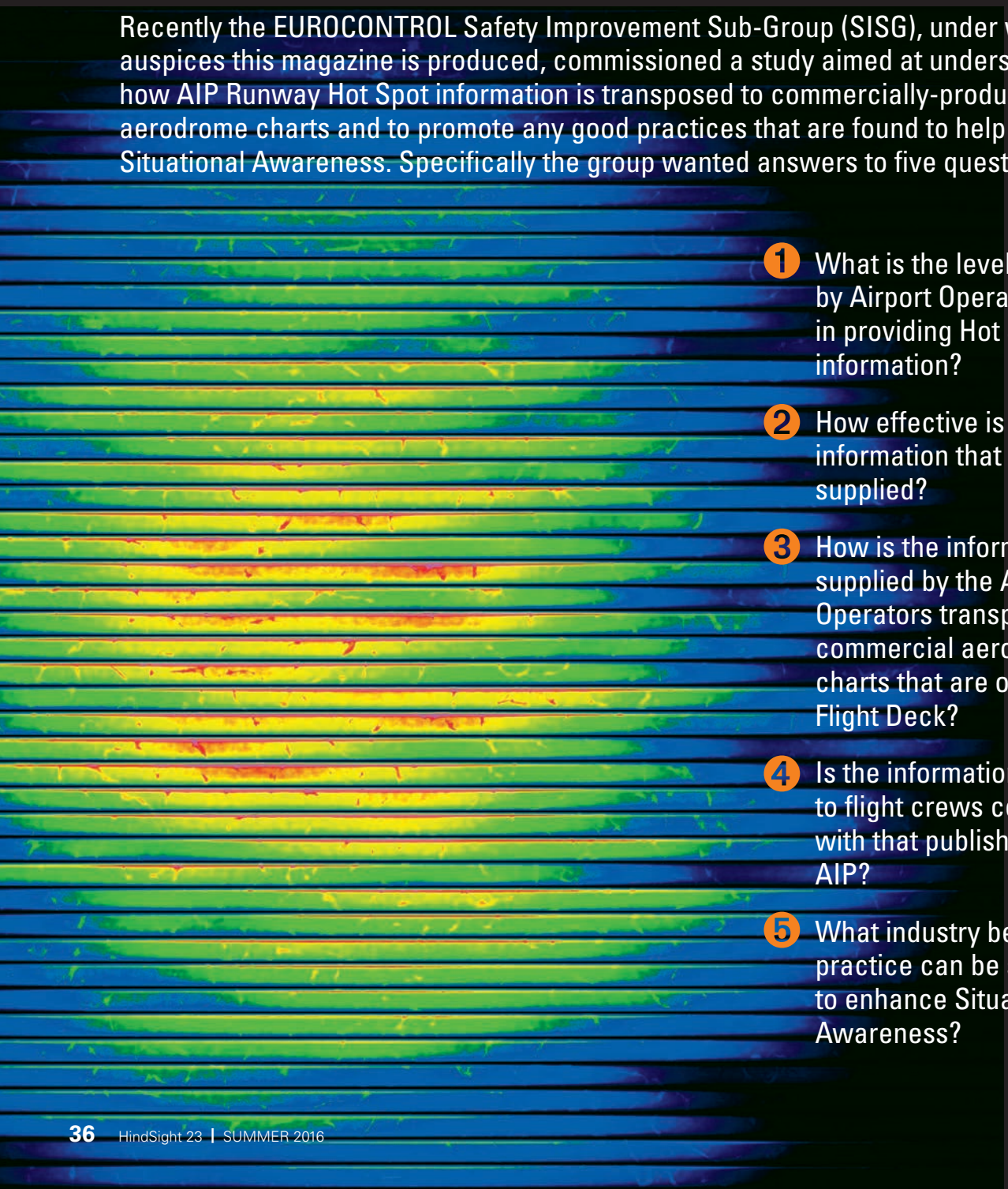
EFFECTIVE PRESENTATION OF AERODROME HOT SPOTS CAN ENHANCE SITUATIONAL AWARENESS AND REDUCE RUNWAY INCURSIONS

Recently the EUROCONTROL Safety Improvement Sub-Group (SISG), under whose auspices this magazine is produced, commissioned a study aimed at understanding how AIP Runway Hot Spot information is transposed to commercially-produced aerodrome charts and to promote any good practices that are found to help improve Situational Awareness. Specifically the group wanted answers to five questions:



1. What is the level of uptake by Airport Operators in providing Hot Spot information?
2. How effective is the information that is supplied?
3. How is the information supplied by the Airport Operators transposed to commercial aeronautical charts that are on the Flight Deck?
4. Is the information provided to flight crews consistent with that published in the AIP?
5. What industry best practice can be shared to enhance Situational Awareness?

Before we answer those questions, let's be clear about what we are talking about. What is an Aerodrome Hot Spot?

ICAO Doc 9870 defines a Hot Spot as:
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 Annex 4 lays down the criteria used to establish a hot spot on a chart and the symbols to be used.

ICAO PANS-ATM Doc 4444 states that many aerodromes have hazardous locations on taxiways and/or runways where incidents have occurred. Such positions are commonly referred to as "hot spots".

The 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.

Right, now we've got the legal bit out of the way, let us get back to the questions that were posed.

1 What is the level of uptake by Airport Operators in providing Hot Spot information?

The SISG study collected a sample of AIP aerodrome diagrams for 64 European airports, generally 3 per state. In addition a selection of AIP aerodrome diagrams from Australia, China and USA were reviewed as comparison at a global level.

It was found that almost 25% of airport diagrams had no Hot Spot information at all. Whether these airports genuinely had no Hot Spots to report or had not carried out the work is not known. However, this group included three European capital city airports with multi-runway operations.

2 How effective is the information that is supplied?

A review of the of airports that did have Hot Spot information on their AIP charts concluded that less than 40% were judged to be effective. Effectiveness, in this case, being a combination of presentational clarity and usefulness of the information. 45% of airport AIP charts were judged to be of no or low effectiveness. In some cases a symbol showing a Hot Spot is shown on the Airport Diagram but there is no 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 other cases the accompanying text simply states a generic message such as "Do not cross the holding point without an ATC clearance."

So clearly whilst the majority of airport operators have made a start, there is a lot more that we can do to make the effort worthwhile i.e. the end game being to improve Situational Awareness , which in turn should reduce the frequency of Runway Incursions.

3 How is the information supplied by the Airport Operators transposed to commercial aeronautical charts that are on the Flight Deck?

Here's a legal bit again. European Commission Regulation 73/2010 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. In terms of scope, the aeronautical data/information process chain extends from original data sources (e.g. surveyors, procedure designers, aerodrome operators, etc.), through AIS to the end user. Concerning aerodrome operators, it applies for those aerodromes for which IFR or Special-VFR procedures have been published in national AIPs, as such procedures demand higher safety awareness.

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. Source providers also supply information to commercial organisations for transposition to flight crew information, both on paper and electronically. 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.

The accepted source page is entered into an Electronic Source Library and examined by analysts to identify the changes made and then passed to the appropriate downstream production group. This generates a staggering 270,000 database change transactions every monthly cycle.

Before publication each changed data file, be it paper, electronic or text is subject to two sequential peer reviews. Should significant discrepancies be found, notification is made by periodic NAV data/chart alerts before the next cycle.

MIKE **EDWARDS**

was until recently Head of Safety Investigation at NATS (the UK Air Navigation Service Provider). He held this role for 7 years and prior to that he was Head of Investigation at London ACC. He had been an ATCO at Edinburgh and Heathrow before becoming the manager of all student controllers and then a Supervisor at London Terminal Control. He holds a PPL with Group B rating.

4 Is the information provided to flight crews consistent with that published in the AIP?

The quick answer is YES. In the vast majority of cases the information shown on the AIP diagram is copied exactly by commercial suppliers. All of the information available from the AIP on 43 of 47 examples examined was the same. 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.

5 What industry best practice can be shared to enhance Situational Awareness

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

The EUROCONTROL study found five examples of suggested best practice that singularly or in combinations may improve the visibility and quality of Hot Spot information and thus enhance Situational Awareness.

- *Each Hot Spot depicted by a clear bright red circle and joined to a red label box e.g. HS1*
- *Large, eye-catching textual information elaborating the action required of pilots in and around the Hot Spot. This should 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 can be very effective in enhancing the Situational Awareness of the flight crew.*

EXAMPLES OF CURRENT INDUSTRY BEST PRACTICE

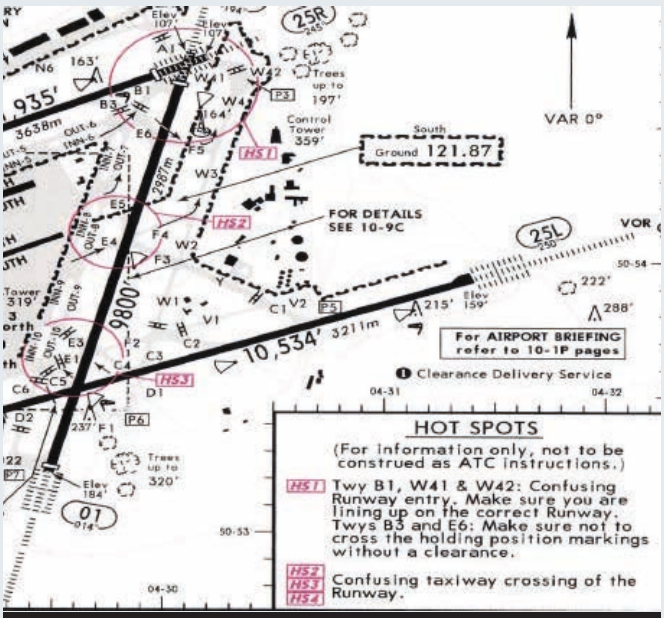


Figure 1

Figure 1 illustrates each Hot Spot depicted by a clear bright red circle and joined to a red label box e.g. HS1, HS2, HS3. It also has an example of large tabulated textual information elaborating the action required of pilots in and around the Hot Spot:

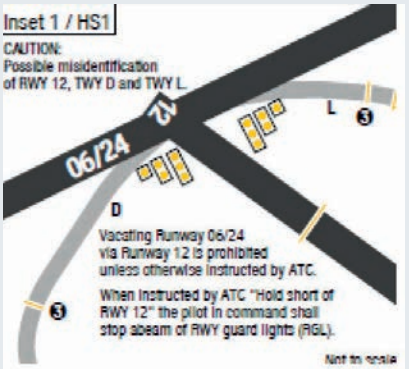


Figure 2

Figure 2 illustrates 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.

Figure 3 illustrates where the aerodrome diagram could otherwise be too cluttered to present Hot Spots effectively, the use of specific Hot Spot pages can be effective. This 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.

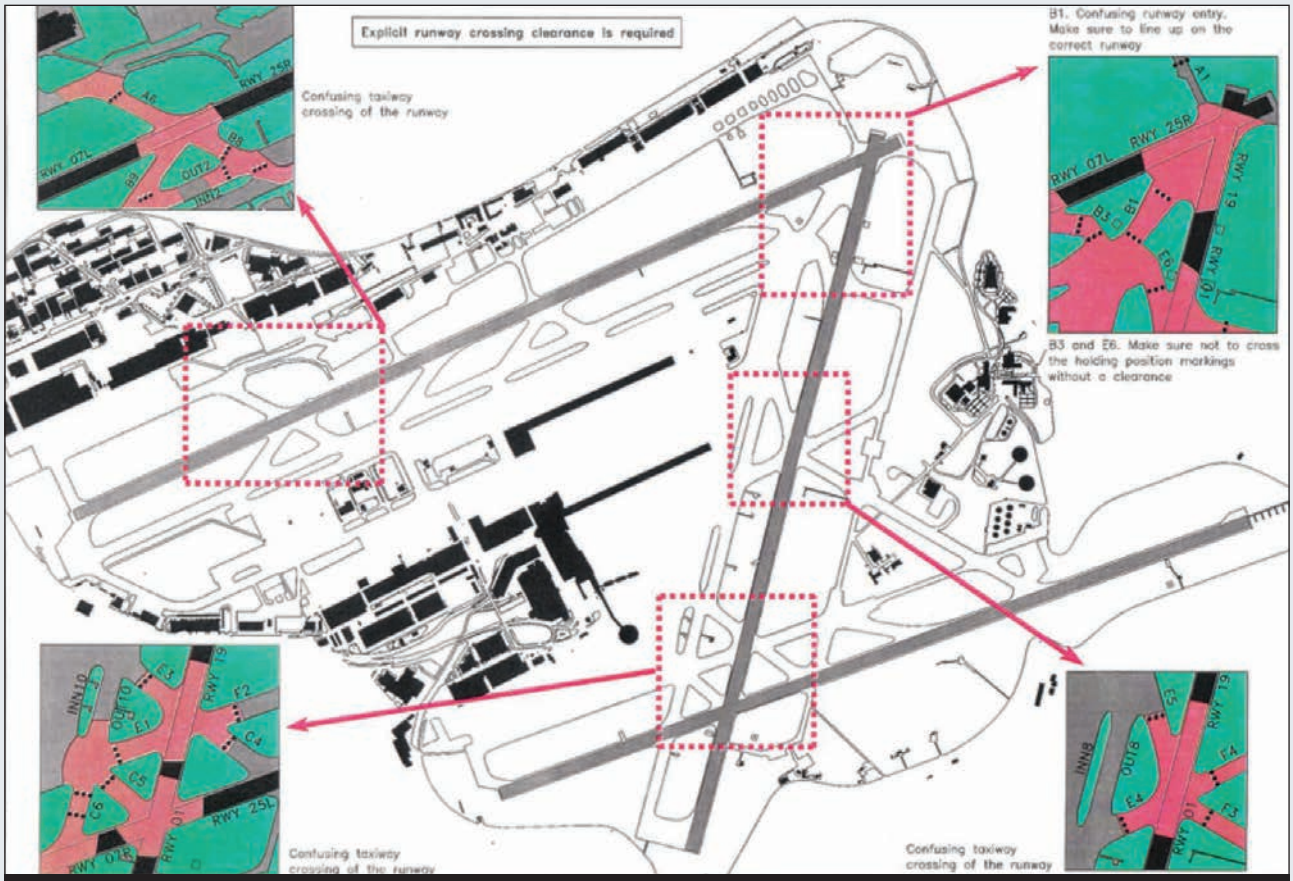
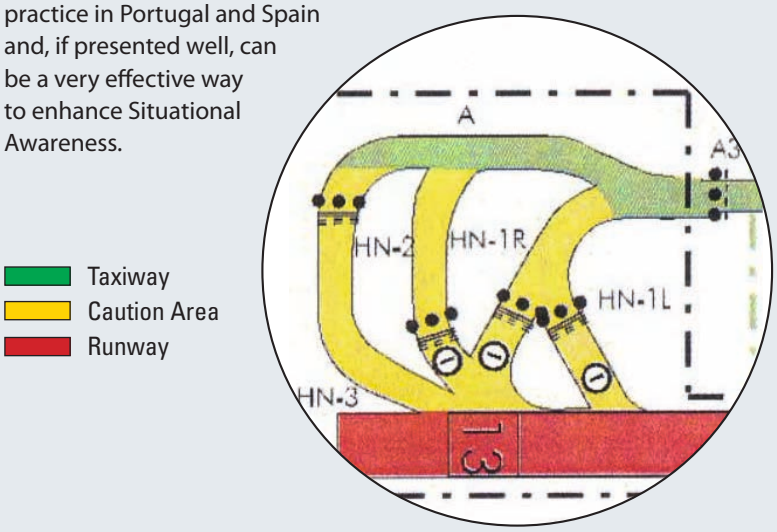


Figure 3

This figure illustrates the use of a colour-coded format which can assist in the depiction of runways, Hot Spot areas and normal taxiways.

The use of this colour set is standard practice in Portugal and Spain and, if presented well, can be a very effective way to enhance Situational Awareness.



So what can you do to help?

Check out the Aerodrome Diagram in the AIP for your local airport. Does it show Hot Spots? If so, are they useful? Do they use any of the five best practices illustrated?

If the answers to these questions are not all positive, then seek out the airport Local Runway Safety Team (if there isn't one, find the Airport Director), invite them the look at this article and volunteer your services in whatever way that you feel able. The message is simple:

Effective Depiction of Hot Spots = Enhanced Situational Awareness = Fewer Runway Incursions = Less Risk of something nasty happening (possibly to you).