skyguide

safety bulletin

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What is Safety without improvement?

Shortly before last Christmas, I decided to apply to the succession of Marcian Tessin at the head of the Safety Reporting and Investigation Management division (SR). A few weeks later, I was officially appointed after having successfully gone through the official recruitment and selection process. I see my new position as a very challenging opportunity to get closer to the business and to address Safety at the "sharp-end" of our ATM-System. In this respect, one of the first issues I have been confronted with is our ability to make real progress on Safety. Indeed, it belongs to the mission of my division to process a lot of inputs issued from various sources – like for instance SIRs, OIRs and internal investigation reports – in such a way that something can effectively be done about the problems these sources emphasize. But what does this exactly mean ? Put differently, the huge amount of work produced by my collaborators is not worth the effort if the Safety Recommendations they propose at the end are not being implemented. Furthermore, the time many of you do invest in reporting occurrences and in participating to internal investigations is wasted as a consequence. And in this respect, I have to admit that my first impressions are quite lukewarm. In fact, it appears that most of our joint effort to improve Safety vanishes into managing delicate confrontational situations instead of focusing on implementing Safety improvement measures. Sounds strange? Not really if you look at the way Safety Recommendations are actually being managed within our company. First, my division produces a lot (maybe too many) of such improvement proposals, second it has the tendency to do it in isolation and third, it follows a rather "dictatorial enforcement process" to get them implemented. This creates a situation where those who have the power to make such changes happen are overloaded with what they consider ill-formulated demands and feel obliged to explain why they cannot respond to them as expected. As a result, time and effort are wasted, mutual trust and understanding is eroded and no progress can be made on Safety. So how can we change this? Simply by working closer together! Let's take for instance our internal investigation process. Several critical occurrences – or a cumulative aggregation of unwanted outcomes – are sometimes considered worth to be further investigated. In such cases, it is the job of our internal investigators to identify the systemic factors lying behind these undesirable manifestations and to formulate conclusions in this respect. However, transforming these conclusions into Safety Recommendations shall not be a unilateral exercise but rather a subtle negotiation process with those who will be tasked to implement them – what is currently definitely not the case. Furthermore, the way we actually transform SIRs into Safety Recommendations looks exactly the same and is in my opinion also in need for significant improvement. Thus, by working closer with the persons who have the power to make changes effectively happen, I believe that our company will increase its ability to achieve what we are all aiming for: real progress on Safety. Hence, implementing this cultural change within our company will be my main concern from now on. In this respect, I'm looking forward to create very soon opportunities for interesting and challenging discussions.

With my best regards,

Stéphane Barraz
Head Safety Reporting and Investigation Management, SR

RUNWAY INCURSION: what are the criteria to report / should I report or not?

The topic Runway Incursion has been discussed a lot during the recent years on a national and on an international level. But what is a runway incursion after all? A runway incursion is an incident at an airport which adversely affects runway safety; it is defined by the International Civil Aviation Organization (ICAO) 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.

The Runway Incursion is a kind of incident that often leads to discussions and not all concerned parties, stakeholders or national authorities in Europe come to the same conclusion, if they analyze the same runway related incident.

The european group for runway safety of Eurocontrol refer to some helpful ICAO provisions. They are:

ICAO provisions for Stop Bars and ATC Clearance

ICAO Annex 2, Rules of the Air:

"An aircraft taxiing on the manoeuvring area shall stop and hold at all runway-holding positions unless otherwise authorized by the aerodrome control tower."

"An aircraft taxiing on the manoeuvring area shall stop and hold at all lighted stop bars and may proceed further when the lights are switched off."

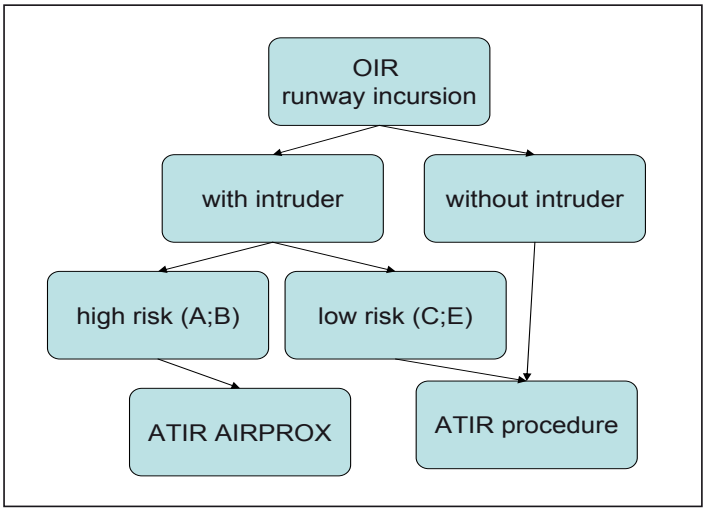
Why does it make sense to report runway incursions and to file an OIR?

These runway incursion incidents represent examples that enable skyguide, the airport authorities or national authorities like FOCA to increase safety standards. Eurocontrol as well is interested in collecting and analyzing these data on a European level. Many new measures at different airports in Europe were implemented due to prior reported runway related incidents like runway incursions.

Is the reporting of a runway incursion optional?

The reporting of runway incursions is often seen as optional, but actually it is part of the compulsory incident reporting as imposed by our regulator FOCA (federal office for civil aviation). The authorities expect to receive an OIR from skyguide. In fact the OIR then is first converted into an ATIR (Air Traffic Incident Report) within SRO (safety reporting and investigation) and handed over to FOCA and the AAIB (aircraft and accident investigation bureau). That actually means that runway incursions have to be reported to the authorities, exactly like it is done for airproxes or separation minimum infringements.

Examples of runway incursions:



Runway incursions can involve just one aircraft or vehicle or person, that enters the runway surface without ATC clearance or it can involve an intruder as well, meaning a second aircraft, vehicle or person.
So, usually there are two types of runway incursions:
An aircraft including an intruder, e.g. an aircraft rolling on the runway and a vehicle on the same runway without ATC clearance, or an aircraft/vehicle/person without an intruder, e.g. a vehicle towing a bizjet and crossing a runway without ATC clearance.

What are we, SRO, doing with your runway incursion OIRs?

OIRs "runway incursions" are processed by SRO and are filed as **ATIR** (see graph above). A Runway Incursion without an intruder is always processed as an **ATIR Procedure**. A Runway Incursion with an intruder is processed as an **ATIR Airprox**, if the risk is classified as significant (risk C) or no risk (risk E). A Runway Incursion with an intruder is processed as an ATIR Airprox, if the risk is classified as major (risk B) or serious (risk A).

Why do people not always report runway incursion incidents?

They may fear to be blamed in retrospect but also underestimate the need to report or do not see the necessity anymore to inform about deviations which have become part of "normal operations". However, increasing the reporting rate – and more generally developing a broader understanding of daily runway operations – is something skyguide's safety department takes very seriously.

It definitely makes sense to report, hopefully you share our opinion!

Nicholas Scherrer
SRO

The usefulness of (human & organizational) performance variability

With this article, we would like to introduce you to two important concepts we have to consider when we are investigating: **The Efficiency – Thoroughness Trade-Off (ETTO) principle** (prof E. Hollnagel), and the **Performance Variability** resulting from it.

Performance variability is found in all kinds of human activity and at all levels: at work or at leisure, people routinely make a choice between being effective and being thorough, since it rarely is possible to be both at the same time.
The decision depends on different factors and resources that can be expressed in terms of time, materials, money, physical or psychological effort, manpower, well-being and health/fatigue status, etc…

Thoroughness

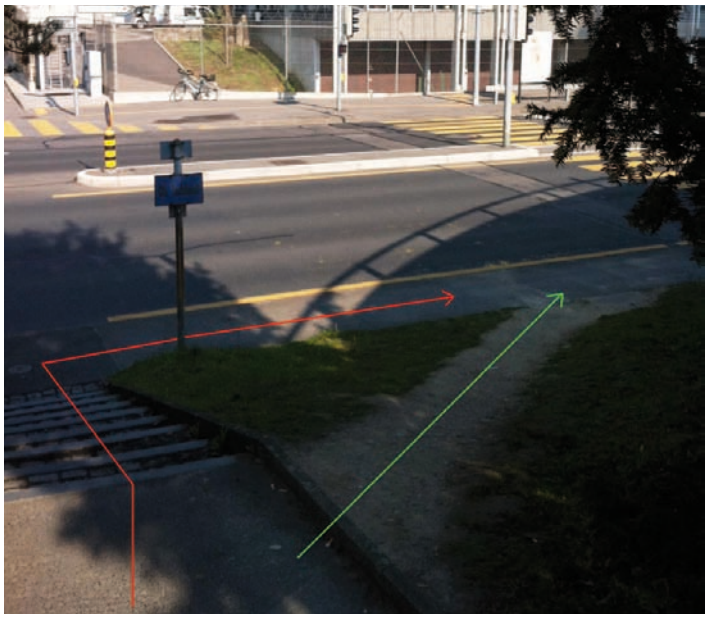
The Thoroughness describes an activity carried out only if the individual or organization is confident that the necessary and sufficient conditions and resources for it exist.
The resources can be expressed in terms of time, materials, money, physical or psychological effort, manpower, well-being and health/fatigue status, etc…

Efficiency

The efficiency means that the level of investment or amount of resources used or needed to achieve a goal are kept as low as possible.
The resources can be expressed in terms of time, materials, money, physical or psychological effort, manpower, well-being and health/fatigue status, etc…

An example from Geneva: everyday, you come to skyguide by car and cannot afford to be late at work.
Each day, and depending on the time at which you woke up, if you slept well or not, the time at which you left home, the weather, the traffic situation, the need to fill the car's tank or to drop the kids at school, etc…, you will park at the ICC at a different time. Depending on all these factors, you will have to choose between two options to reach the crosswalk:

- **the thorough way:** you'll use the steps and the sidewalk. It's longer than the shortcut on the grass and it's safer. As you've arrived early enough, you've filled all the conditions to make this thorough choice and to be at work on time.
- **the efficient way:** you'll use the shortcut on the grass. It's shorter than the steps and the sidewalk and it's more risky. As you've arrived later than usual, you cannot afford to be thorough: you have to be efficient and you decide to shorten your walk time to be on time at work.



Now let's go through an example of an occurrence that happened in Geneva, and try to identify the Efficiency-Thoroughness trade-offs…
The information about this occurrence is based on an internal investigation report released in 2009: (all time indications in UTC)

The Occurrence

The incident occurred in the Sector INI North-East (INNE; sector North and East combined).
The workload was reported by the ATCO's as being very high at the moment of the incident, due to the high traffic load combined with CB activity.
The traffic load as reported by FMP was 35 flights between 11:40 and 12:40 (full sector capacity: 34)

On that morning, the Supervisor of ACC Geneva was informed about a possible CB-activity during the day. Taking into consideration the foreseen traffic volume, that was forecasted slightly below the sector capacity, the Supervisor decided to apply the "wait-and-see" strategy, which means that no preventive measures (i.e. rate reduction) are taken until the

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forecast gets confirmed by the weather radar or by reports from the control sectors.

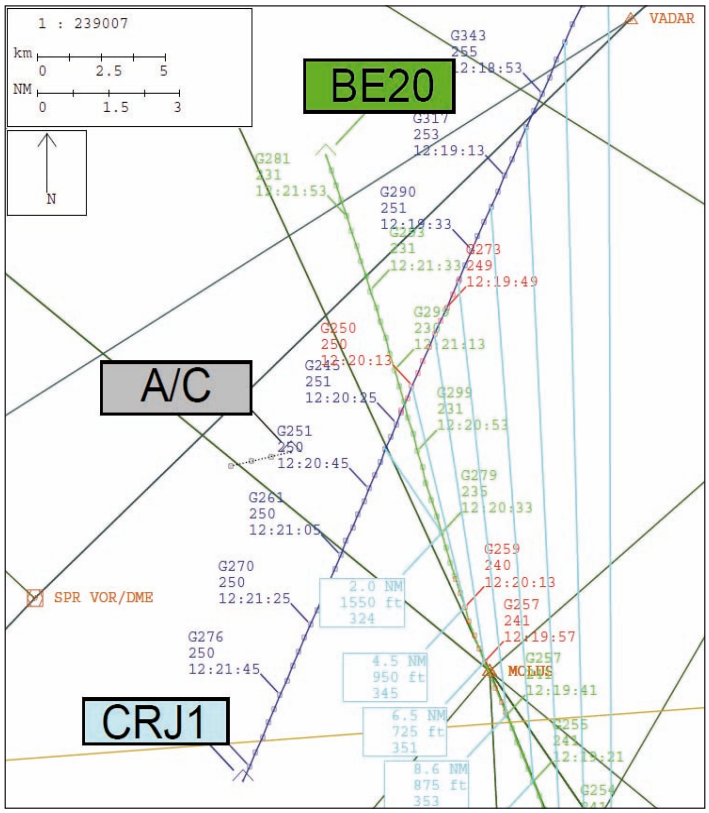
This is actually a common procedure when the traffic demand does not exceed the sector capacity. Otherwise, the Supervisor has the possibility to reduce the traffic amount, via the FMP, by 10% as a preventive measure and by 20% as a short term protection measure.

At the sector INI North-East, the traffic load increased rapidly above the forecasted numbers, with 35 flights crossing the sector within one hour (11:40 – 12:40 UTC), whereas the sector capacity is set at 34 flights.

In the same time span, the CB activity was increasing rapidly, and so to speak all of the aircraft in the sector had to avoid weather.

As a consequence, the frequency occupation reached a state close to congestion.
At 12:16 a CRJ1 flying from Munich to Lyon, called on frequency, in the region of Payerne, descending to FL250, on a heading of 210° (south of track) to avoid weather. It was subsequently cleared to descend to FL210.

At 12:19, the E-STCA triggered an alarm between CRJ1 and a BE20 flying from Torino to Nancy, steady at FL240 on course to MOLUS (on frequency since 12:12)
Immediately, the ATCO re cleared the CRJ1 to stop descent and to maintain FL250, in order to achieve 1000ft separation with the BE20, and in the same transmission he instructed the BE20 to descend to FL230, accompanied by a traffic information.
Those avoiding actions resulted in a minimum recorded separation of 4.5NM / 950ft. (minimum required separation: 5NM / 1000ft)



Where were the trade-offs in this occurrence?

1) Staffing
Theoretically it would be possible to hire as much staff as needed to open all the control sectors 24 hours a day. Of course that would be way too thorough but not at all (cost-) efficient.
The trade-off that is made on the organizational level, is to foresee enough staff to open the sectors taking into account the estimated expected traffic amount. Speaking of the INI Sectors, that means 1 sector for low-traffic periods (e.g. night time), 2 sectors for "normal" traffic periods, and 3 sectors for high traffic periods (ski-charter week-ends, etc.)
At the time of the incident, staff was available to man 2 sectors (INI North-East and INI South) which leads us to the next trade-off:

2) the supervisor's strategy
Since the option of opening a third sector was not available (due to the trade-off n°1), the Supervisor had to decide whether he should apply a traffic restriction or not.
The easy and thorough solution would be to apply a traffic restriction measure each time when CB activity and high traffic load are forecasted.
But the weather forecast (and the traffic forecast at that time) available to the Supervisor are generally estimated as rather imprecise. Plus, every traffic restriction creates delays, and especially in the INI sectors, those delays provoke negative reactions from the customers. Additionally to those outside economic pressures, the Supervisor mentions that exactly this kind of decisional space constitutes a big part of the motivation to fulfill the tasks as a supervisor. His personal goal is to protect the ATCO's from a traffic overload, but also to create a min-

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imum of delay. (= thoroughness vs. efficiency)

3) the ATCO's work

The most limiting factor in the ATCO's working environment is time. Time is running the same, whether traffic load is low, or high. During "low traffic", the ATCO can be very thorough by scanning the radar screen and the control strips before every ATC clearance.

Whereas during a situation as described for this incident, with high traffic load and CB activity, thoroughness is traded-off against efficiency, even if it doesn't necessarily happen on purpose, as the following two statements of the ATCO show:

He stated during the interview that he did not assimilate the avoiding heading as announced by the CRJ1 on first call, probably as a consequence of his task saturation, and therefore did not realize that it was on converging track with BE20.

He also made the interesting statement that he cleared the CRJ1 to FL210 "as usual". Actually, most of the time the INE sector provides an automatic release for descent to FL210 for all traffic inbound to Lyon. This is because traffic entering INN sector at FL250 is often too high to comply with the FL restriction over MILPA (FL160-FL180). Therefore, those aircraft are frequently cleared to FL210 by INN at the first call.

Well this internal "release"-procedure could actually also be called a trade-off…

Handling of the whole situation was further hampered by the fact that the current procedure prescribes for INI controllers to write the cleared flight levels (CFL) on the control strips, and to input the heading on the label. Therefore an efficient scanning is troubled by the fact that no complete picture of the traffic situation is available neither on the screen (no CFL) nor on the strips (no headings), but only by combining both of them. Other scanning tools such as DST, HST or route adherence monitoring are not available at the INI sectors. (another trade-off made at the time when the stripless system was introduced at the upper sectors "only"…)

4) E-STCA settings

The ATCO stated during the interview that the E-STCA alarm triggered too late to be able to maintain the required minimum separation, but early enough to issue avoiding actions in order to prevent compromising the safety of the aircraft.

This is in accordance with what the E-STCA, as a safety net, is designed for. However, the E-STCA could be tuned in a more sensitive way (=more thourough). But by doing this, more nuisance alarms would be generated, with the risk of distracting the ATCO in their work. (= less efficient)

The Efficiency – Thoroughness Trade-Off (ETTO) principle

The essence of the balance or trade-off between efficiency and thoroughness can be described by the ETTO principle. In its simplest possible form, it can be stated as follows: in their daily activities, at work or at leisure, people routinely make a choice between being effective and being thorough, since it rarely is possible to be both at the same time. If demands for productivity or performance are high, thoroughness is reduced until the productivity goals are met. If demands for safety are high, efficiency is reduced until the safety goals are met.

Performance Variability

As a consequence of this permanent trade-off, the human and organizational performance is and must be variable.

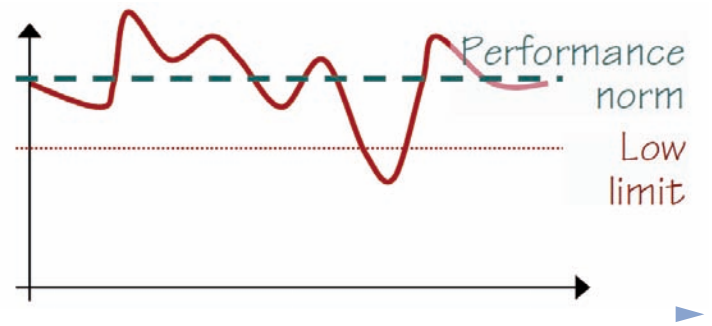
Outcomes are determined by performance variability rather than by (human) failure probability. Performance variability is a source of success as well as of failure.

As seen from the figure below, performance is sometimes better than the norm, sometimes worse, and on occasion even worse than the low limit, i.e., unacceptable in some way.

However, human performance never fails completely. a human "component" cannot stop functioning and be replaced in the same way a technological component can. (This, nevertheless, does not stop people from sometimes thinking in this way.)

What have we learned?

What is very important to realize with what happened in this occurrence is that under different circumstances (i.e. more precise weather forecast, better meteorological conditions during the time of the incident, no sector saturation, or INN sector unbundled from INE, etc…), the same strategic choices from the Supervisor,



► *The usefulness of performance variability*

the same procedures, the same system settings and ultimately the same decisions from the ATCOs, would have lead to a successful situation!

So, where lies the difference between successful and unsuccessful performance? Ernst Mach (1838-1916) gives us the answer:

"Knowledge and error flow from the same mental sources, only success can tell one from the other."

David Fraternali & Alain Gaberell

Glossary

ATCO: Air Traffic COntroller
ETTO: Efficiency-Thoroughness Trade-Off
E-STCA: Enhanced Short Term Conflict Alert
FL: Flight Level
FMP: Flow Management Position
INE: INI East sector
INN: INI North sector
INNE: Grouped INI North & East sector
NM: Nautical Miles
OIR: Operational Internal Report
RE: Radar Executive
RP: Radar Planner
UTC: Universal Time Coordinated

More about ETTO

Safety bulletin: safety bulletin #16, December 2006
Book: "The ETTO principle: Efficiency-Thoroughness Trade-Off" by prof E. Hollnagel (Ashgate, 2009)

Feedback to ATCOs for year 2010

Hello everybody

Many thanks to all of you for reporting the various situations through the past year. To show you a summary of our work, we collected the available data and put it into a simple overview. With this feedback, we would like to encourage you to continuously report and help to improve our system.

Zurich TWR / APP:

136 reports were filed within the Tower and Approach sector Zurich.
89 OIRs concerning VFR airspace infringement (34 thereof conflicting with other traffic)
12 OIRs concerning level busts (3 on STAR, 5 on ILS, 3 on SID, 1 other)
The remaining reports concerned various topics such as In-/Outbound EDTD, In-/Outbound LSZC, In-/Outbound LSZT, TCAS alerts, collapsed nose wheel, hot air balloon, and so on…

2 Internal Investigation Reports were published
1 Internal Investigation Report was written together with ACC Zürich

Zurich ACC

108 reports were filed at the ACC Zürich. Lower/Upper and few of them ARFA.
7 Internal Investigation Reports were published, 4 are still under investigation…

Geneva ACC:

Around 130 reports were filed at the ACC Genève (INI's and UAC-W sectors). The variety of the reported situations is huge: loss of contact, loss of separation, problems with snow removal pocedures, Emergency descents and smoke in the cockpit, closed Delta position and also several Saturation Reports, to name a few.

5 Internal Investigation Reports were published, and another 6 are in progress.

Geneva TWR / APP

We are still missing an investigator, please in case of interest contact the SR unit.

SR ATCO investigators
Valerie Jost, Nedzad Bilalovic;
Alain Gaberell

Safety Improvement Reports in the T department

As mentioned it in the last Safety Bulletin, I would like to take advantage of this page to inform you about the SIR status in the T department.

Let's start with a few words about my function at skyguide, one of my hats and maybe the most known, is Mr. WAC (procedure related to the technical maintenance at skyguide), one other one is SPOC (single Point of Contact) for the T department in the Safety Panel, actually the meeting where all SIRs are being discussed.

As a reminder about the SIR process, anybody can write a SIR, then SR will de-identify it, analyze it and send it to the SPOC of the concerned unit. Thereafter the Safety Panel, which includes all the SPOC(Single Point of Contact) in O and T and SR will meet 5 times a year and do a follow-up of the evolution on the SIR treatment. The normal Life Cycle of a SIR ideally brings the Status to «Closed». This means the improvement has been implemented. The role of the SPOC is to transfer the SIR to the group that can bring a solution to the SIR, if it exists. The SPOC is a sort of «transmitter» between S and the line (O and T). The role of SR is to make sure things happen!

TISM 22.07.2010 incident report:

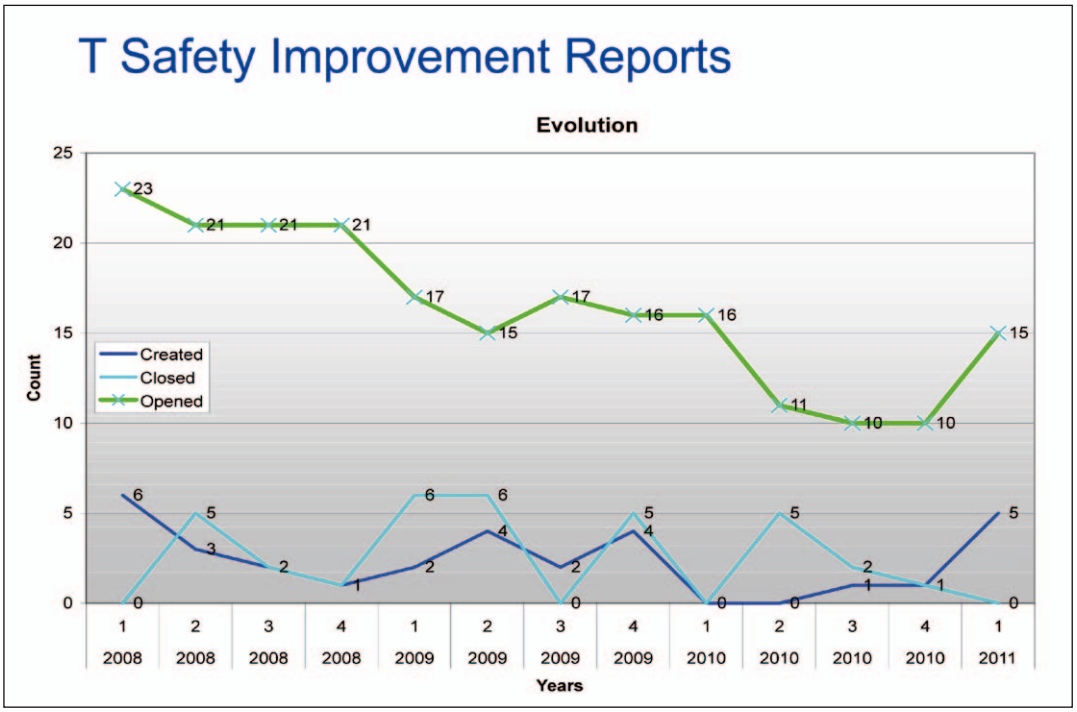
2010-07-17 16:10:00	SWI-VISTA-Z TEL	Am DEP kommen auch Phantomanrufe aus Emmen! (Wie in Bern)	Ursache liegt beim Militär und ist dort bekannt. Die Linkverbindungen (B-Bus) werden durch Gewitter gestört, daher die Fehlsignalisierung.	TLOGP00017824

To talk about a concrete example, let's take an event reported in Dübendorf. On the 22.07.2010, on the weekly TISM (Technical Incident Scheduling Meeting)

The incident was called «phantomcall from Emmen».

Techlog:
>2010-07-17 16:11:00 - XXX xxx - Submitted
Am DEP kommen auch Phantomanrufe aus Emmen! (Wie in Bern)

On the Thursday, at the TISM meeting we talked about the event and we started right away a research to solve the problem, this included not only T department but also the Army since the event had a direct link to Emmen. We included Swisscom to bring a workaround solution to fix the situation.



Safety Improvement Reports in the T department

Meanwhile someone wrote a SIR regarding this problem. In this precise case T was not aware of the SIR but not knowing the SIR did not play any role, since the incident was already recognized on TISM and handled in the Technical department.

SIR 760 2010.07.17:
Telefon von Emmen ruft (wenn Emmen nicht aktiv) z.T. im 5. Minutentakt «selbständig» an. Wenn man den Hörer abnimmt, ist niemand in der Leitung und z.T. hört man ein Piepsen. Problem an SYMA gemeldet. Telephone Emmen is calling (if Emmen is not active),
Calls come in a 5 minutes tact by his own. I f you are taking the phone, there is nobody in the line and you can hear a «bip» sometimes. Problem was relayed to SYMA.

The solution has been consolidated between TNC-Z, FUB and Swisscom in a delay of a little more than 1 month.

Let's look at the evolution of SIR for the T department til March 2011 (see graph).

Let's look more carefully on the status:

The 5 new SIRs are 782, 783, 791 796 and 723. From those new SIR, the 782 (Test screen at GVA TWR) is solved and proposed to be closed. For the 796, the solution is ready, T is waiting for the change request. 791 and 783 are under evaluation. The 723 was previously assigned to S and since December, to T. It needs more investigation.

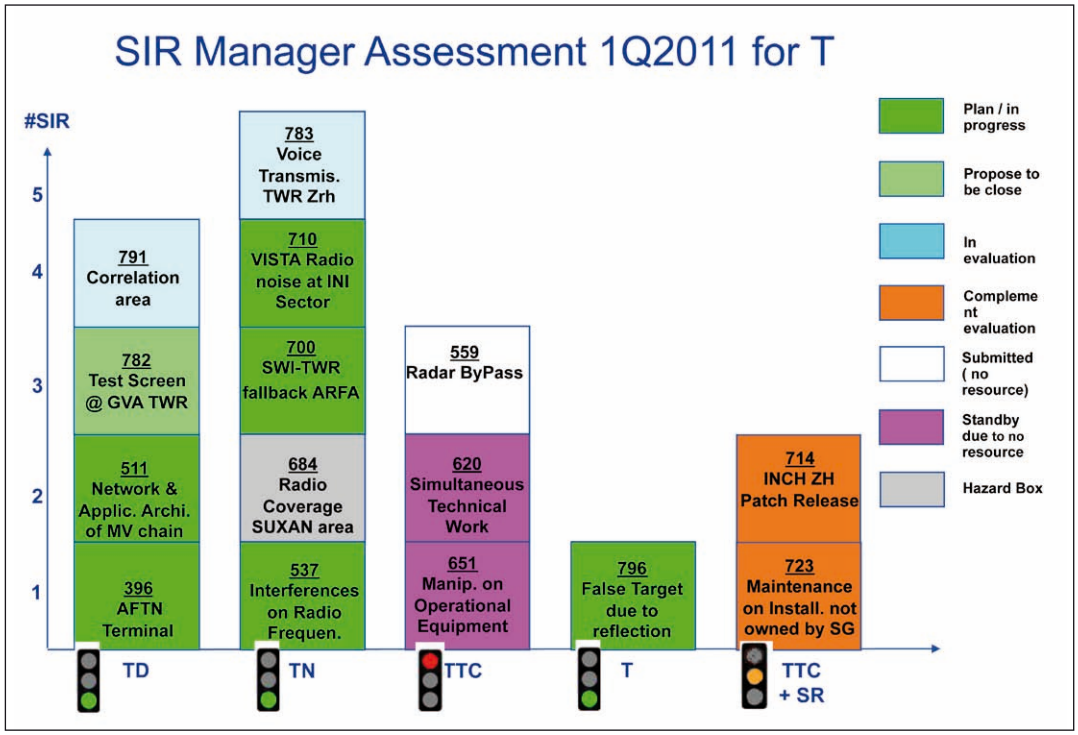
The SIR in light green is solved and ready to be closed (782).

The SIR in green are scheduled or in progress (been solved).(511, 396, 710, 700 537 and 796)

The orange color are SIR that need a complement of investigation.

The Blue SIR are in evaluation. (791, 783).

The violet and white are in standby due to a lack of resource in the TTC group.



JEAN-PIERRE LAMBERT
TTC

Aircraft Accident Rate is Lowest in History

Tokyo – The International Air Transport Association (IATA) announced the aviation safety performance for 2010 showing that the year's accident rate for Western-built jet aircraft as the lowest in aviation history.

The 2010 global accident rate (measured in hull losses per million flights of Western-built jet aircraft) was 0.61. That is equal to one accident for every 1.6 million flights. This is a significant improvement of the 0.71 rate recorded in 2009 (one accident for 1.4 million flights). The 2010 rate was the lowest in aviation history, just below the 2006 rate of 0.65. Compared to 10 years ago, the accident rate has been cut 42% from the rate recorded in 2001. A hull loss is an accident in which the aircraft is destroyed or substantially damaged and is not subsequently repaired.

"Safety is the number one priority. Achieving the lowest accident rate in the history of aviation shows that this commitment is bearing results. Flying is safe. But every fatality is a human tragedy that reminds us of the ultimate goal of zero accidents and zero fatalities. We must remain focused and determined to move closer to this goal year by year," said Giovanni Bisignani, IATA's Director General and CEO.

In absolute numbers, 2010 saw the following results:

- 2.4 billion people flew safely on 36.8 million flights (28.4 million jet, 8.4 million turboprop)
- 17 hull loss accidents involving western-built jet aircraft compared to 19 in 2009
- 94 accidents (all aircraft types, Eastern and Western built) compared to 90 in 2009
- 23 fatal accidents (all aircraft types) compared to 18 in 2009
- 786 fatalities compared to 685 in 2009

IATA member airlines outperformed the industry average with a Western-built jet hull loss rate of 0.25. That rate is equal to one accident for every 4 million flights. The IATA Operational Safety Audit (IOSA) became a condition of IATA membership from 1 April 2009. All 234 IATA member airlines are now on the IOSA registry. The IOSA registry is open to all airlines and it currently consists of over 350 airlines. "The numbers tell the story. In the first full year after the IOSA became a condition of IATA membership, the accident rate for IATA carriers has never been so low. The data confirms that IOSA is helping to drive safety improvements around the world. It is an important part of a comprehensive safety strategy involving governments and industry working together to further reduce the number of accidents and fatalities," said Bisignani.

There are significant regional differences in the Western built jet hull loss accident rate:

- North America (0.10), Europe (0.45), North Asia (0.34) and the Commonwealth of Independent States (0.0) performed better than the global average of 0.61
- Asia-Pacific was higher than the global average at 0.80 in 2010 and about the same from the previous year (0.86)
- The Middle East and North Africa region saw its accident rate fall significantly to 0.72 (compared to 3.32 in 2009) with only one accident involving a carrier from the region
- Latin America & the Caribbean reported a higher accident rate of 1.87 with four airlines from the region involved in accidents, compared with a zero accident rate in 2009
- Africa had an accident rate of 7.41, which was lower than the 2009 rate of 9.94. While showing improvement, Africa once again has the worst rate in the world. There were four Western-built jet hull losses with African carriers in 2010. African carriers are 2% of global traffic, but 23% of global western-built jet hull losses.

Source: IATA

Regional Accident Rates
Western-built Jet Hull Losses per Million Sectors
As of 31 December 2010