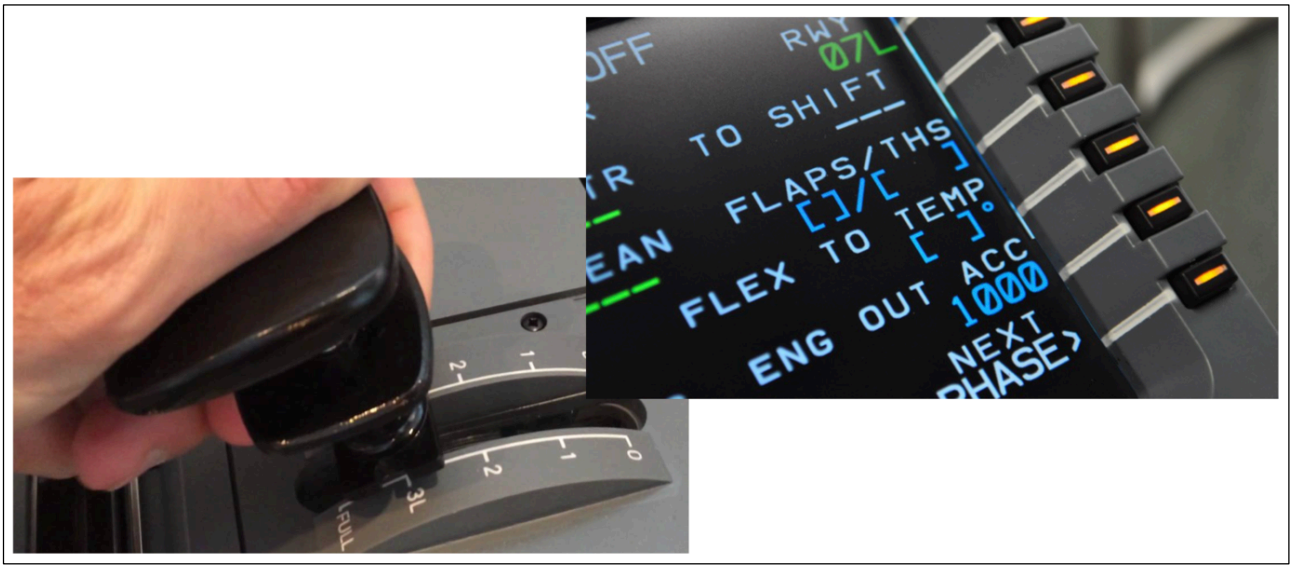


Erroneous Flaps selection at RWY holding point

Voluntary Air Safety Report

Flight XXYYYY: FCO – TLV
EOBT – ETA: 11.20 – 14.40 UTC
Trip time: 3^h01^m
TOW: 80.500 kg – Pax 163
Stand: 610
Friday afternoon

Crew arrived on board, fed and rested, in transit from previous leg but with due time before current flight, at 10.50 UTC (Universal Time Coordinated) due to queue at Security control.

During pre-flight checks crew got a CTOT (Calculated Take Off Time) of 16.36 UTC. Asking on 131.9 (Company Traffic Flow management frequency), crew acknowledged that a NOTAM (NOtice To AirMen) was issued concerning Ben Gurion closure at 15.00 UTC without having given them no reason about that closure (NOTAM not included in the briefing package). Contacted soon after by 131.750 (Company Operations management frequency), crew was instructed to board passengers as per normal procedure, while OCC (Company Operational Control Centre) investigating about any improvement. Boarding started around 11.05 UTC.

At 11.30 UTC, Tel Aviv Company Supervisor, from Ben Gurion Tower to monitor the situation, in contact with either 131.750 and Eurocontrol in Bruxelles, informed crew that if they had blocked off in few minutes he would have managed for their arrival at destination. Flight blocked off at 11.35 UTC soon after solving the change of CTOT from 16.36 UTC to 11.52 UTC on 121.725 (FCO Ramp frequency).

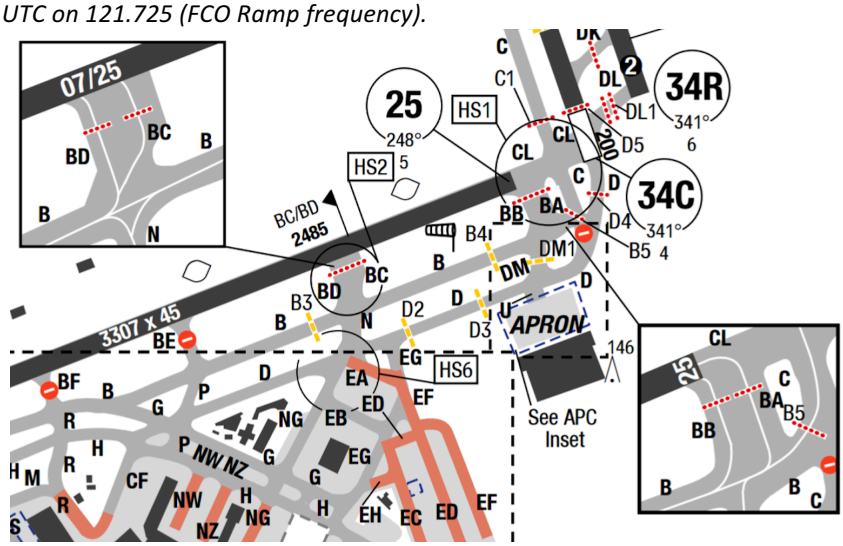


Figure 1: Airport Ground Chart

Before taxing Flaps 1+F were selected as per TODC (Take-Off Data Card) RWY 25 R01 (Full length) and aircraft was instructed by 122.125 (FCO Ground West) to proceed via R-B holding short N (Figure 1), for ground frequency change (2 engine Taxi due weight). During taxi PM (Pilot Monitoring) suggested to get TODC RWY 25 T01 (BC intersection) ready for use. Both crews agreed on the issue and PM printed out new TODC for T01. On main taxiway B, crew realized for about 5 traffic taxing ahead of them on N, and decided to slow down abeam BC intersection despite instructed, by 121.9 (FCO Ground East frequency), to proceed full length and monitor Tower frequency 118.7. Before Take-Off checklist down to the line was completed. Time is now around 11.50 UTC.
Crew then decided to inform the Tower controller about their CTOT to ask for any help. Tower controller is not keen on crew request: sequence is to be respected despite CTOT, moreover because ILS RWY 16L has become unserviceable since few minutes, therefore all inbound traffic is diverted for landing on RWY 16R. Once the aircraft started moving again, the new on-duty Tower controller instructed the crew to proceed via BC Intersection and get ready for departure. PM, at this stage, inserted new TOD in FMCG MCDU Performance page but, new Flaps setting (BC Intersection requires Flaps 2) was not selected. Flight XXYYYY is cleared to enter, line up and Take-Off from RWY 25 BC Intersection. Before Take-Off checklist below the line is accomplished.

Few seconds before entering the runway PF (Pilot Flying) realizes that Flaps setting does not agree with the one calculated. PM selects new Flaps setting and flight took off, continued and landed uneventful at destination.

Occurrence analysis

Our occurrence can be represented using the following diagram:

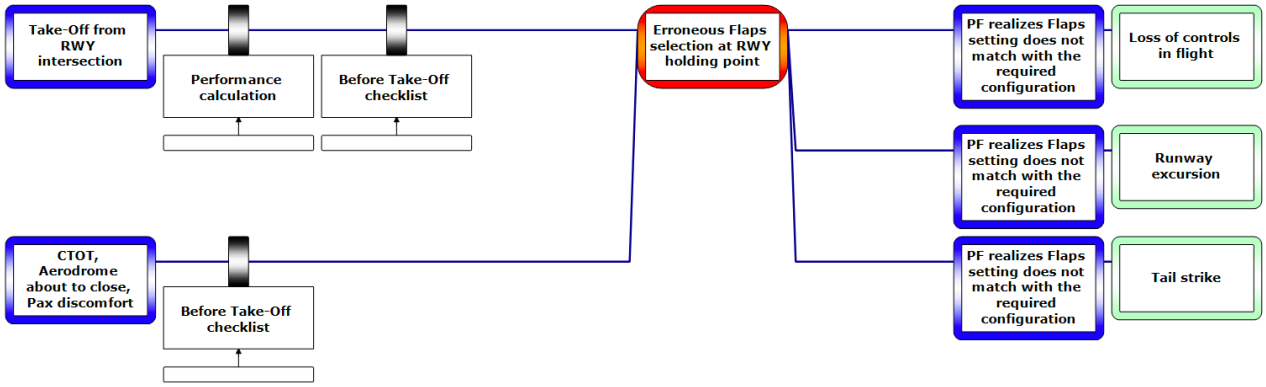


Figure 2: Occurrence analysis

With reference to Figure 2, 2 initiating events have been identified:
1. "Take-off from RWY intersection";
2. "CTOT, Aerodrome about to close, Pax discomfort";

which lead to the "Erroneous Flaps selection at RWY holding point" event.

Hence, 3 plausible consequences originate:
1. "Loss of controls in flight";
2. "Runway excursion";
3. "Tail strike";

neutralized by PF intervention who, during line-up, spots Flaps setting required/Flaps lever position mismatch.

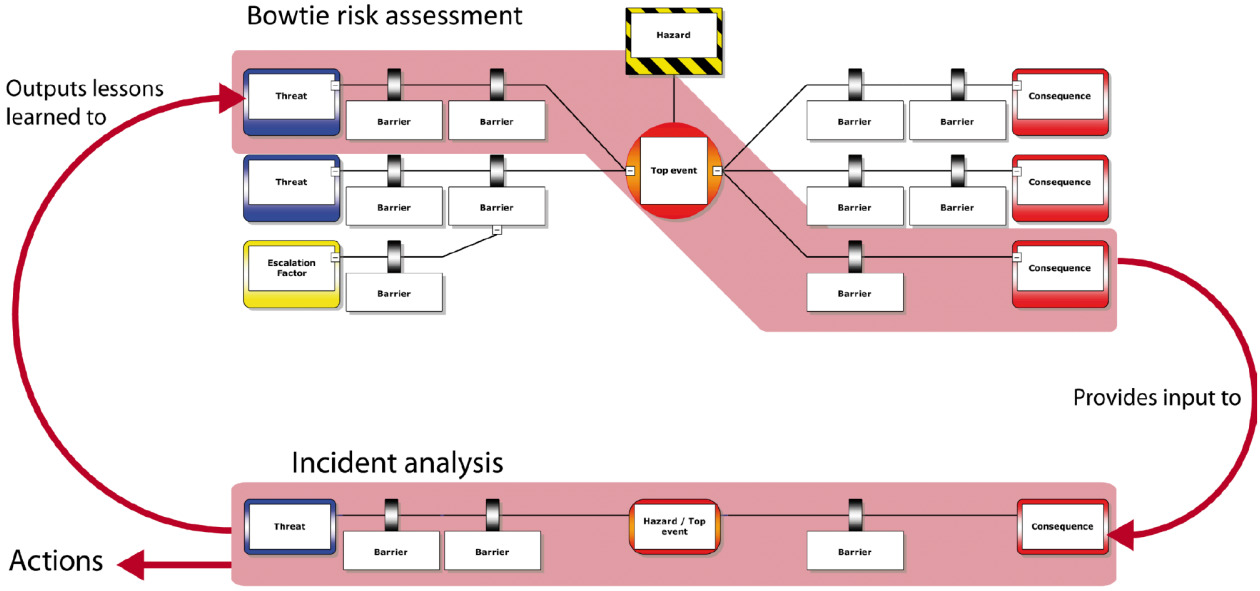
Operator barriers
On first causal limb 2 barriers are in place:
1. "Performance calculation";
2. "Before Take-Off checklist";

On second causal limb 1 barrier is in place:
1. "Before Take-Off checklist";

Regulatory framework and Company documentation for barriers construction and development, here are not considered and are taken for granted.

We will perform the analysis of this occurrence using Incident XP tool by CGE Risk Management Solutions.
IncidentXP combines the most innovative incident analysis methods in one safety tool, allowing you to choose which one you need.
Six methods to choose from are most innovative barrier based incident analysis methods, selected for IncidentXP.
They are: Timeline, BSCAT™, Tripod Beta (TB), Barrier Failure Analysis (BFA), Root Cause Analysis (RCA), TOP-SET® RCA.

Incident XP can be used either as a stand-alone module or in strict relation with BowTieXP visual risk assessment.
In this second case, IncidentXP makes sure lessons learnt from incidents are maximized when transferred to the global risk assessment as a follow-up contribution, enhancing safety assurance process.



BFA method (Barrier Failure Analysis) to in-deep barriers status understanding shall be used (Figure 3) for our occurrence analysis.
This method (3 blocks method), consists in the research of underlying causes linked to the three following questions: WHAT happened, WHY did it happen, HOW did it happen (last one cause, to be looked for, at higher organizational level). Following this approach, the condition of "Failed" for "Performance calculation" and "Before Take-Off checklist" barriers can be worked out.

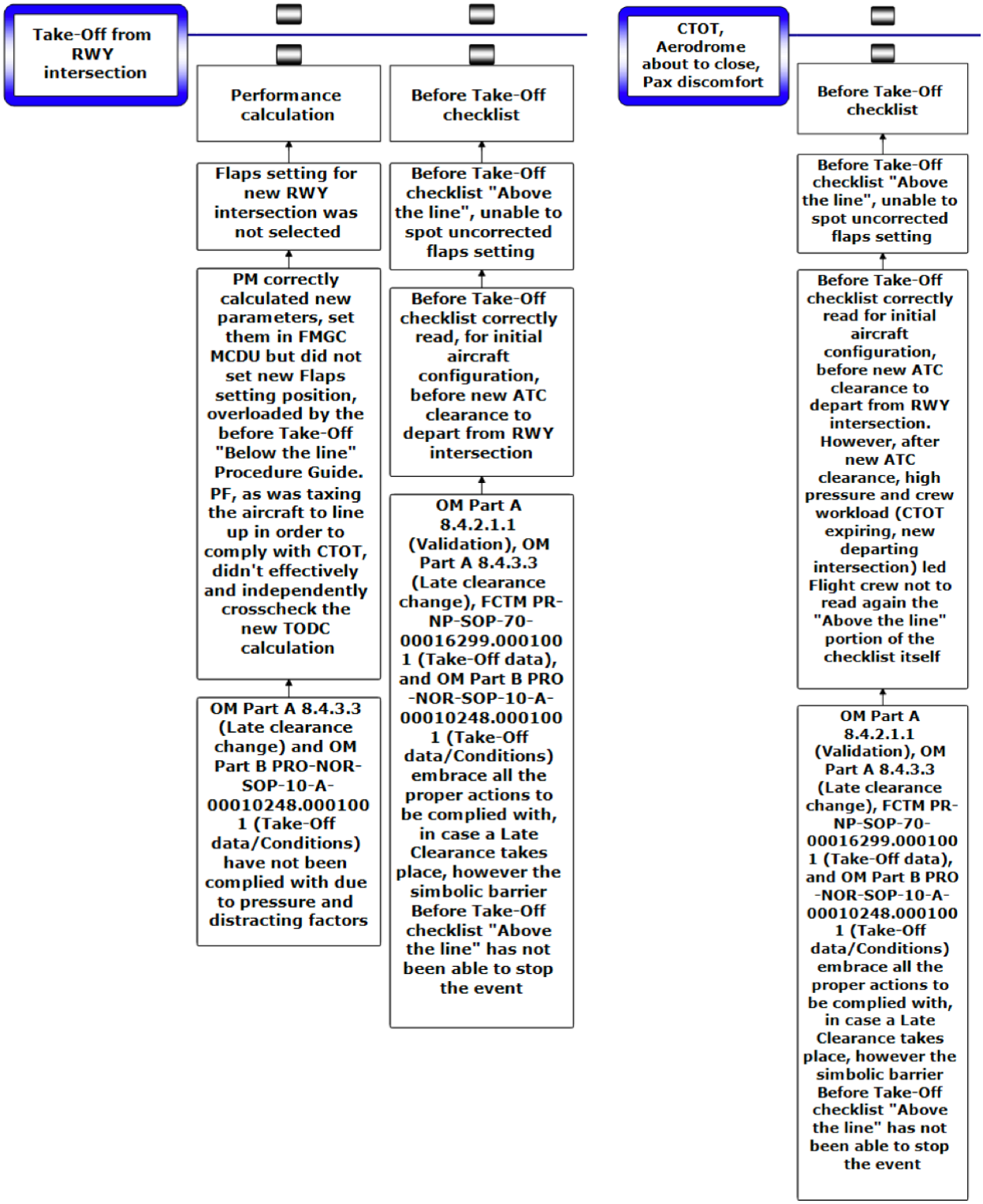


Figure 3: Barrier Failure Analysis (BFA) method for "Performance calculation" and "Before Take-Off checklist" barriers

Visual Risk Assessment

Let's now look at the occurrence within a wider and all-embracing risk analysis context, which approaches the Hazard "Aircraft at Take-Off – All Weather Operations" leading to an associated Top Event "Incorrectly configured/unprotected aircraft at holding point" (Figure 4).

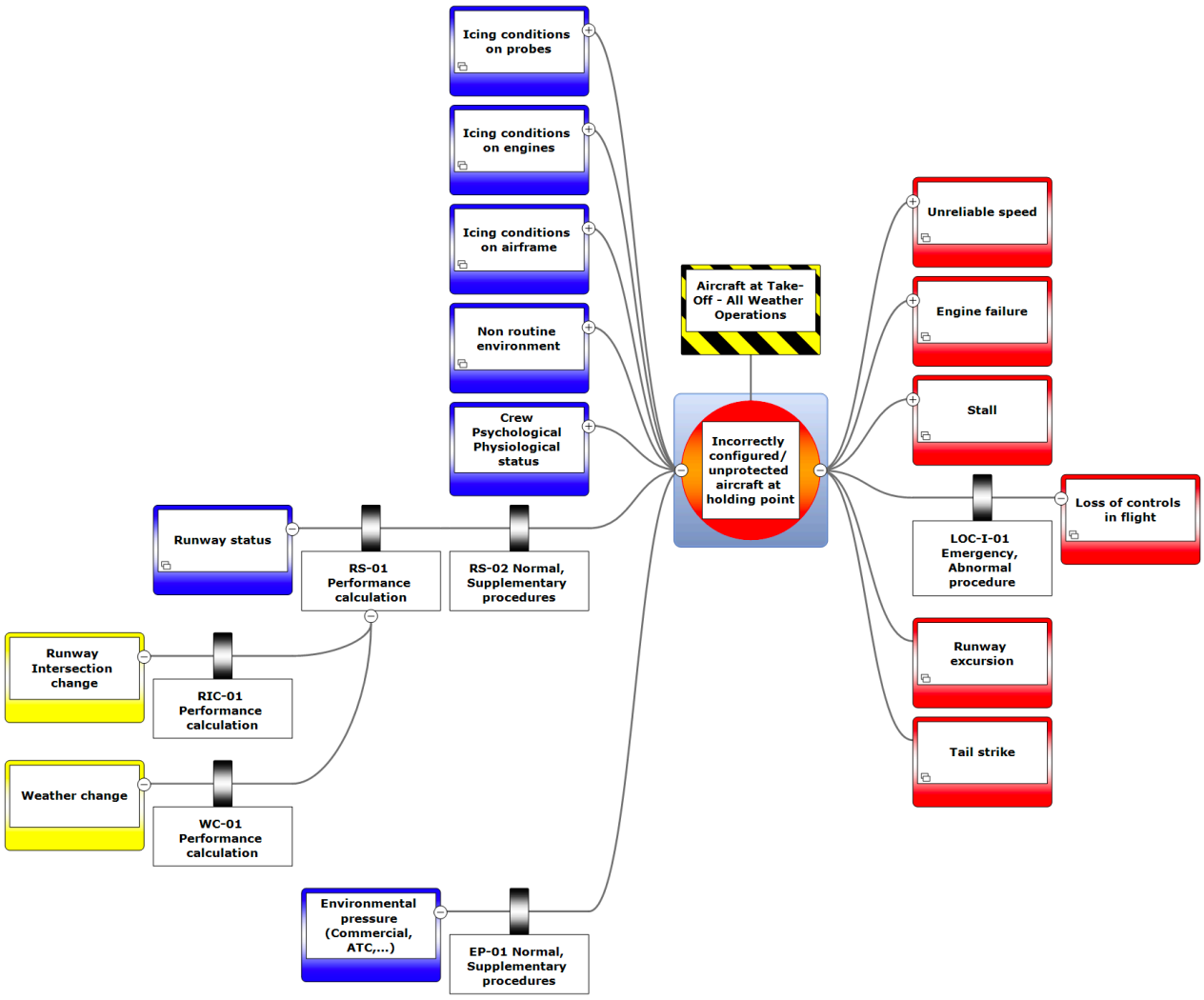


Figure 4: Bow-Tie visual risk assessment, Aircraft at Take-Off – All Weather Operations

"Runway status", "Environmental pressure (Commercial, ATC, …)" threats and "Loss of controls in flight", "Runway excursion", "Tail strike" consequences are the only limbs enlarged for the purpose of present analysis.
Left of Top Event, the last two of seven threats, "Runway status" and "Environmental pressure (Commercial, ATC, ...)" are exactly parents of our occurrence initiating events.
Right of Top Event, the last three of six consequences are exactly our proposed outcomes.
Moreover, RS-01 barrier is strictly influenced by two escalating factors, the first of those, "Runway Intersection change" (occurred to flight crew), pierced through a failed mitigating barrier "RIC-01 Performance calculation".
It is worth noting that no mitigating barriers are in place on the last two consequential limbs "Runway excursion", "Tail strike".

Enlarging barriers RS-01, RS-02, RIC-01, WC-01, EP-01 e LOC-I-01 the following can be inferred (Figure 5):

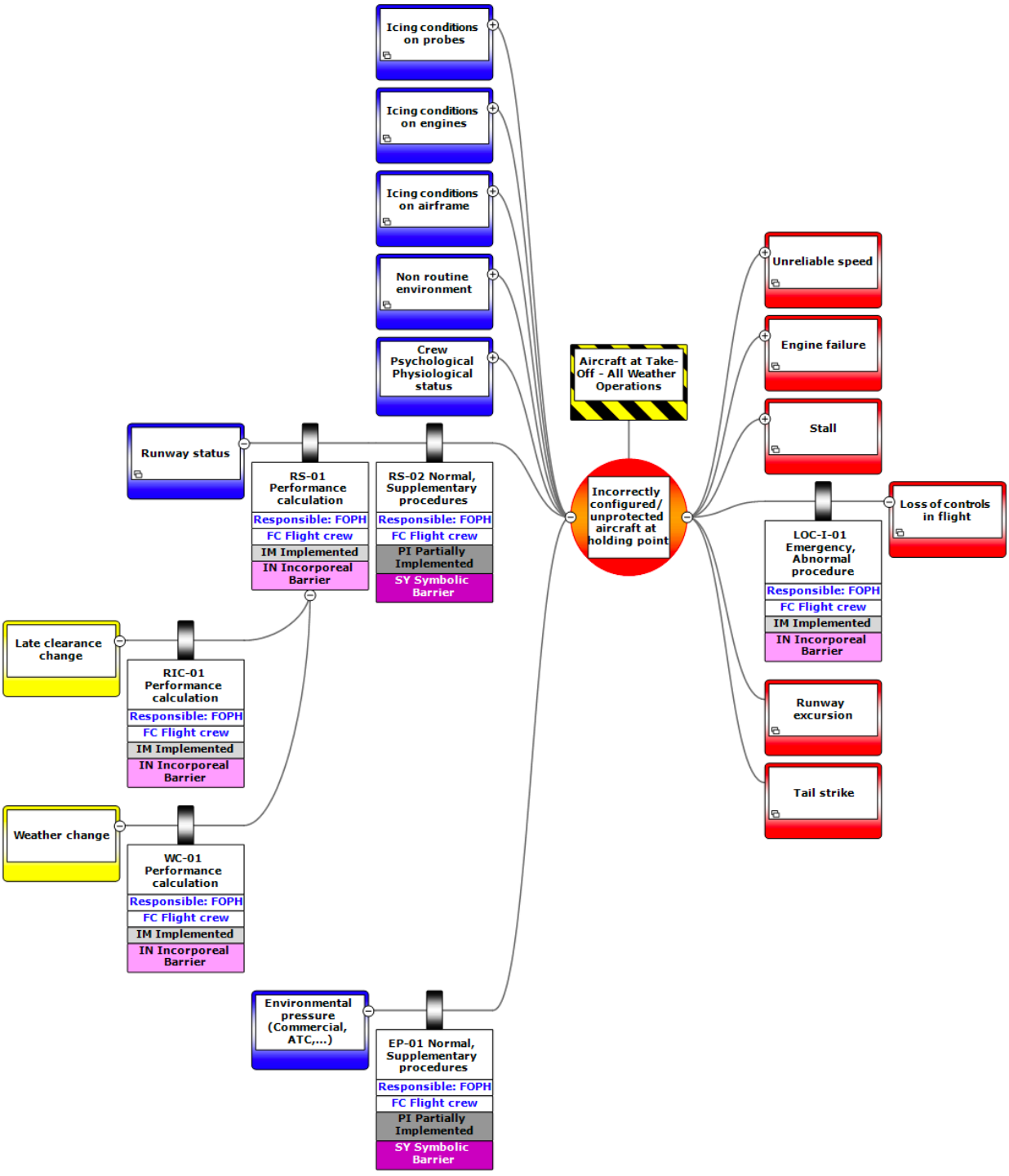


Figure 5: Barrier description

Responsibility: All barriers report to Flight Operations;
Accountability: Flight Crew are the only direct actors interfacing with all barriers;
Implementation: RS-02 and EP-01 have new software FWC-H2F9D (see next page) at implementing stage, but only on some fleet aircraft (this is the reason of Partially Implemented barrier indicated);
Nature: RS-01, RIC-01, WC-01 and LOC-I-01 are Incorporeal barriers: RS-02, EP-01 only Symbolic.

Final summary

1. On causal and consequential risk assessment limbs no risk distribution is in place as for Responsibility and Accountability. Flight Crew are the only direct actors of the game and no alternative choice can be considered for obvious reasons.

2. FWC-H2F9D[1] software implementation certainly mitigates the frequency of similar occurrences, since it introduces a partially Functional interface, however it cannot prevent occurrences belonging to the following scenario: Flight Crew omits either the insertion of new FMGC-MCDU Flaps setting and the selection of corresponding Flaps lever, in response of a triggered new departure configuration change.

3. Human Factor wise, an effective and inexpensive counter measure (without any Regulator actor involvement) which should lead to a further frequency mitigation could be adopted with the following two steps:
   a. The reading of the Before Take-Off checklist "Above the line", shall be postponed at the holding point, aircraft on parking brake and only after having implemented all modifications for new TODC related to Runway departing position and Weather change.
   Moving as close as possible to the Top Event the most powerful barriers in place (Symbolic RS-02, EP-01 as neither Functional nor Physical exist) can be the an immediate effective countermeasure.
   b. During such reading and only after having complied with "FCTM PR-NP-SOP-70-00016299.0001001 (Take-Off data)" and "OM Part B PRO-NOR-SOP-10-A-00010248.0001001 (Take-Off data/Conditions)" PM challenges Take-Off Data Card (Speeds, Flaps e Flex) physically keeping in hand TODC, while PF responding and visually checking in FMGC-MCDU Performance page and Flap Indication/Lever.

1 FLIGHT WARNING COMPUTER (FWC) STD H2F9D INTRODUCTION
The "F/CTL FLAP/MCDU DISAGREE" ECAM caution is added for flight crew awareness. This caution is triggered in phase 2 when the T.O. CONFIG TEST pushbutton is pressed, or in flight phase 3, if the FLAPS lever position and the FLAPS position entered in the FMS are different.