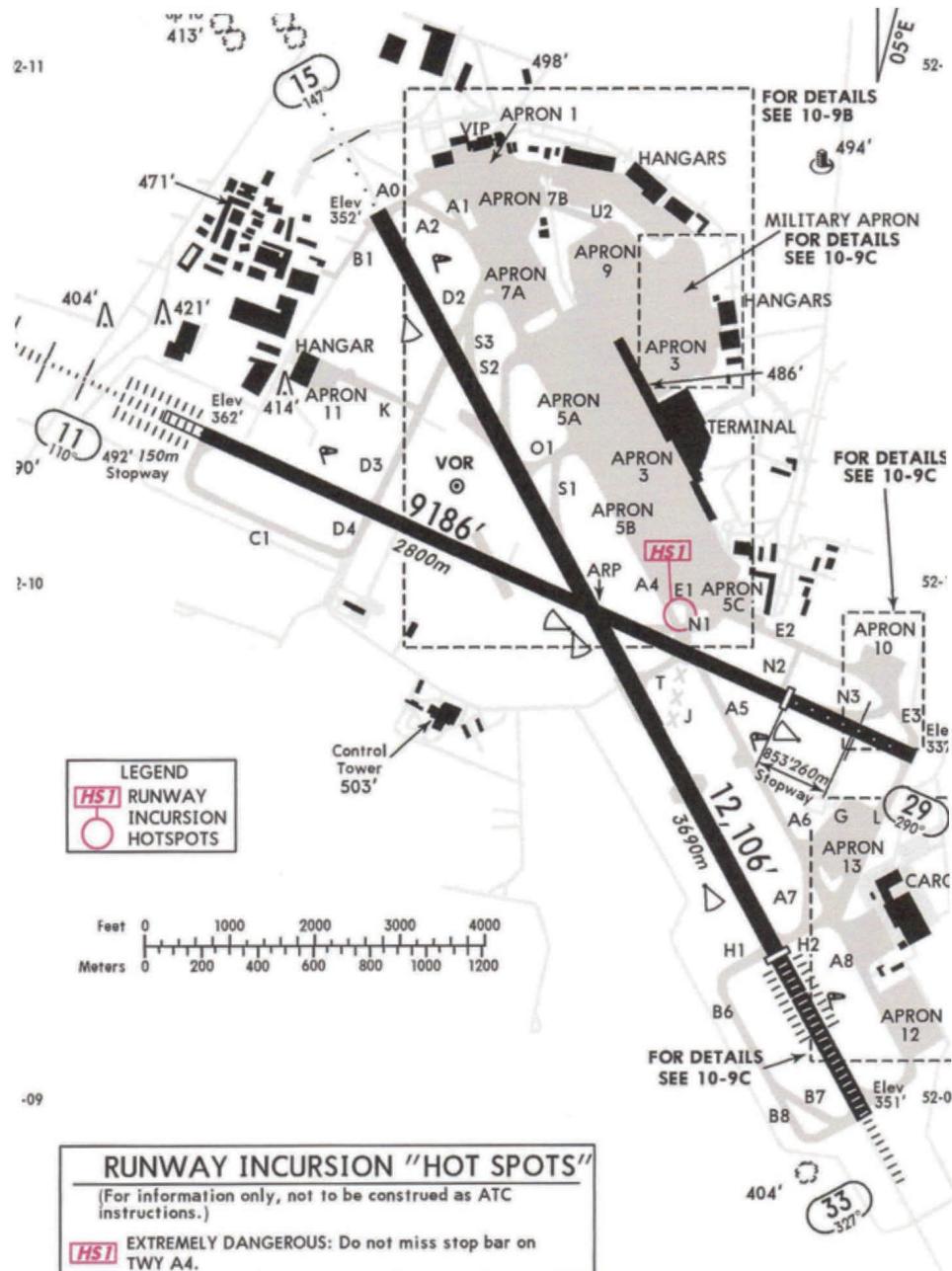
Figure 11: Company A aerodrome diagram of Warsaw

The Company A chart is simpler as it does not include aircraft parking stand numbers. It is easier to see where HS1 is located. The Runway Incursion "Hot Spots" text box is large and easy to read. It repeats the AIP wording "Extremely Dangerous" but misses out any reference to TWY M3. There is also no expanded graphic of the area.
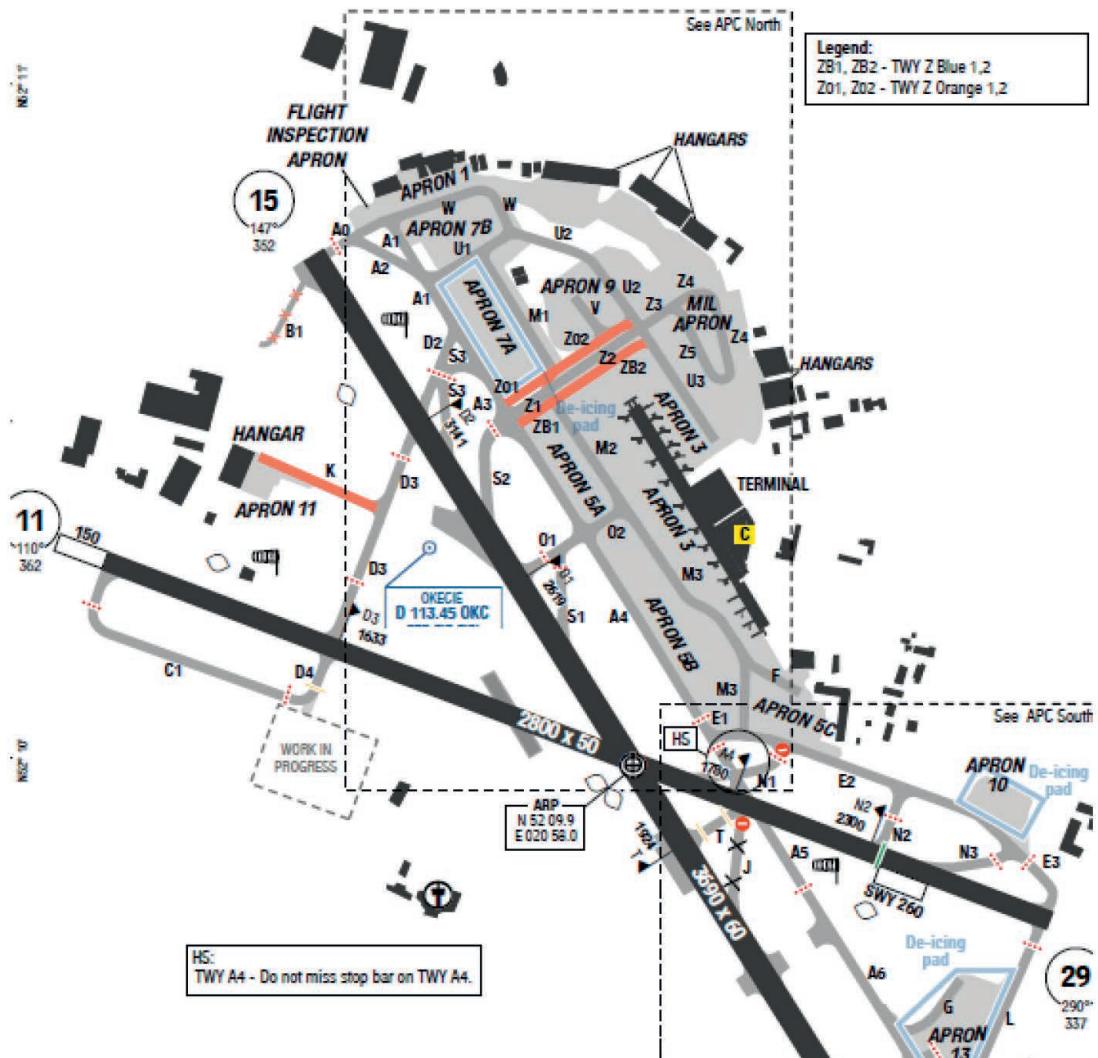
Figure 12: Company B aerodrome diagram for Warsaw

The Company B chart for Warsaw shows the Hot Spot as a black circle and label "HS". It has a text box, which is not connected to the main picture stating " HS: TWY A4 – Do not miss stop bar on TWY A4.

It does not include the wording "Extremely Dangerous" and like Company A it does not make reference to M3, nor does it have any expanded graphic.

4.5 Maastricht

The AIP aerodrome diagram for Maastricht is included because it uses a different format to highlight Hot Spots. Figure 13 shows no Hot Spots circles on the main diagram but does have an expanded graphic in the top-left corner. This is a representation of four holding points on the taxiway but with segments omitted.

It is very difficult firstly to understand what it is trying to show and secondly to then relate the Hot Spot positions to the main chart.

Figure 14 is the equivalent aerodrome diagram from Company B, for comparison.
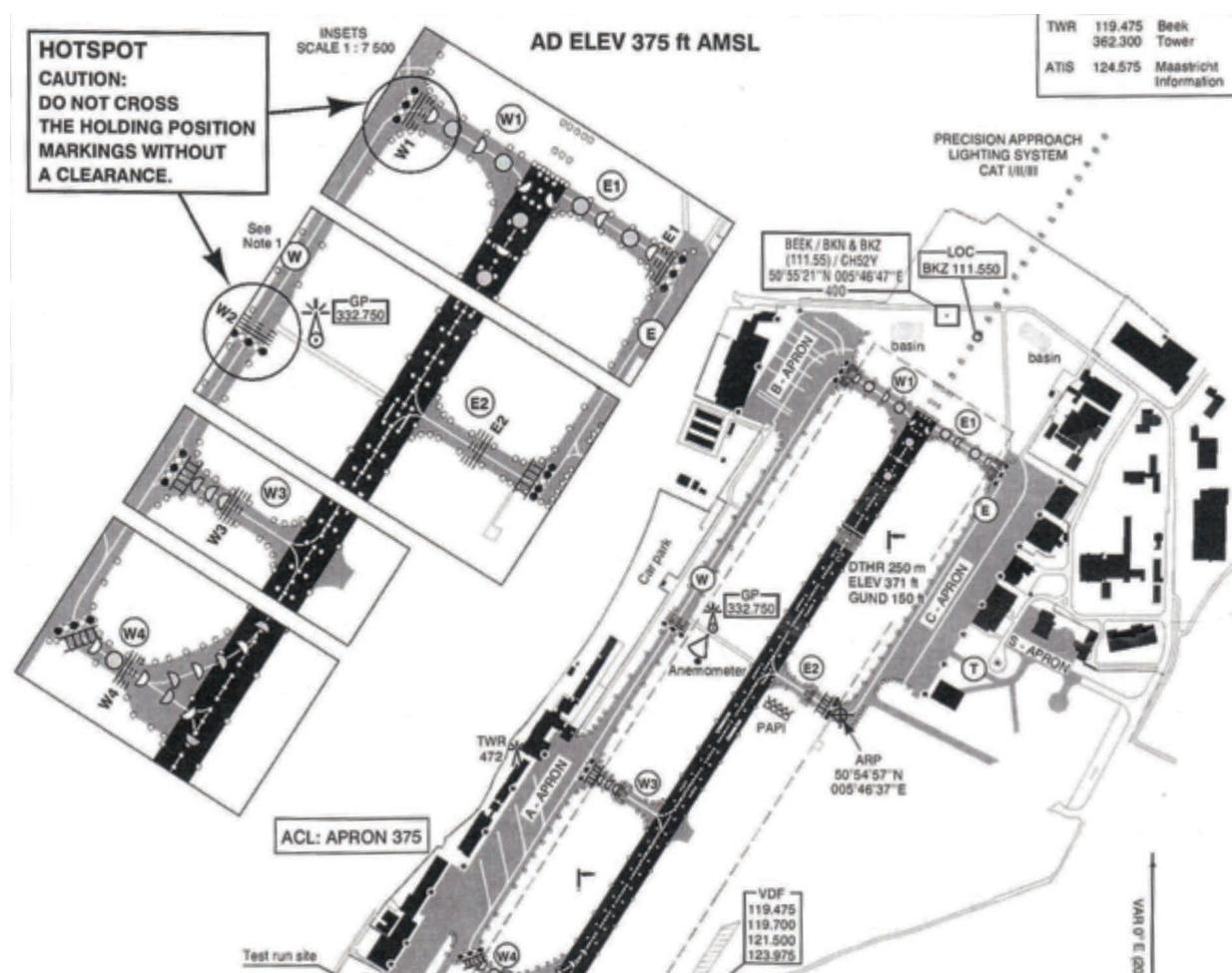
Figure 13: AIP aerodrome diagram for Maastricht
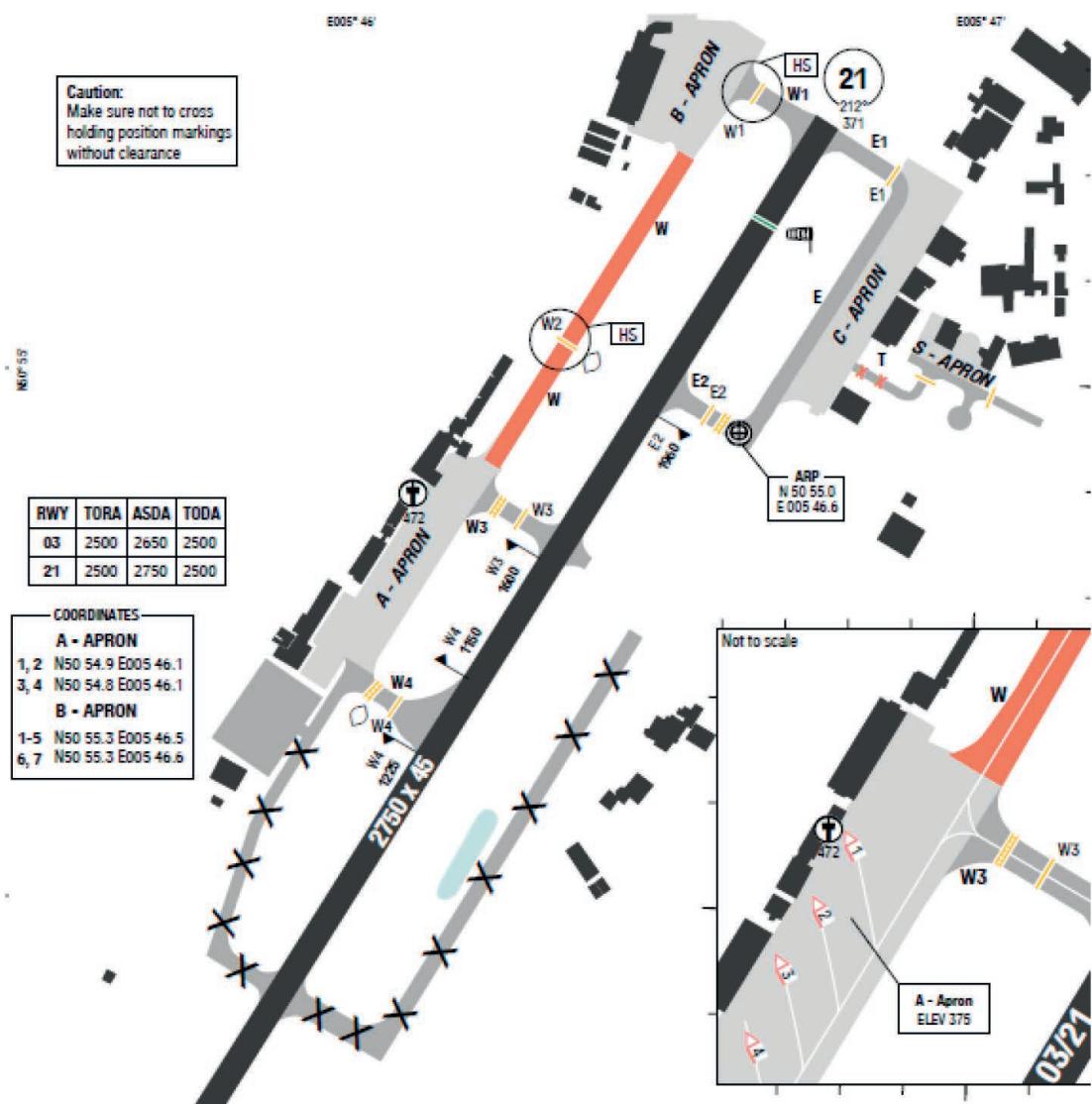
Figure 14: Company B aerodrome diagram for Maastricht

Company B uses its standard format of black circles and generic "HS" labels. It has a text box labelled Caution with text appropriate to a Hot Spot, but the text box is not labelled as such.

4.6 Representation of Hot Spots on non-European AIP aerodrome diagrams

Figures 15, 16 and 17 show a selection of AIP aerodrome diagrams around the world to contrast against the European charts. They are Sydney (Australia), Kunming (China) and Las Vegas (USA).
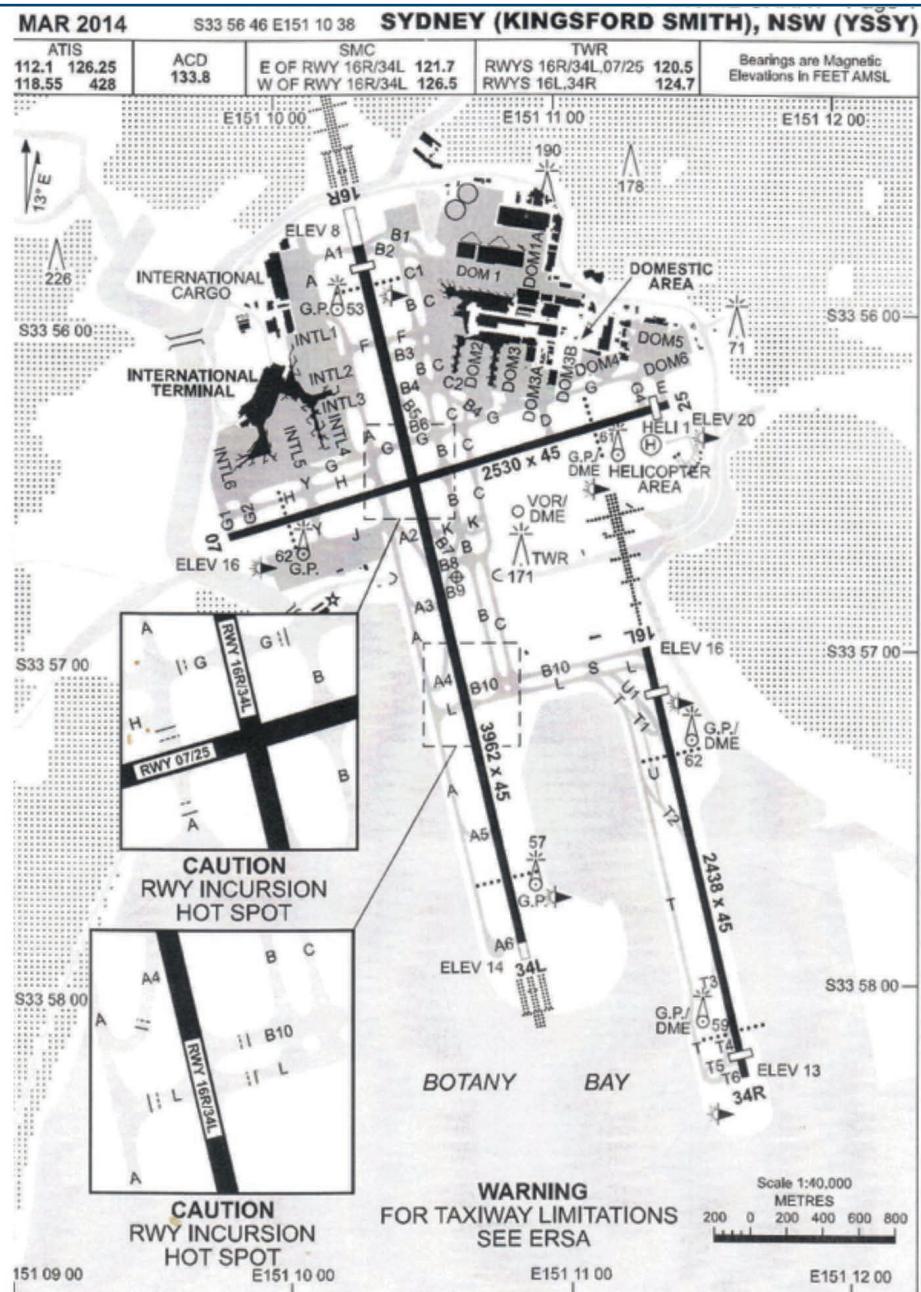
Figure 15: AIP aerodrome diagram for Sydney

The expanded graphic of the runway incursion Hot Spots are useful, but there is no text to enhance the pilot's understanding other than to use caution. Since it is not unreasonable to assume that pilots do exercise caution when taxying, the effectiveness of the Hot Spot information is low.
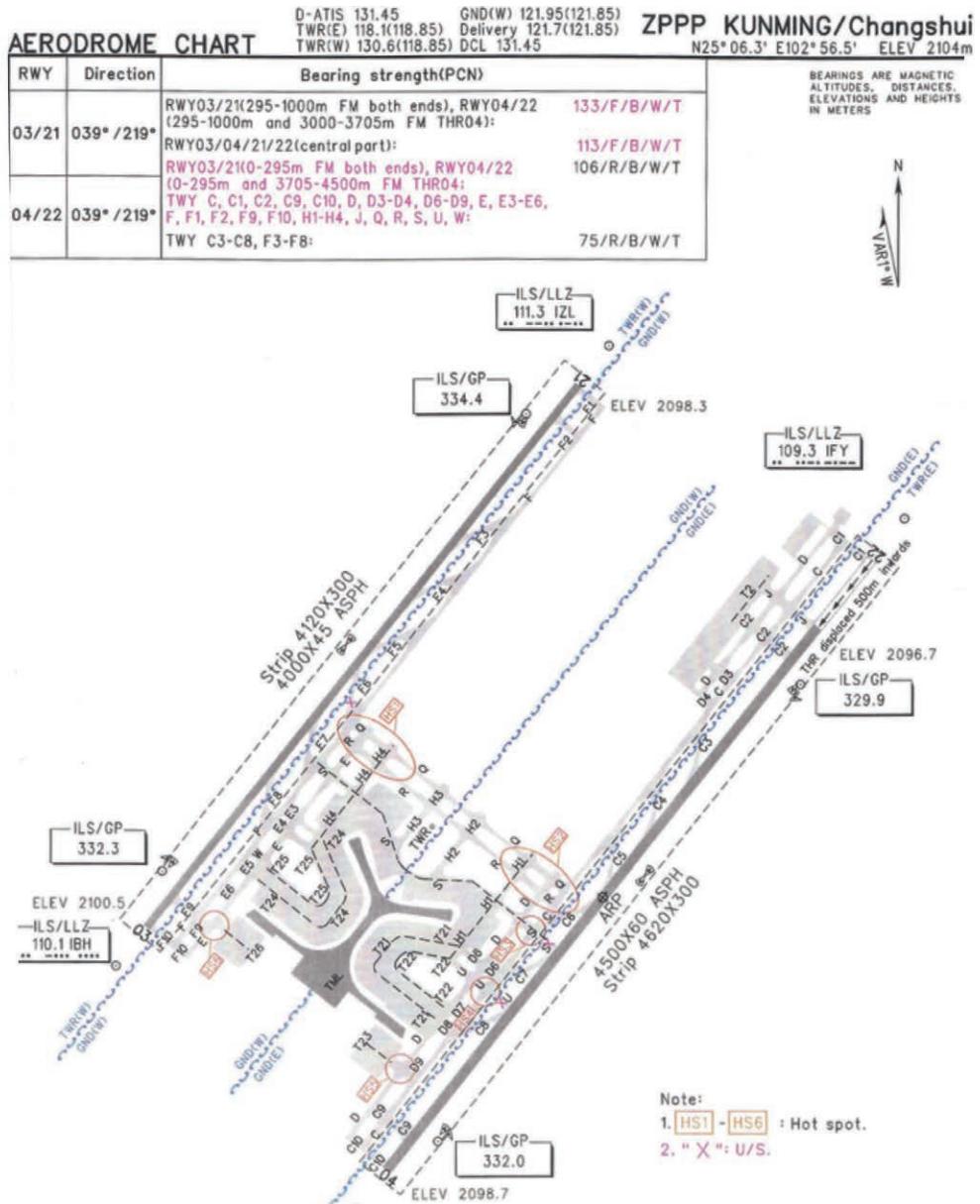
Figure 16: AIP aerodrome diagram for Kunming

The diagram shows six red circles and labels HS1-HS6. The font is faint and not easy to assimilate. There is no textual information to aid understanding of why each Hot Spot exists
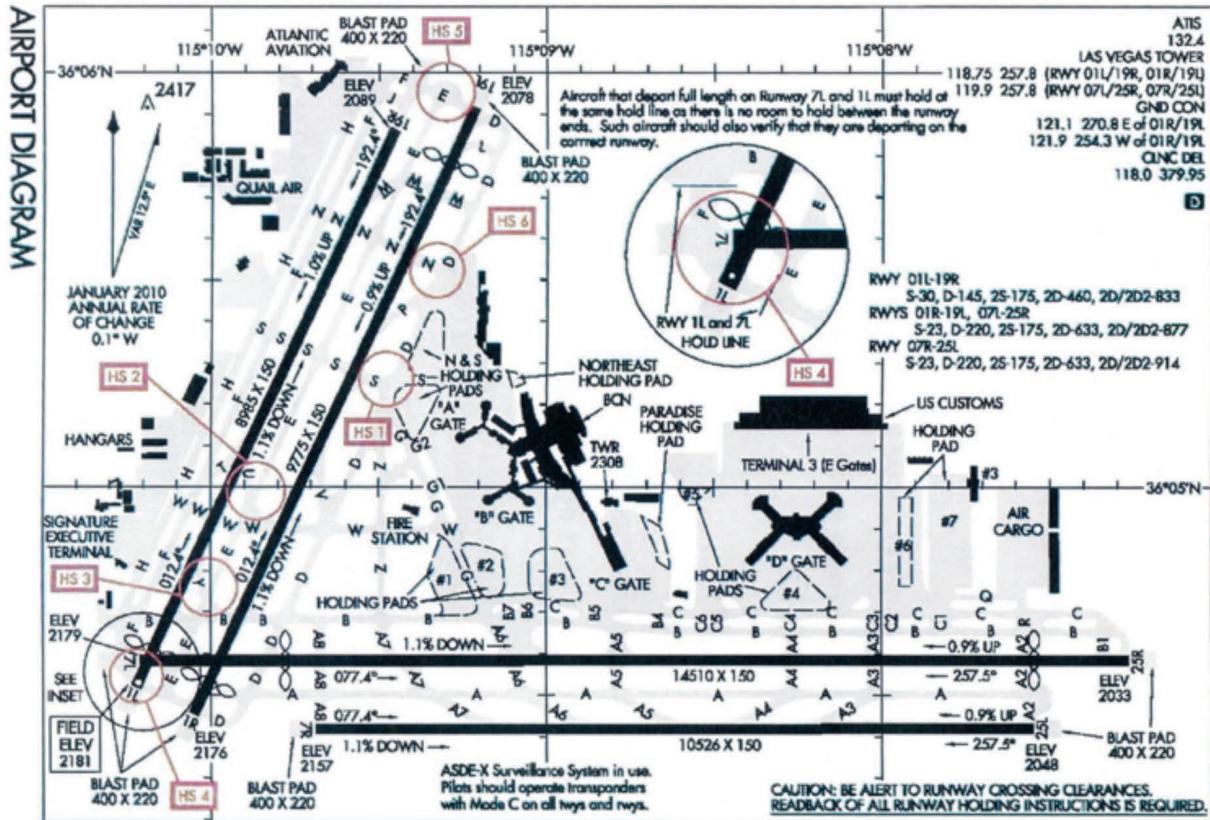
Figure 17: AIP aerodrome diagram for Las Vegas

The main aerodrome chart shows six Hot Spot circles and labels HS1-HS6. One Hot Spot (HS4) has an expanded graphic and text, which is very useful but there is no link from the graphic to the actual position on the main diagram. Textual descriptions of each Hot Spot are on a separate page in the Airport Facilities Directory (AFD).

Examples are:

■ HS 1 Exiting the ramp, use caution at Twy S not to cross the rwy holding position markings for Rwy 19L. Twy S intersects with Twy D, Twy Z, and Twy G, which require a turn to the north or south.

■ HS 2 Exiting Rwy 01R–19L use caution not to enter Twy U and avoid entering Rwy 01L–19R without authorization.

■ HS 3 Exiting Rwy 01R–19L use caution not to enter Twy Y and avoid entering Rwy 01L–19R without authorization.

5. ANALYSIS OF EFFECTIVENESS

5.1 AIP Aerodrome Diagrams

Each AIP aerodrome diagram was examined for effectiveness. Effectiveness, in this case, being a combination of clarity of presentation and the usefulness of the information provided on Hot Spots.

An effectiveness scale of Very Good, Good, Okay, Low and Nil is used. In addition 18 (24%) of the aerodrome entries had no Hot spots. Judgements are solely the opinion of the author. There is however a high confidence in the relativity of effectiveness.

5.1.1 All AIP aerodrome diagrams (76)

Very Good	6	8%
Good	17	22%
Okay	9	12%
Low	13	17%
Nil	13	17%
No Hot Spots	18	24%

5.1.2 AIP aerodrome diagrams that do present at least one Hot Spot

Very Good	6	10%
Good	17	29%
Okay	9	16%
Low	13	22%
Nil	13	22%

39% of AIP aerodrome diagrams with Hot spots are judged to be Good or Very Good. However 45% of these diagrams are judged to be of Low or No effectiveness.

5.2 Company A aerodrome diagrams (European only)

Very Good	14	10%
Good	18	29%
Okay	8	17%
Low	4	8%
Nil	3	6%

68% of Company A aerodrome diagrams with Hot spots are judged to be Good or Very Good. 14% of these diagrams are judged to be of Low or No effectiveness. However, this is limited by the information supplied by the source supplier on the AIP diagram. The final table (5.1.4) therefore makes a comparison between the AIP and the commercial diagrams.

5.2.2 Comparison of commercial aerodrome diagrams with AIP diagrams

Commercial product More effective than AIP	27	57%
About the same effectiveness	14	30%
Commercial product Less effective than AIP	6	13%

87% of the Commercial products were judged to be better or at least as good as the AIP products. 60% were judged to be an improvement in effectiveness.

6. CONSISTENCY

The members of SISG expressed concern that information aerodrome charts produced by commercial providers do not always include any or all of the Hot Spot information from the AIP.

The study found that the Company A commercial product reproduced all of the information available from the AIP on 43 of the 47 examples. In three out of the remaining four examples, the commercial product had more information or more accurate information. In only one case was a part of the available AIP information not transposed onto the commercial product. Thus, in all but one occasion the commercially produced product reproduced or improved on the AIP information.

The study also found that the format and presentation of Hot Spots was consistently applied in Belgium/Luxembourg, China, France, United Kingdom and USA. In all other states there was variation between individual airports.

7. BEST PRACTICE

The study noted the following styles of presentation that seemed to provide clarity and effectiveness of Hot Spot information.

■ Each Hot Spot depicted by a clear bright red circle and joined to a red label box e.g. HS1

■ Large tabulated textual information elaborating the action required of pilots in and around the Hot Spot. This may be on the main aerodrome diagram or on the obverse page if clarity is best served.

■ The use of additional graphical boxes depicting the Hot Spots in greater detail. These additional boxes should be physically linked by lines or arrows to the Hot spot on the main diagram, if possible.

■ Where the aerodrome diagram would otherwise be too cluttered to present Hot Spots effectively, the use of specific Hot Spot pages can be effective.

■ The use of a colour-coded format which assists the depiction of runways, Hot Spot areas and normal taxiways.

8. CONCLUSIONS

The members of the SISG voiced the concern that the AIP versions often only describe the Hot Spot and do not provide any additional explanatory information to help with pilot understanding/awareness of why the Hot Spot is there and what actions they can take to mitigate the associated risk.

1. The study found that 18/76 (24%) of airport diagrams had no Hot Spot information at all. This included at least three European capital city airports with multi-runway operations.

2. The study found that of those airports that did have Hot Spot information on their AIP charts, only 39% were judged to be effective or very effective. Effectiveness, in this case, being a combination of presentational clarity and usefulness of the information. However 45% of airport AIP charts were judged to be of no or low effectiveness.
    The members of the SISG voiced a concern that the aerodrome charts produced by commercial providers (which are used by pilots) do not always include any or all of the Hot Spot information from the AIP.

3. The study found very little evidence to support this concern. In the vast majority of cases the information shown on the AIP diagram was copied exactly by the commercial provider. There are a few cases where the information supplied is actually greater or more accurate. On only one occasion did the commercial product factually miss available information.

4. Comparing and contrasting the commercial product with the AIP diagrams, it was judged that 57 % of commercially produced diagrams were of higher effectiveness than the AIP charts. 13% of commercial products were judged to be of less effective than the relevant AIP chart.
    The members of the SISG wished to be informed as to the process of transposing change information from a source supplier to the publication of the revised document/data.

5. One of the principal commercial suppliers was able to demonstrate a process which receives information from a global network of 246 worldwide providers. A total of around 35,000 source pages are notified for amendment at each monthly AIRAC cycle. The company refers back to the data source provider issues for clarification around 220 times per cycle (1 in 2000). The output involves 270,000 database changes every month. Non-conformity/error issues are subsequently flagged up in 1 in 200 new charts/data files. When significant discrepancies are found notification is made by periodic Nav data/chart alerts before the next cycle.
    Accepting that the operational system requirements to cope with such a workload are massive, it may be considered that a non-conformity/error rate of 0.5% is rather high in a safety critical industry.

6. The study has found five examples of suggested best practice that singularly or in combinations may improve the visibility and quality of Hot Spot information and which are recommended for consideration by SISG members.

APPENDIX: Review of each AIP Aerodrome Diagram and its commercial counterpart

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Australia AIP	Sydney/Kingsford Smith Aerodrome Chart	2 black hatched squares with a line from the appropriate text box	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: CAUTION RWY INCURSION HOT SPOT	The squares on the main chart are hard to find, being in light black broken lines. The text boxes are bold and clear.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Perth Aerodrome Chart	Nothing on chart apart from an arrow and a line from a text box	Expanded picture of the Hot Spot showing holding points and taxiways. TWY N holding point is highlighted. Only text is: RWY INCURSION HOT SPOT	Nothing on main chart apart from and arrow from the text box. The text box is bold and clear.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Darwin Aerodrome Chart	Nothing on chart apart from 4 arrows and lines from text boxes	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: RWY INCURSION HOT SPOT	Nothing on main chart apart from the arrows from the text box. The text boxes are small and do not stand out.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Adelaide Aerodrome Chart	1 black hatched square with an arrow and a line from the text box.	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: CAUTION RWY INCURSION HOT SPOT	The square on the main chart would be hard to find, being in light black broken lines if the arrow and line from the text box was not there. The text box looks the same as other areas on the chart that are highlighting something else.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Belgium and Lux AIP	Luxembourg Ground Movement Chart App2: Hot Spots	Large red square with broken lines over taxiway/holding point for intermediate departures. Expanded coloured graphic box, but no linked text. Small stand-alone box with text.	One text box which only says "Explicit runway crossing clearance is required".	Dedicated HS page helps clarity. The expanded graphic is clear and the text box, once found is clear – but on opposite corners	Okay: Good for having a dedicated page and the graphic good. The text however is on the opposite corner and not very informative.
Company A	Luxembourg	Same as Ostend	Text is copy of AIP	Clear enough but no specific HS legend.	Less: (L) No labelling of HS circles and no boxes around text. No specific HS legend. What is there is quite clear.
Belgium and Lux AIP	Oostende-Brugge Aerodrome Chart App1: Hot spots	Same as LUX except that there some text under each expanded graphic.	Same as LUX plus a little extra under each graphic. Example: Confusing point multiple exits.	Same as LUX plus clear text under each box.	Good: Better than LUX due to extra text generic under each extended graphic.
Company A	Ostend	Three red circles to match the AIP entry. No labels but red arrows to text. No expanded graphic. The Parking chart does not show the HS that relates.	Text is copy of AIP	Clear enough but no specific HS legend.	Less (0): No labelling of HS circles and no boxes around text. No specific HS legend. What is there is quite clear.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Australia AIP	Sydney/Kingsford Smith Aerodrome Chart	2 black hatched squares with a line from the appropriate text box	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: CAUTION RWY INCURSION HOT SPOT	The squares on the main chart are hard to find, being in light black broken lines. The text boxes are bold and clear.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Perth Aerodrome Chart	Nothing on chart apart from an arrow and a line from a text box	Expanded picture of the Hot Spot showing holding points and taxiways. TWY N holding point is highlighted. Only text is: RWY INCURSION HOT SPOT	Nothing on main chart apart from and arrow from the text box. The text box is bold and clear.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Darwin Aerodrome Chart	Nothing on chart apart from 4 arrows and lines from text boxes	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: RWY INCURSION HOT SPOT	Nothing on main chart apart from the arrows from the text box. The text boxes are small and do not stand out.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Australia AIP	Adelaide Aerodrome Chart	1 black hatched square with an arrow and a line from the text box.	Expanded picture of the Hot Spot showing holding points and taxiways. Only text is: CAUTION RWY INCURSION HOT SPOT	The square on the main chart would be hard to find, being in light black broken lines if the arrow and line from the text box was not there. The text box looks the same as other areas on the chart that are highlighting something else.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Belgium and Lux AIP	Luxembourg Ground Movement Chart App2: Hot Spots	Large red square with broken lines over taxiway/holding point for intermediate departures. Expanded coloured graphic box, but no linked text. Small stand-alone box with text.	One text box which only says "Explicit runway crossing clearance is required".	Dedicated HS page helps clarity. The expanded graphic is clear and the text box, once found is clear – but on opposite corners	Okay: Good for having a dedicated page and the graphic good. The text however is on the opposite corner and not very informative.
Company A	Luxembourg	Same as Ostend	Text is copy of AIP	Clear enough but no specific HS legend.	Less: (L) No labelling of HS circles and no boxes around text. No specific HS legend. What is there is quite clear.
Belgium and Lux AIP	Oostende-Brugge Aerodrome Chart App1: Hot spots	Same as LUX except that there some text under each expanded graphic.	Same as LUX plus a little extra under each graphic. Example: Confusing point multiple exits.	Same as LUX plus clear text under each box.	Good: Better than LUX due to extra text generic under each extended graphic.
Company A	Ostend	Three red circles to match the AIP entry. No labels but red arrows to text. No expanded graphic. The Parking chart does not show the HS that relates.	Text is copy of AIP	Clear enough but no specific HS legend.	Less (0): No labelling of HS circles and no boxes around text. No specific HS legend. What is there is quite clear.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Belgium and Lux AIP	Brussels Ground Movement Chart App4: Hot spots	Same method as Lux and Ostend. 4 red squares with large lines and arrows pointing to appropriate expanded graphic. Each graphic has text close by.	Same as Oostende. Good coloured expanded graphics with simple text. Example: Confusing runway entry. Make sure to line up on the correct runway.	Dedicated page. Colour of expanded graphics sometimes makes letters/numbers hard to read.	Good: Dedicated page and clear graphics but choice of colour makes text a little hard to read. Text is somewhat generic.
Company A	Brussels	Red Circles with lines to clear HS1, HS2 etc labels Large HS Text Box in corner In addition Parking Charts show close hot spots and HS textbox.	Text Box repeats the wording of the AIP. The additional HS circles on the Parking chart simply refers back to previous for description of the HS	Very clear. Good use of Red on main chart. The expanded graphic on the parking chart is clearer than the AIP version as it is in grey taxiway, black writing.	Better (VG): Slightly better than the AIP as the colours and text are clearer especially on the Parking charts.
Company B	Brussels	Black squares generically labelled HS and a number to a key in a legend box. There is no specific "Runway Hot Spot" textbox	The text repeats the wording of the AIP. However the Hot Spot labelled HS1 by the AIP and Company A, for example, is annotated as HS2.	Very unclear. The Hot Spots are all just labelled as HS not individually. Each one has a number which not the number of the Hot Spot, it is a key to a statement elsewhere.	Good: Dedicated page and clear graphics but choice of colour makes text a little hard to read. Text is somewhat generic.
Belgium and Lux AIP	Liege Ground Movement Chart app2: Hot Spots	Same method as Brussels. 4 red squares with large lines and arrows pointing to appropriate expanded graphic. Each graphic has text close by Same format for all Belgian airports.	Same as Brussels. Coloured expanded graphics with simple text. Example: Confusing point: Crossing of runway S3 and C3 not aligned.	Dedicated page. Colour of expanded graphics sometimes makes letters/numbers hard to read..	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
China AIP	Shanghai/Hongqiao Aerodrome Chart	4 red circles on chart labelled HS1-HS4	No text box. Item in Legend Notes in Red HS1-HS4: Hot spots	The note is clear text	Nil: No textual explanation of why each Hot Spot exists. They are all runway crossing points at intersections, but no text.
China AIP	Qingdao/Liuting Aerodrome Chart	7 red shapes (circles, boxes and corners of apron) on chart labelled HS1-HS7	No text box. Item in Legend Notes in Red HS1-HS7: Hot spots	The note is clear text	Nil: No textual explanation of why each Hot Spot exists.
China AIP	Kunming/Changshui Aerodrome Chart	6 red shapes (circles, boxes) on chart labelled HS1-HS6	No text box. Item in Legend Notes in Red HS1-HS6: Hot spots	The note is clear text	Nil: No textual explanation of why each Hot Spot exists.
China AIP	Xiamen/Gaoqi Aerodrome Chart	3 red circles on chart labelled HS1-HS3 Same format for all China airports	Nil		Nil: No textual explanation of why each Hot Spot exists.
Czech Republic AIP	Brno Aerodrome Chart	No HS information as such. There is however a square box of a complicated runway entry/crossing, which is expanded in a text box. This could have been labelled Hot Spot	No text box. Item in Legend Notes in Red HS1-HS3: Hot spots	The note is clear text	Low: No HS information as such. However one runway entry/crossing area is highlighted and expanded.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Company A	Brno	Repeats AIP entry including expanded graphic			Same (L)
Czech Republic AIP	Pardubice Aerodrome Chart	Nil			N/A: No HS information
Czech Republic AIP	Praha Aerodrome Chart	4 faint rectangles, two of which overlap. Labelled HS1 to HS4	Small statement in corner of chart "HS1-HS4 see backside of this page"	Difficult to identify the Hot spots on the main chart, but the expanded views overleaf are very good.	Good: The small statement on the main chart could be missed – but the information overleaf is large, clear and useful.
Company A	Prague	6 clear rectangles (edition is 8 months later than the AIP copy)	Clear. Repeat of AIP in a different font and colour.	Very clear	Better (VG)
Company B	Prague	6 clear rectangles, labelled HS1-HS6.	Clear. No specific HS text box. No detail for Hs 2 at all.	Clear	Same (G) Clearer graphic but text is less easy to find.
Denmark AIP	Kobenhavn/Kastrup Hot Spots Chart	Dedicated page for Hot Spots. 1 red circle with red line to text box, which is also in red outline.	Text: Caution to taxi speed should be exercised after vacating RWY 22L via rapid exit TWY B4. Due to risk of taxiway excursions be aware that the curved part of TWY B4 is designed for max 15 KT in dry conditions.	Very clear and large text.	Very Good: Dedicated Hot spot page. Whilst only 1 HS the format and text is very good.
Company A	Copenhagen	Company A format. Clear red circle with line to HS box. Legend hot spot box.	Example: HS2: When cleared to rwy 13 via holding point on Twy A, do not enter Twy E4	Very good.	Better (G); Text is in English and very clear. No expanded graphic but main chart is clear enough.
Denmark AIP	Odense Aerodrome Chart	No HS information given			N/A No HS information
Denmark AIP	Aalborg Aerodrome Chart	No HS information given			N/A: No HS information
Espana AIP	Malaga Ground Movement Chart	Black circles with lines to expanded graphics. Green =Taxiway. Yellow=Caution Area. Red=Runway. **This could be a best practice**	Text in free space. Spanish only. Example: PRECAUCION: AL SER INSTRUIDO A RODAR VIA TWY A A PUNTO DE ESPETA DE PISTA 13/31. NO ENTRAR EN TWY E4INCURSION EN PISTA.	Clear apart from only Spanish.	Good: Clarity is good. Graphics are good.Text appears to be useful if only in Spanish
Company A	Malaga	Company A format of red circles and HS boxes. No expanded graphic but text is in English	Example: HS2: When cleared to rwy 13 via holding point on Twy A, do not enter Twy E4	Very good.	Better (G); Text is in English and very clear. No expanded graphic but main chart is clear enough.
Espana AIP	Palma de Mallorca Ground Movement chart	Same as Malaga.	Same as Malaga. Example HS2: Rodando por south, continue siempre por TWY LINK	Same as Malaga.	Good: Clarity is good. Graphics are good. Text appears to be useful if only in Spanish. Separate diagrams for east and west ops.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Company A	Palma	Same as Malaga.	Same as Malaga.	Same as Malaga.	Same (G): Text is in English and very clear. No expanded graphic but main chart is clear enough. Only one chart.
Company B	Palma	Black circles with individual HS1-HS3 labels	Taxiing on TWY LINK always continue on TWY SOUTH	As good as Company A	Better (VG): Better than AIP as text is in English and very clear. No expanded graphic but main chart is clear enough. Separate charts for east and west.
Espana AIP	Madrid Barajas Ground Movement Chart	Hot Spots are shown on main chart as Red rectangles and labelled HS1-HS7. Nothing else on main chart. Dedicated hot spot pages for North and South configurations. Very detailed expanded graphics. Text in Spanish and English	The expanded graphics show correct routing in Green. Conflicting traffic in yellow and incorrect routing in Red. **This could be a best practice.** Text Example: Aircraft taxiing by M10 and A10, without contact with next unit MUST STOP at transfer point M10-2 and A10-2.	Each diagram is very clear. Good use of colours. But, not easy to quickly see which page to be looking at.	Very Good. Dedicated pages. 2 Hot spots per page, so very large. Text in Spanish and English. Good use of correct and incorrect routing depictions.
Company A	Madrid	Hot Spot page showing HS for both configurations. Text in English Hot Spot page showing HS for both configurations. Text in English	Big text boxes in very clear English	Big text boxes in very clear English. However because only small area of airport is shown for each, it is only easy to orientate.	Less:(G) perhaps not as clear as AIP which is spread over several pages. Dedicated HS page is good practice
Finland AIP	Rovaniemi Aerodrome Chart	3 large circles, filled orange. Arrows to each one labelled Hot Spot 1 etc.	Text box . Text Hot Spot 1&2 "Crossing military aircraft and vehicles. An explicit crossing clearance must be received before proceeding over the runway. Hot Spot 3 "Observe taxiway lights separating TWY T and civil apron"	Very clear text if a bit small and not bolded	Good: some useful information, not just token circles at runway HPs.
Company A	Rovaniemi	Company A format. Clear red circle with line to HS1-HS3 boxes. Large clear legend.	Copy of AIP	Very clear	Better (VG). Copy of AIP but depicted even more clearly.
Finland AIP	Oulu Aerodrome Chart	Same format as Rovaniemi. One filled circle, labelled hot spot 1.	Text box. Text Hot Spot 1 "Crossing military aircraft and vehicles. An explicit crossing clearance must be received before proceeding over the runway.	Very clear text although box is not connected to the HS1 circle.	Good: some useful information, not just token circles at runway HPs.
Company A	Oulu	Company A format. Clear red circle with line to HS1 box. Large clear legend.	Copy of AIP	Very clear	Better (VG). Copy of AIP but depicted even more clearly.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Finland AIP	Helsinki Aerodrome Chart	Same format as Oulu. 4 large filled circles, labelled 1 to 4.	Text box. Example Hot spot 3. "Wide APN. Make sure of correct turn before runway when taxiing for RWY 04R"	Writing is clear but small.	Okay: The whole chart is cluttered, trying to get lots of information on 1 page. The text for HS3 could be more explicit – it is only for acft on the eastern aprons, hdg northwest. Would be better to mention Turn right on Taxiway Z at corner of the apron.
Company A	Helsinki	Same Company A format. Red circles and lines to labels in boxes. Large Hot Spot on separate page together with TORAs etc.	Text is copy of AIP	Very clear. Putting the HS on a separate page is helpful	Better (VG) than the AIP. Much less cluttered by using two pages.
France AIP	Dijon Longvic Ground Movements Chart	Uses Company A format of 2 small red circles with short line to HS1 –HS2 squares. Legend has the red circle annonated as "Point chaud/Hot spot" Repeated on Ground Movements Chart. GMC chart has CAUTION text box, but not linked to circles.	The Text box is written in French and English. Example " Intersection between road and RWY 01/19.	Writing is French (normal script) then English (italics).	Good: Hot spot circles are clear. Need to turn page to find text.
Company A	Dijon	Company A format. Chart and Hot Spots legend all on same page.	Text as per AIP in English		Better (VG): Same as AIP but on one page, saving having to turn over
France AIP	Lille Lesquin aerodrome Chart	1 small red circle labelled HS. Text box in clear space but not linked to the circle	The Text box is annotated HS in Red. It is written in French and English. "TWY leading to RWY: risk of incoming in RWY02/20 if holding point P5 not followed".	Writing is French (normal script) then English (italics).	Good: Hot spot circles are clear. Text boxes are clear but not linked to circles.
Company A	Lille	Same format as Dijon, using the Company A system.	Text as per AIP in English	Good	Same (G): AIP chart is slightly larger and therefore clearer.
France AIP	Paris le Bourget ground Movement Chart	Same format as Dijon. 5 small red circles labelled HS1-HS5 on main Aerodrome chart. Legend has the red circle annonated as "Point chaud/Hot spot" Repeated on Ground Movements Chart. GMC chart has CAUTION text box, but not linked to circles	The Text box is written in French and English. Example " Confusion risk between thresholds 07 and 09.	Writing is French (normal script) then English (italics).	Very Good: Hot spot circles are clear. Text boxes are clear not linked to circles. However on large airport lines would be counter-productive.
Company A	Le Bourget	Same comments, with use of the Company A format	Text as per AIP in English	Good	Same (VG).

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Germany AIP	Berlin/Schonfeld Aerodrome Chart	Same format as Koln. 4 Red circles with their number besides.	No text box, just a list of 4 small statements at the bottom of the Supplementary list. Examples 1. Confusion TWY intersection east of TWY Centreline lighting. 3. TWY D/Entry Ramp4 Crossing helicopters from/to HP North	No box. Very small print.	Low: The whole chart is very difficult to read. There is more prominence given to the "under construction" bit than the live airfield. There is at least some text to indicate the issue at each Hot Spot, but no expanded view of the "confusing taxiway".
Company Apesen	Berlin Schonfield	4 clear red circles with lines to labels within boxes. Prominent HS text box with clear text.	Text is copy from AIP	Very clear. No expanded boxes to help with the "confusing twys"	Better (O): Better than the AIP. Very clear, but No expanded boxes to help with the "confusing twys".
Germany AIP	Dusseldorf Aerodrome Chart	At least there is consistency across all 4 German charts.	No text box. A tiny statement in a space "Attention Checkpoints. Do not cross without a clearance"	No box. Tiny print.	Nil: Difficult to find, difficult to read and finally of no value (just not to cross without a clearance)
Company Apesen	Dusseldorf	Same Company A format. Red circle with line to label box. Dedicated HS textbox. In addition point is well marked on the Parking chart.	Slightly different from AIP. "Clearance limit, when instructed by ATC"	Very clear, taking into account of the Parking chart	Better (O) than the AIP. Very clear.
Germany AIP	Koln/Bonn Aerodrome Chart	Similar to Hamburg. Red circles on chart with a number 1 or 2 beside it. The numbers are white in red circles.	No text box, just a small statement showing the number 1 and 2 plus text " Confusing TWY when crossing RWY. Explicit RWY crossing clearance required"	No box. Tiny print. One plus point for the labelling in red circles with white print.	Nil: Difficult to find, difficult to read and of little value. If the taxiway is confusing – show an expanded view
Company Apesen	Cologne-Bonn	Same format as Berlin. HS circles and lines to red label boxes. Large Hot Spot Text Box	Text is copy of AIP plus a caveat (for information only, not to be construed as ATC instructions)	Very clear. No expanded boxes to help with the "confusing twys"	Better (O) than the AIP. Very clear, but No expanded boxes to help with the "confusing twys".
Greece AIP	Athens/Venizelos Aerodrome Chart	No HS information	nil		N/A: **No HS information given for this airport despite having 4000m parallel runways and many RETs.**
Greece AIP	Kerkira Aerodrome Chart	No HS information	nil		N/A: No HS information given for this airport.
Greece AIP	Thessaloniki Aerodrome Chart	6 small black circles with small labels HS1 etc.	6 small text boxes. Example: HS2 Wide Opening. Where applicable make sure of correct turn from Apron to TWY F before RWY 10-28.	The text is small but clear. The HS circles on the chart are so small that searching for 6 took some time. difficult to spot and there is no link to the text boxes	Okay: Good attempt at providing 6 Hot spots, but boxes and text is too small.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Company A	Thessaloniki	Company A format with good Hot Spots legend	Text as per AIP, but bolder and clearer	Much clearer than Aip	Better (G): Much clearer than AIP
Hungary AIP	Budapest Aerodrome Chart	4 black square Hot spots with no labelling. There are lines leading to them from the 3 text boxes. The detail on the whole chart is very small in order to get it all on one page.	Boxes are very small with expanded graphics for the area. There is text underneath each box, but too tiny to read.	Impossible to read	Nil: Incredibly small writing, which is almost impossible to read – but seems to just say don't cross without a clearance.
Company A	Budapest	Company A red HS circles with arrows from text.	Text is large and clear. Example: Twys A1 and B1 confusing twys-verify the correct taxi route	Clear	Better (G): Larger and Clearer. Much better than AIP
Hungary AIP	Gyor Aerodrome Chart	No HS information	nil		N/A: No HS information
Hungary AIP	Heviz Aerodrome Chart	No HS information	nil		N/A: No HS information
Ireland AIP	Dublin Aerodrome Chart	Very small red circles around 4 holding points. All in the area of rwys 28 and 34 THR	Text box has very large red "RUNWAY INCURSION HOT SPOTS" It is just an expansion of the main chart with no text at all	The graphic is very clear, but no text.	Low: The expanded view of the runway holding points is useful in itself, but there is no text.
Company A	Dublin	Reproduction of the AIP. No expanded graphic.	Text box is not expanded.	Clear but no text.	Same(L). Copy of AIP information, but without the expanded graphic
Ireland AIP	Cork Aerodrome Chart	Two red circles at an intersection and a holding, which are presumably Hot Spots, but not indicated as such.	Hidden away in the legend is one line showing that a red circle is a RI hot spot.	No text box, no text	Nil: Just two small red circles on the chart. No dedicated text box, no text.
Company A	Cork	Clear red circle with line to Legend hot spot box. Attempt to follow Company A format but info is lacking on AIP.	Copy of AIP	Very clear	Better(G). Copy of AIP information, which is poor but it is depicted in a much better and consistent way.
Ireland AIP	Shannon Aerodrome Chart	No Hot Spots shown	nil		N/A: No HS information
Italy AIP	Rome Hotspot Map	Main chart has small hotspot circles in Red with lines to expanded detail and text	Example: Landing traffic on RWY16R-34L SHALL NOT VACATE ON RWY 07. Example: BE SURE TO BE NUMBER ONE WHEN INSTRUCTED TO LINE-UP AND CHECK TO THE RIGHT.	Very Good. The expanded detail boxes are very clear and detailed. The accompanying text boxes and in large red letters.	Very Good: Very clear detail and easy to follow.
Company A	Rome	Company A format on main chart plus one expanded graphic for the adjacent rwy 34 and 25 holding areas	The text is on separate page and is very clear.	Very good	Same (VG): Different style but at least as equally clear

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Italy AIP	Venezia Hotspot Map	Faint red circles or oblongs on main chart but very large and clear red arrows leading from HotSpot boxes to the point on the chart.	Example: When on departure sequence for RWY 04L, ATC may require to hold at IHP "**M1**".	Very Good: Expanded detail graphics with text in same box. The large arrows from each box are effective at pointing at the HotSpot.	Good: The boxes and the detail are clear, but not as good Rome. Use of IHP and RHP is not standard but presume mean "Intermediate Holding Position" and "Runway Holding Position"
Company A	Venice Hot Spot	Company A format of red circles and square HS boxes.	Dedicated Hot Spot page. Large Runway Incursion Hot Spots legend. One variation from AIP text: HS2: ATC may require to hold at intermediate holding point **M3**	Very Clear	Better (VG): Overall clarity is much better
Italy AIP	Verona HotSpot Map	Large red hatched boxes on chart with very large red arrows from HotSpot Boxes. In addition there is a general statement "Do not cross runway holding position unless cleared by TWR 118.650"	Each hotspot box has expanded graphic on the area but no text. There is a red dot to indicate where the stop bars are.	The expanded Graphics are very clear, but there is no text. The main picture is difficult to read due colour choice.	Low: There is no message other than not to cross the holding position unless cleared by ATC. The frequency is included, which is useful added information.
Company A	Verona	Company A format of red circles and square HS boxes.	Large Runway Incursion Hot Spots legend.	Clear	Better (O): Overall clarity is better, but could benefit from expanded graphics
Netherlands AIP	Eindhoven Aerodrome	Nothing on main runway chart. Separate box showing only holding points at both ends. No annotations.	CAUTION: DO NOT CROSS THE HOLDING POSITION MARKINGS WITHOUT A CLEARANCE	Not good. It takes a little while to assimilate the Hotspot graphic box as being both ends of the runway with the middle cut out.	Nil: Just a warning not to enter rwy without a clearance.
Company A	Eindhoven	Clear red circle with line to Legend hot spot box. Attempt to follow Company A format but info is lacking on AIP.	Copy of AIP	Very clear	Better (G). Copy of AIP information, which is light but depicted in a better and consistent way.
Netherlands AIP	Maastricht Aerodrome	Nothing on main runway chart. Separate box showing only holding points and intersections without rest of the runway	CAUTION: DO NOT CROSS THE HOLDING POSITION MARKINGS WITHOUT A CLEARANCE	Poor. It takes time to assimilate the Hotspot graphic box as being both ends of the runway and the intersections with the middle parts cut out.	Nil: Just a warning not to enter rwy without a clearance.
Company A	Maastricht	Clear red circle with line to Legend hot spot box. Attempts to follow Company A format but info is lacking on the AIP.	Copy of AIP	Very clear	Better (G). Copy of AIP information, which is light but depicted in a better and consistent way.
Company B	Maastricht	Clear black circles with generic HS labels. Isolated text box labelled as Caution.	The text is a copy of AIP	Clear but disjointed	Better (O) Copy of AIP information but presented in a better, if not optimum, way.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Netherlands AIP	Amsterdam Aerodrome Ground Movement	Main chart has boxes with arrows leading to the text box. No annotations. There are separate points labelled CAUTION 1-4 which are not Hotspots.	Example: DO NOT ENTER N3 WHEN INSTRUCTED TO TAXI VIA TWY B AT A14 OR A15 (NON STANDARD ROUTING)	Okay. It takes a little while to assimilate the format. The graphics within the text boxes are very good. Coloured red/yellow/green to denote rwy/ret/taxiway. Useful text explanations of the issue.	Good. The text explaining the Hot spots are good. Some improvements can be made to the actual hot spot on the chart as they are dotted black squares rather than clear red circles.
Company A	Amsterdam	Company A format. Clear red circle with line to HS1-HS4 boxes. Clear Hot Spots Legend box	Copy of AIP	Very clear	Better (VG). Copy of AIP but depicted more clearly.
Norway AIP	Trondheim Aerodrome	A black circle. Annotated HS1, in a text box.	ANGLED TWY. DIFFICULT TO SEE TRAFFIC ON FINAL RWY 09.	Good. Apart from it being all in Black. The HS1 box is clear and the RI box in the legend is very good.	Good. One holding point highlighted with a generic explanation of the problem.
Company A	Trondheim	Company A format. Only circle and HS box on main chart and text on next page	Same as AIP	Clear but text on apron diagram page which is unrelated	Less(O): Not as good as AIP as split over two pages and the text is on Ground page with no related graphic.
Norway AIP	Sandefjord Aerodrome	3 black circles. Annotated HS1, HS2,HS3	**1.** Holding position before RWY intersection. Short taxi distance from main apron. Angled TWY. Difficult to see traffic on RWY 36. **2.** Holding point before RWY intersection. **3.** Short taxi distance from main apron. Angled TWY. Difficult to see traffic on RWY 18.	Good. Apart from it being all in Black. The textboxes box are clear catch the eye.	Good for HS1 and HS3. Nil for HS2 is just a warning of a rwy holding point.
Company A	Sandefjord	Company A format. Only circles and HS boxes on main chart and text on next page	Same as AIP	Good but split over two pages	Same (G): Split over two pages maybe unnecessary.
Norway AIP	Oslo Aerodrome Ground Movement	4 black circles. Annotated HS1, HS2,HS3, HS4	**1.** Angled TWY. Difficult to see traffic on final. **2.** Installed TWY C?L LGTS on C1 and A4 indicates direction to the RWY C/L. Caution must be exercised when instructed to cross RWY fm C1 to A4 and vice versa due to lack of visual aids. **3.** TWY V leading directly to a RWY intersection. Caution must be exercised when approaching the holding point A6. **4.** Angled TWY. Difficult to see traffic on RWY 01L.	Very Good. Apart from it being all in Black. The textboxes box are clear catch the eye.	Very Good for HS2. Detailed explanation. Good for other three.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Company A	Oslo	Company A format. Only circles and HS boxes on main chart and text on next pagecircles are in Company A Red format	Same as AIP	Good but split over two pages	Same (G): Split over two pages maybe unnecessary.
Norway AIP	Oslo Aerodrome Ground Movement	4 black circles. Annotated HS1, HS2,HS3, HS4	**1.** Angled TWY. Difficult to see traffic on final. **2.** Installed TWY C?L LGTS on C1 and A4 indicates direction to the RWY C/L. Caution must be exercised when instructed to cross RWY fm C1 to A4 and vice versa due to lack of visual aids. **3.** TWY V leading directly to a RWY intersection. Caution must be exercised when approaching the holding point A6. **4.** Angled TWY. Difficult to see traffic on RWY 01L.	Very Good. Apart from it being all in Black. The textboxes box are clear catch the eye.	Very Good for HS2. Detailed explanation. Good for other three.
Company A	Oslo	Same as AIP except circles are in Company A Red format	Same		Same (VG), as per AIP ground chart
Portugal AIP	Faro Aerodrome Chart	No HS information	Nil		N/A: No HS information
Portugal AIP	Lisbon Aerodrome Ground Movement	All in boxes. Intersections expanded and shown in boxes. Colour coded. Green = Taxiway Yellow = Caution Area Red = Runway	Box with yellow fill. **1.** CAUTION DO NOT CROSS/ENTER RWY WITHOUT ATC CLEARANCE. **2.** WHEN TAXIING ON RWY 35 APPROACHING TWY U2/U3 CAUTION RWY03/21 IS AHEAD	Poor. The presentation is extremely confusing. There is no immediate link between the boxes and points on the chart.	Low. There is some useful information but it is difficult to interpret it in real time.
Company A	Lisbon	Company A fomat with a clear separation Hot Spots text box on main page		Very clear	Better (G): Much cleared than the AIP
Portugal AIP	Porto Aerodrome	A black circle around one intersection but no annotation	Within a box labelled LEGEND there is a row "Runway incursion Hot spot". This only shows that a black circle is a Hot spot. No text.	Poor. Refer to legend.	Low. One intersection is highlighted, others are not. However, no indication why.
Company A	Porto	Company A format with Runway Incursion Hot Spot text box.	**Additional Text.** Act landing rwy 17 must not vacate at F or A3 unless cleared by ATC.	Very clear	Better (G): Clear presentation and more text than AIP
Poland AIP	Krakow Aerodrome Chart Krakow Hot Spots	No HS information. Separate chart. One rectangle in Red on Apron	Nil Textbox " Part of ground movement area invisible form TWR"	Very clear	N/A: Nothing near runways.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Poland AIP	Poznan Aerodrome Chart	No HS information	Nil		N/A: No HS information
Poland AIP	Warsaw Aerodrome	Circle on intersection and then a larger expanded view	No box. Clear but small red text. EXTREMELY DANGEROUS Do not miss STOP BAR on TWY A4 and M3	Good due to Expanded view of Hot Spot. Line and arrow to/from text to chart.	Okay: Specific message for one intersection only. High attention language "Extremely Dangerous". Could be more explicit e.g.when taxying for rwy 33 departure.. rwy 29 ahead.
Company A	Warsaw	Company A format at HS. Large Runway Incursion Hot Spots text box	Large and clear – but – does not include M3. No expanded graphic.	Clearer than AIP	Same (0) in that it retains AIP text but shown more clearly. **However, text re taxiway M3 is missing.**
Company B	Warsaw	Company B format of black circles and labels. Small text box with Hot Spot information, but not labelled as such.	No use of "Extremely Dangerous" and no reference to M3	Information is clear	Less (P) It has dropped the urgency of "Extremely Dangerous". It does not reference M3 and has no expanded graphic.
Romania AIP	Bucharest Aerodrome Ground Movement	No HS information	Nil. No expanded graphic		N/A **No HS information Despite 3500m parallel runways**
Romania AIP	Constanta Aerodrome Chart	No HS information	Nil.		N/A No HS information
Romania AIP	Timisoara Aerodrome Chart	One red circle labelled HS1 on exit from Apron. Hot Spot row in legend. Small HS text box in corner	Small box easily missed. Act exiting TWY L and entering APRON must turn left.	Clear but small and not connected	Low: Clear circle but no information
Company A	Timisoara	Company A format. With separate Hot Spots section in legend.	Same as AIP but easier to spot and bigger.	Cleared than AIP	Better (0): same information but better presentation
Slovenia AIP	Ljubljana Aerodrome Chart	No HS Information	Nil	Very clear	N/A No HS information
Slovenia AIP	Maribor Aerodrome Chart	No HS Information	Nil	Very clear	N/A No HS information
Slovenia AIP	Portoroz Aerodrome	Circles annotated HS1, HS2 Large and clear RWY Incursion hot spot legend	TWY A holding point! Caution DO NOT ENTER THE ACTIVE RWY WITHOUT ATC CLEARANCE	Good. Red on both chart and text.	Low. Very clear but just a warning not to enter rwy without a clearance.
Company A	Portoroz	Company A format. Large Legend	As per AIP but in addition at HS1: **Caution: markings poorly visible.** Do not enter the active rwy without ATC clearance.	Very clear	Better (G): Additional information

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Sweden AIP	Stockholm/Arlanda Hotspot Chart	Two dedicated hotspot charts. Small insets to show where on the airport the expanded chart is located. Full page each showing taxiways, holding points and arrows from text boxes	Apron exit instructions: Example "For exit Apron D use UC for stand 66-69" Taxi instructions " Taxi to holding point Y1 from TWY Z via U and Y.	Good. One small confusion is that there are insets of whole airport but they are aligned differently i.e N/s and E/W. It took unnecessary time to orientate the two hotspot charts.	Very Good: Whole pages devoted to hot spot charts. More text could have been helpful, given the large amount of space available.
Company A	Arlanda	HS squares shown on aerodrome chart but no expanded graphic	No text other than a generic Company A format box in the legend.	Poor	Less(G) less helpful than AIP as no expanded graphic to help.
Sweden AIP	Visby Aerodrome Chart	2 black Hot Spot (one circle & one rectangle) on main chart. Labelled HOT SPOT. No text	In Legend area there is one Hot Spot area expanded to show taxiways and holding points clearly. No text. No information on other hot spot.	The graphics are clear, but no information.	Low: One HS has no information at all. The other HS has just an expanded graphic of the area.
Company A	Visby	Reproduction of AIP circles	No text other than a generic Company A format box in the legend.		Same (L)
Sweden AIP	Angelholm Aerodrome Chart	1 circle in black labelled "HOT SPOT Holding Point RWY 14"	No box. No text	Nil	Nil: Nothing apart from a circle on the main chart. No information given.
Company A	Angelholm	Same as Visby			Same (N)
Switzerland AIP	Bern Aerodrome Chart	No HS Information	Nil		N/A No HS information
Switzerland AIP	Zurich Aerodrome Ground Movement Chart	2 separate charts for Apron South and Apron North. South: 3 black circle found, which has no annotation. North: same	At bottom of Legend. Black circle labelled RWY Incursion HOTSPOT. Text "ACT taxiing to RWY 28: be aware of sharp right turn from TWY E or F to TWY A" "ACFT taxiing on TWYe or F northbound. Be aware of RWY AHEAD"	Circle on main chart is not obvious and is not labelled. The text at the bottom of the legend is clear.	Okay: Dedicated page for Ground Movement so room for detail. However, no expanded graphic box, no clear text box. The information that is given is good.
Company A	Zurich	Company A format with large Runway Incursion Hot Spot text box	Same text as AIP	Clear but no expanded graphic	Better (G): Despite all being on one page, presentation of HS is better than AIP
Switzerland AIP	Geneva Aircraft parking/docking Chart	2 separate charts for Area South and Area North. South: Nothing found on main chart but 3 large hot spot graphics underneath. North: 2 large black circles with no labelling.	South: Three HS but all called HS2: the expanded graphic boxes are good but text just says: "DANGER Potential Conflict with traffic on Outer TWY". North: 2 Circles called HS1 in Legend with some text covering both, regarding proximity to a grass runway and its approaches.	Circle on main chart are clear for one but completely absent on the other. The text is clear.	Okay: Dedicated page for Ground Movement so room for detail. Expanded graphics on one page but nothing useful. The other page does have good information but lacks clarity.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Company A	Geneva	Follows the information in AIP	Large Hot Spot box with text repeated from AIP	Very clear	Better (G): Information from AIP is not good, but Company A presentation is clearer and larger.
Turkey AIP	Istanbul Aerodrome Chart	8 small red circles on main chart. No labelling. No text.	In Legend is shown small red circle = Hot Spot.	Circles are difficult to find and no information on their meaning.	Nil: No information other than a circle.
Turkey AIP	Istanbul/Sabiha Gokcen Aerodrome Chart	2 red circles, labelled Hot Spot 1-2. Neither of them are adjacent to a runway.	Nil	Poor	Nil: Just two faint red circles on a chart. No text.
UK AIP	Manchester Aerodrome Chart	2 filled circles. Two small text boxes. No linl between circles and boxes.	Example: HS1 Hold Z1 has dharp turn from TWY V. Markings and stopbar lights may not be visible until close to the junction.	Size of boxes are unnecessarily small so writing is small	Good: Same as Stansted. Apart from the text boxes being split into one HS each. Writing small. Information however is excellent.
Company A	Manchester	Company A format. Clear red circle with lines to HS1-HS2 boxes. Large clear legend.	Copy of AIP	Very large text and very clear	Better (VG). Copy of AIP but depicted even more clearly.
UK AIP	Aberdeen Aerodrome Chart	1 filled circle and one text box.	Text " Longer distance between holding point and runway than at other holds due to taxiway angle. Low winter sun may produce glare when approaching holding point.	size of box is unnecessarily small with consequent very small writing.	Good: Same as Stansted. Good information, but text is very small.
Company A	Aberdeen	Company A format. Clear red circle with line to HS1-HS4 boxes. Legend on separate page	Copy of AIP	Very clear	Better(VG). Copy of AIP but depicted even more clearly.
UK AIP	London Heathrow Aerodrome Chart	3 filled red circles and red text boxes.	Example "Pilots are to maintain a good lookout at all times and are responsible for wing tip clearance"	Same as Aberdeen	Okay: Same as Stansted but the text information is generic.
Company A	Heathrow	Company A format. Clear red circle with line to HS1-HS3 boxes. Legend on separate page All UK airports have same format	Copy of AIP	Very clear	Better (G). Copy of AIP but depicted even more clearly.
Ukraine AIP	Kyiv Boryspil Runway, Taxiway Markings and Hot Spots Chart	6 red HS circles labelled 1 -6. Red arrow leads from text box for each.	Clear text in each box. Example: Use caution when taxiing TWYs 9,10 and 18.	Clear text	Good: dedicated page for cautions and Hot spots is good. The clarity is good. The value of the information is limited to just exercise caution.
Company A	Kyiv Boryspil	Standard Company A format with large hot Spot legend on separate page	Same as AIP		Same (G): Good replica of AIP.

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
Ukraine AIP	Kyiv Antonov Aerodrome Chart	No HS information	Nil		N/A: No HS information
Ukraine AIP	Odesa Aerodrome Chart	No HS information	Nil		N/A: No HS information
USA FAA AFD	Boston Logan Airport Diagram	4 small Brown circles and short lines to brown rectangles labelled HS1-HS4. There is also a general caution note to be alert to runway crossing clearances and that readbacks of all runway holding instructions are required.	No text box on Airport Diagram	The circles and rectangles on the chart are clear	Okay: Diagram only shows where the Hot spots are, no explanations, no expanded graphics.
	Text in AFD	Text on another page gives brief details for each Hot Spot	HS 1 Maintain vigilance when taxiing on Rwy 15L–33R approaching Rwy 04L–22R. HS 2 Maintain vigilance on Twy C when approaching Rwy 04L–22R. HS 3 Maintain vigilance on Twy E and Twy K when approaching Rwy 04L–22R. HS 4 Holdline on Twy B is further back than expected. Rwy 14 markings are not taxi markings, thus is confusing to where to hold short.	Text is clear but not on same page.	Separate page in AFD gives text details. Information is generally generic of the "beware runway ahead" type. One specific and useful HS4.
USA FAA AFP	Las Vegas Airport Diagram	Same as Boston. Apart from one additional expanded graphic of RWY 1L and 7L thresholds	Same as Boston. Apart from text over the expanded HS4 graphic. " Aircraft that depart full length on Rwy 7L and 1L must hold at the same hold line and must verify that they are departing from the correct runway.	Same as Boston. In addition, the one piece of extra text is clear	Good: Same as Boston but with one Hot spot (HS4) shown in expanded graphic with informative text.
	Text in AFD	Text for each HS on a separate page	HS 1 Exiting the ramp, use caution at Twy S not to cross the rwy holding position markings for Rwy 19L. Twy S intersects with Twy D, Twy Z, and Twy G, which require a turn to the north or south. HS 2 Exiting Rwy 01R–19L use caution not to enter Twy U, and avoid entering Rwy 01L–19R without authorization. HS 3 Exiting Rwy 01R–19L use caution not to enter Twy Y, and avoid entering Rwy 01L–19R without authorization. HS 4 Rwy holding position markings for Rwy 07L and Rwy 01L are co–located, and located north of Rwy 07L. Verify rwy heading and alignment with proper rwy prior to departure. HS 5 Twy D and Twy N intersection is not visible from the ctl twr.		Presentation split between the Diagram page and the text page. The text on the AFD page is specific to each HS and useful

Country & source	Chart	Detail on Chart	Detail in Textbox	Clarity	Effectiveness
USA FAA AIP	Palm Beach Airport Diagram	Same as Las Vegas 5 circles and accompanying rectangles HS1-HS5. In addition one piece of text of CAUTION near 10L threshold.	Same as Las Vegas. No expanded graphic but one piece of text. "Pilots are cautioned not to mistake Twy L for Rwys 10l/28R or 10R/28L	Same as Las Vegas	Okay: Same as Las Vegas. The text is quite good in intent but could be more explicit. For example: HS 2 Acft NW–bound on Twy F missing left turn onto Twy L. This could be Aircraft departing 10L via F and L must be vigilant to identiy the left turn onto L – Runway Ahead.
	Text in AFD	Brief text on separate page US airports all have same format	HS 1 Runway 10L hold short line on Twy L is located prior to the bend in the Twy. HS 2 Acft NW–bound on Twy F missing left turn onto Twy L. HS 3 Acft of the north ramps miss the turn onto Twy G. HS 4 Large pavement area at the intersections of Twy L, Twy L3, Twy E and the ramp may cause confusion.		

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