March 2024

MARS

Makeup Allocation Regulation Schiphol

Document Status

This document is a concept version of the MARS Policy, pending airline consultation. This document has been developed in partnership with GHSPs.

Table of Contents

1 Introduction

The Makeup Allocation Regulation Schiphol (MARS) is intended to establish guidelines for equitable, non-discriminatory makeup capacity allocation in the Baggage Handling System (BHS) at Amsterdam Airport Schiphol (AAS). This policy applies to the allocation of makeup capacity for commercial passenger flights only, thus excluding cargo and other flights.

This MARS policy describes the current way AAS distributes makeup capacity but also contains a new method which aims to measure the degree to which the makeup capacity allocation is optimal and non-discriminatory (i.e. fair): the VLP. This method is yet to be tested in the operational environment. Together with airlines and GHSP's, AAS aims to consult and test this new method. While testing and while applying the MARS principles AAS will take practical feedback from the GHSP's into account where possible and/or make adjustments where reasonable or necessary (see section 6.3).

This first chapter introduces Amsterdam Airport Schiphol (1.1) and the planning process for makeup allocation (1.2).

1.1 Amsterdam Airport Schiphol – priorities

AAS is a dynamic and efficient transport hub offering air, rail, and road connections. It offers all passengers, visitors, employees, and employers at AAS all of the services and facilities that they require. AAS aims to achieve this in a responsible manner: safe, efficient, reliable, sustainable, and with inspiration and hospitality.

AAS is responsible for allocating makeup capacity to the Ground Handling Service Providers (GHSPs) operating at the airport, such that each GHSP has at its disposal an equitable share of available capacity which allows for the makeup of the flights that each handler is responsible for. This involves allocation and planning on a per-season basis, at strategic and operational levels. The increasing demand on the operational model, diversity of stakeholder needs, and the increasing number of criteria that planners and managers must deal with make this a complex and challenging task. AAS is devoting a great deal of attention to three concrete priorities; 1.) Optimizing capacity, 2.) Improving system and operational performance, and 3.) Delivering excellent employee & passenger experiences. The quality of service at AAS is a defining characteristic of the airport and is a shared interest of all stakeholders. These aspects form the foundation of MARS.

Stakeholders

This policy will mainly impact Ground Handling Service Providers (GHSPs), with ancillary impacts on other stakeholders, such as airlines and all passengers traveling through AAS.

1.2 Makeup Capacity Allocation and Planning Process

As stated in section 1.1, AAS is responsible for creating a fair and non-discriminatory allocation of makeup capacity. The result is shared with GHSPs, and the two parties collaboratively work to create the makeup capacity planning for each specific area. This iterative, collaborative process is detailed in Figure 1, below.

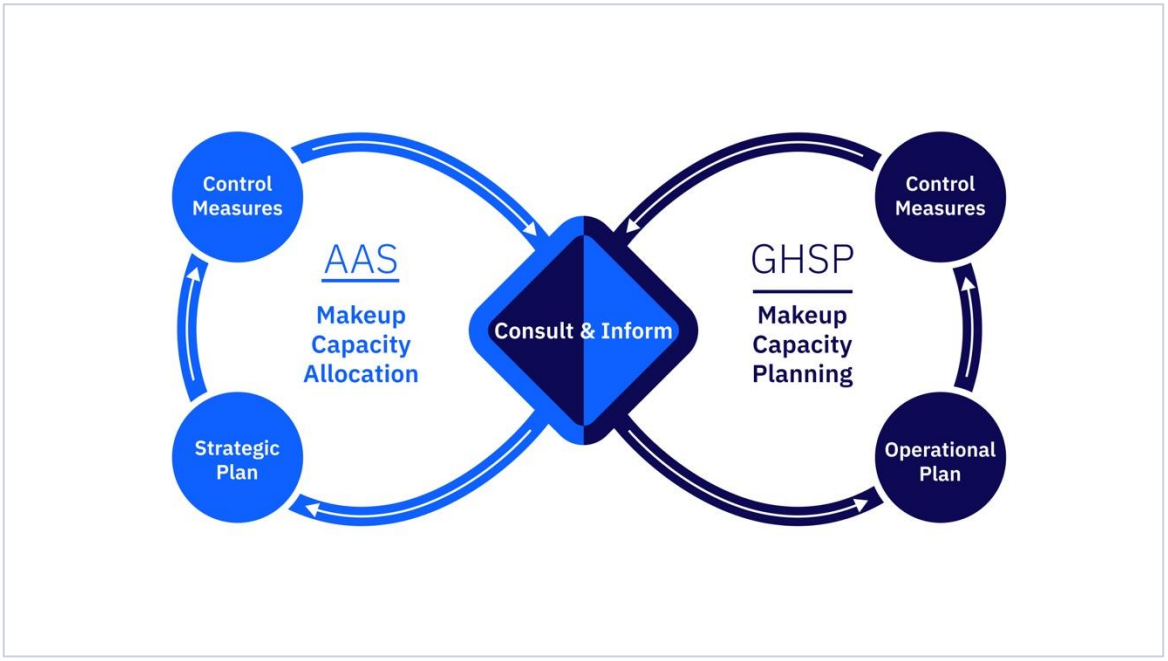


Figure 1: Collaborative allocation and planning process

AAS performs different steps in the process towards optimal makeup capacity allocation (see Table 1). These steps are performed at different moments in time and with different goals but always considering the same principles (4.1), restrictions (4.2), and optimizations (4.3). The AAS actors involved in the planning process for makeup capacity allocation operate within the Airport Operations & Aviation Partnerships (AO&AP) department .

Planning	Actor	Applicable for the period	Time to operations	Goal(s)
Integral Capacity planning	Forecasting, Analysis & Capacity management Team (AAS)	Next year, third year	3 years	Long term capacity planning
The season allocation of work packages and zoning	Senior Asset planner (AAS)	Next season	Up to 6 months	Short term (season-level) capacity allocation
Planning of flights to makeup capacity	Asset planner (in partnership with GHSPs)	Next week	D-7 to D-1	Planning & possible control measures
Operational assignment	BASS Regie (in partnership with GHSPs)	Today	Up until 24 hours	Operational makeup capacity planning changes

Table 1: The different planning cycles

2 Rights and Obligations

In order to facilitate optimal makeup capacity allocation, it is necessary to have the basic rights (2.1) and obligations (2.2) in place. These are outlined in this chapter.

2.1 Rights

The objective of baggage makeup capacity allocation is to provide all GHSPs with assets to make up flights on-time and in-full, whilst maintaining overall BHS integrity. Therefore, all flights are assigned at least one makeup location in order for the GHSP to have the ability to process all expected bags. AAS provides the makeup locations based on the expected demand and optimal baggage flows. Therefore, the number and/or type of assigned assets or timing may be adapted based on, amongst others, a change in number of expected bags and their arrival patterns.

2.1.1 Announcement of season plan

If airlines or GHSPs have specific requests with regard to the baggage makeup capacity allocation, they should contact opmaakplanning@schiphol.nl at the latest six weeks before the start of the new IATA winter or summer season.

Four weeks prior to the IATA new season, the preliminary baseline plan is shared with the GHSPs by the AAS Senior Asset Planner via e-mail. This baseline plan is based on the flight schedule in the coming season. If and when applicable, separate consultation will take place with the GHSPs whose specific requests cannot be met. GHSPs may send their comments to opmaakplanning@schiphol.nl at the latest two weeks prior to the start of the IATA season. If possible, the baseline planning will be adjusted accordingly, whereafter the final version will be published. The final version is, however, still subject to operational changes, as stated in chapter 5.

2.2 Obligations

The following rules must be obliged to:

- AAS will provide facilities, otherwise known as makeup locations, consisting of: exit points and their associated makeup positions (MUPs) and loading unit positions (LUPs), for baggage makeup.
- AAS will distribute information related to capacity allocation and planning in a timely manner, as described in section 1.2 and chapter 6.

- GHSPs must provide makeup staff and equipment for each assigned makeup location. AAS assumes sufficient staffing from all GHSPs.
- The GHSPs are requested to provide the seasonal flight schedule, in the agreed-upon information system(s) of record for makeup allocation and planning, at least 3 months in advance. In case of any changes, the GHSP should adjust this immediately, in order to have continuously accurate data for baggage make-up allocation and planning updates.
- Additionally, the GHSPs are requested to provide the information below, in the agreed-upon information system(s) of record for makeup allocation and planning. When these are not provided, AAS will calculate and derive the required planning parameters from historical data for the specific flight(s).
    - Total expected number of bags per flight split by transfer and local check-in bags, at least 3 months in advance.
    - Type of loading unit used for makeup of the flight, for example distinguishing between a container or a cart. This information should be shared by D-7.
- When an airline is considering switching to another GHSP, the relevant Customer Support Manager should be consulted as soon as possible, in order to maintain BHS integrity. Switching to another GHSP may affect the makeup location allocated for this airline or may affect the baggage area where a GHSP has their operations. For more information on maintaining BHS integrity, see section 4.1.1.
- The airlines and GHSPs are requested to provide information with regard to their expected demand versus capacity on a continuous basis throughout the year, in line with the D-30 and D-7 planning cycles. This will enable AAS to facilitate an efficient operation and to arrange control measures in a timely manner, if necessary. If a GHSP is unable to occupy all assigned makeup locations due to staff shortages, they must notify AAS based on the schedule below:
    - Before D-7: AO&AP
    - Between D-1 and D-7: APOC
    - D=0: BASS regie
- Delays must be reported to BASS regie, in case a flight's delay impacts the makeup planning (See section 5.1.3).

Flights for which data is missing or not provided will receive low priority in makeup capacity planning.

3 The Season Plan and Zoning

The season plan is a general strategy for makeup capacity allocation which is able to accommodate the expected busiest week of the season, or other exceptional weeks (for example, due to a holiday or planned work), based on the expected flight schedules provided by the airlines.

3.1 The Season Plan

Twice a year, a season plan is produced by AAS[1].The plan contains a makeup capacity planning based on MARS principles (4.1) and the flight schedules provided by airlines.

The purpose of this planning is to determine the zoning structure (3.2) and is the basis for the one-day-ahead planning made by AAS during the specific season. In addition, the season plan may reveal capacity issues during the oncoming season and is the basis for seasonal preferences. The one-day-ahead planning will take into account operational data and may therefore deviate from the season plan.

3.2 Zoning

Zoning is determined as a baseline on a twice per year basis, as a part of the season plan[2].

Each baggage hall has a focus based on handling flights nearest to their dominant bag entry point . However, the allocation of a flight to a baggage hall is also dependent on other factors, including but not limited to the baggage hall and sorter capacity, the exit point profiles, the flight profile, or works projects. Each baggage hall has a maximum capacity to guarantee safety and efficiency of the baggage process. A general logic is used to determine zoning[3] (see Table 2).

[1] AAS reserves the right to make adjustments to the plan during the season, according to situational needs.
[2] AAS reserves the right to make adjustments to zoning during the season, according to situational needs.
[3] This is a general logic, but AAS retains the right to deviate in order to maximize efficiency of the BHS and overall airport-wide performance.

Departure Gate	Departure Hall	Baggage Hall	Robots (LUPs)	Carousels (LUPs)	Laterals (LUPs)	Flow Carousels
B Pier C Pier D59-D87	1, 1A	South	6 (6)	2 (20)	19 (38)	1
B Pier C Pier D59-D87	1	BRR	0	1 (18)	0	0
B Pier C Pier D Pier E Pier F Pier G Pier	2	D Hall	0	4 (36)*	32 (93)**	1
B Pier C Pier D Pier E Pier F Pier G Pier	2	E Hall	1 (1)	3 (34)	82 (205)	1
D1-D57 E Pier F Pier G Pier H Pier M Pier	3	West	0	16 (160)	0	1

Table 2: General baggage makeup zoning logic [4,5,7]

**** Only 1,5 carousels in TSD are used in make-up allocation due to shortage of shunting space and ARBO rules.***
***** Lateral 112 is adjacent to Carousel 90 and has a shortage of handling space and presents safety issues. Therefore, it is not used for makeup.***

[4] This table is accurate as of 14th March, 2024. It is subject to change in the future, at the discretion of AAS.
[5] The number of LUPs can vary among makeup assets. (e.g. short and long laterals, large and small carousels)
[7] The number of LUPs listed in this table are cumulative per hall. 1,5 TSD Carousels are included.

4 Allocation of makeup capacity

4.1 Principles

Makeup capacity allocation and planning follows certain principles (4.1). These principles support AAS's goal to be an efficient hub airport (1.1). However, the extent to which these principles can be met is limited by physical, regulatory and other restrictions (4.2). Unfortunately, sometimes, the principles cannot be met, and the outcome of the planning is infeasible. In these cases, AAS Asset Planning will ensure a feasible planning by using control measures (4.6).

AAS uses a decision logic (4.4) to establish a stable and optimized makeup capacity plan. This chapter is written similar to the systematic approach which planning makeup capacity allocation follows. Principles are introduced in order of hierarchy as much as possible.

4.1.1 Guiding Principles

1. Safety

The safety of passengers, staff, and the general public is of utmost importance and will be the primary consideration in all decision-making related to baggage handling.

2. Compliance

MARS is designed and implemented in compliance with all relevant regulations, standards, and laws. Any and all decision-making pertaining to the allocation of makeup capacity shall therefore be governed by these regulations, standards and laws.

3. Transparency

MARS policy provides transparent policy rules and supporting logic such that makeup capacity planning decisions are clear and explainable to all stakeholders involved.

4. Fairness

MARS policy supports the fair distribution of makeup capacity across GHSPs. "Fair", in this case, refers to an unbiased and non-discriminatory planning process and an equitable allocation, wherein each handler obtains an equitable share of optimal capacity, given the capabilities and constraints of

the BHS. Therefore, each GHSP is afforded the opportunity to make-up their flights on-time and in-full, in accordance with ACM regulations. This process is further detailed in section 4.3.1.

5. Stability and Flexibility

MARS policy supports a stable planning, with minimal changes to the baseline planning within the D-7 scope. To maintain stability while providing room to manoeuvre (resilience), the MARS policy remains flexible and adaptable across certain topics, allowing for easy shifting, with minimal impact to the overall system.

Thus, AAS aims to create a stable strategic-level capacity allocation plan. Within the boundaries of this plan, AAS allows for flexibility to work with GHSPs to create the operational plans.

6. Best Effort

MARS policy maximizes efficient use of the BHS at AAS. Within these bounds, AAS will make a best effort to accommodate GHSPs' resource planning and preferences.

7. Continuous Improvement

MARS policy implementation will be continuously monitored and evaluated to identify opportunities for improvement and to ensure that it remains effective and efficient.

8. Collaboration

MARS policy aims at facilitating collaboration between airlines, GHSPs, and airport staff. This is essential in ensuring the smooth operation of the baggage makeup process (see Figure 1).

9. Communication

MARS policy will support effective communication between all stakeholders, including airlines, GHSPs, and airport staff, which is critical in ensuring the overall success of the BHS.

4.1.2 Policy Principles

This section details the more specific planning principles which guide AAS's allocation decisions. However, due to the different layouts and assets in each makeup area, there are area-specific considerations, as well (4.1.3).

1. MARS policy maximizes efficient use of the BHS and facilitates the fastest travel time of bags through the system for the majority of bags. As a result:

    a. In general, makeup location should be planned as close as possible to the entry point of the largest number of bags entered into the system for a designated flight.
    b. MARS policy aims to make efficient use and ensure resiliency of the critical parts of the BHS, and therefore limits the number of bags through non-redundant lines.
    c. Makeup areas are planned on the basis of their maximum operational capacity, which is lower than their maximum technical capacity.

2. Every passenger flight is allocated a make-up location. Flights may be allocated more than one makeup location, if appropriate, based on the Decision Logic (section 4.4).

3. Planning always considers and works to optimize the full AAS operation, including but not limited to check-in, stand allocation, border control, security, baggage makeup and all other parts of the system.

4. All GHSPs are able to conduct operations in all halls, within the designated AAS safety and security limitations.

5. AAS plans for a maximum number of segregations: 5 segregations per "wide-body" (WIBO) aircraft flight and 3 segregations per "narrow-body" (NABO) aircraft flight. This is subject to periodic review.

6. AAS allocates makeup capacity based on the number of LU positions needed (for more information, see sections 4.3 and 4.4). AAS assumes that the GHSP takes organisational measures to ensure sufficient resources to complete makeup.

7. In makeup capacity allocation, one flow carousel is designated per baggage handling area. These flow carousels are meant to be used as a valve for the BHS and are, therefore, not allocated as standard available makeup capacity.

4.1.3 Area-specific principles

South

1. The basis for operations in baggage hall South is the usage of robots in combination with last minute laterals. Makeup capacity planning maximizes the utilisation of the robot(s). This could translate to, but is not limited to, a makeup plan which prioritises the number of bags per segregation in determining robot allocation.

2. Currently, no more than 3 GHSPs may conduct makeup operations in South at one time[6].

BRR

1. Due to space restrictions around the carousel, a maximum of 3 separate GHSPs will be able to operate simultaneously in the BRR.

2. Due to the physical restrictions of the BHS routing to the BRR, flights planned for the BRR will have check-in allocation in Terminal 1. AAS will minimize the number of flights being made-up in the BRR with transfer bags on board. Flights with transfer bags will be evaluated for alternative processes. For example, transfer bags could be sent to the South area and then transported to the BRR for further handling.

D Hall

1. In the D hall, TSD carousels are the preferred makeup locations for flights with high volumes (of transfer bags).

2. High-load flights are assigned to “purple” laterals so that they can be reached by both red and blue Bagtrax lines.

3. For flights with a Terminal 2 check-in, which have D or E as a preferential makeup area, wide bodies are prioritized in E, and narrow bodies in D.

E Hall

1. The E Hall carousels (61, 62, 63) are the preferred makeup locations for flights with high volumes of bags.

[6] Under extraordinary circumstances, contingency rules regarding the number of GHSPs per hall will be observed.

West

1. As long as the West Hall does not have a designated buffer, the carousels act, in principle, as a buffering system.

2. AAS reserves the right to allow for buffer rules for specific flights. This will be decided on a case-by-case basis, and includes an end-date, to be reviewed. In case of disruptions, AAS reserves the right to remove the buffer rules on the day of operation, so as not to jeopardize the BHS. Any resulting impacts are the responsibility of the affected GHSPs.

4.2 Policy Restrictions

In the previous section, the guiding and planning principles have been introduced (4.1). There are, however, some restrictions for the use of the infrastructure which must always be considered. This is either based on physical and system restrictions in the BHS as a whole (4.2.1), area-specific restrictions (4.2.2), or interruptions in the system due to works (4.2.3). In the event of mandatory regulatory requirements by Government agencies and Government ministries with respect to the handling of a departing flight, AAS will comply.

The baggage makeup process is executed across diverse areas, each with distinct physical and system characteristics. These must be considered for makeup capacity allocation. The restrictions are detailed in the subsequent sections.

4.2.1 General Physical and System Restrictions

- High-Risk flights must have a standalone makeup location, meaning that flights with a Government/Security indication by KMar or other national or international authority must be the *only* flight(s) allocated to an exit point with sufficient capacity at that time. The exit point will be decided together with security and is not subject to change on the day of operations whatsoever.
- The maximum capacity of a robot allows for one load unit pertaining to one flight to be loaded at a time. Therefore, a flight may be made up across multiple robots.
- Robots are designed to load specific types of LUs, and therefore are not suitable across all flights.

4.2.2 Area-specific Restrictions

South

1. In order for their flights to be allocated to robots in South, GHSPs must be trained in robot usage and must be aligned with AAS on batching operations.

BRR

1. The BRR is only accessible from Terminal 1 Check-in. Transfer bags cannot reach the BRR via an in-system route.
2. The BRR is not connected to an in-system buffer.

D Hall

1. Only 1.5 of 4 carousels in TSD may currently be used for conventional makeup due to other operational processes in the area and because of Occupational Health & Safety (ARBO) rules.

E Hall

1. There is a maximum of 5 LUPs per lateral lane. A lateral lane consists of one high and one low lateral.

West

1. The two lines 420 and 421 connecting West to the other areas and to the Backbone have a capacity restriction and are non-redundant. They should be used minimally and most optimally. It is, therefore, undesirable for flights not made up in West to check-in in Departure Hall 3. Vice versa, it is undesirable to make up flights in West that are checked-in in other parts of the airport.

4.2.3 Works

Due to projects, maintenance and (technical) failure, makeup areas and assets can be Under Service (U/S), which could lead to temporary capacity reduction. In the Integral Capacity Plan (ICP) and season plan, an assumption is included for the amount of assets and areas which are U/S. Works could have temporary effects on allocation and planning rules.

4.3 Makeup Capacity Allocation and Planning: VLP

Within the boundaries set by the principles and restrictions described above (4.1, 4.2), AAS allocates available makeup capacity with the objective of ensuring that each flight can be loaded on-time and in-full by its designated GHSP, whilst maintaining overall BHS integrity. In addition, AAS aims to achieve a fair allocation of available makeup capacity across all GHSPs operating at AAS (in line with Guiding Principle 4, in section 4.1.1).

4.3.1 Measurement of optimisation and fairness: VLP Indicator

AAS will measure and report the degree to which makeup capacity allocation is optimal and non-discriminatory (i.e. fair) through the Key Performance Indicator (KPI); "VLP".

The VLP Indicator measures the degree to which a given flight:

- is allocated to a makeup location with a sufficient number of available LU positions (V = Volume),
- is allocated to a makeup location that is optimally located considering its dominant baggage entry point (L = Location),
- can be made up in the designated exit point operating time against accepted productivity norms (P = Productivity).

The VLP score is the unweighted average of each of its aforementioned components. A VLP score of 1 indicates an optimal flight allocation. Therefore, AAS aims to allocate available makeup capacity such that the VLP score measured across all flights in the peak time brackets is 1, or as close as possible to 1.

Refer to Appendix 9.1 for the definitions of both the VLP Indicator and its constituent components, its calculation method, as well as the logic which guides the interpretation of the VLP scores.

4.4 Makeup Capacity Allocation and Planning: Decision Logic

AAS applies a decision logic to optimize the allocation of available makeup capacity across all flights on a day (Diagram 1).

The VLP Indicator is applied both in the allocation and planning decision process and in the evaluation and continuous improvement of this process. Applying the decision

logic, AAS aspires to achieve optimal VLP scores across the entire flight schedule of a given day (24 hours). Special attention is given to optimizing the VLP scores across all GHSPs during the peak times when makeup capacity is scarcest, relative to demand.

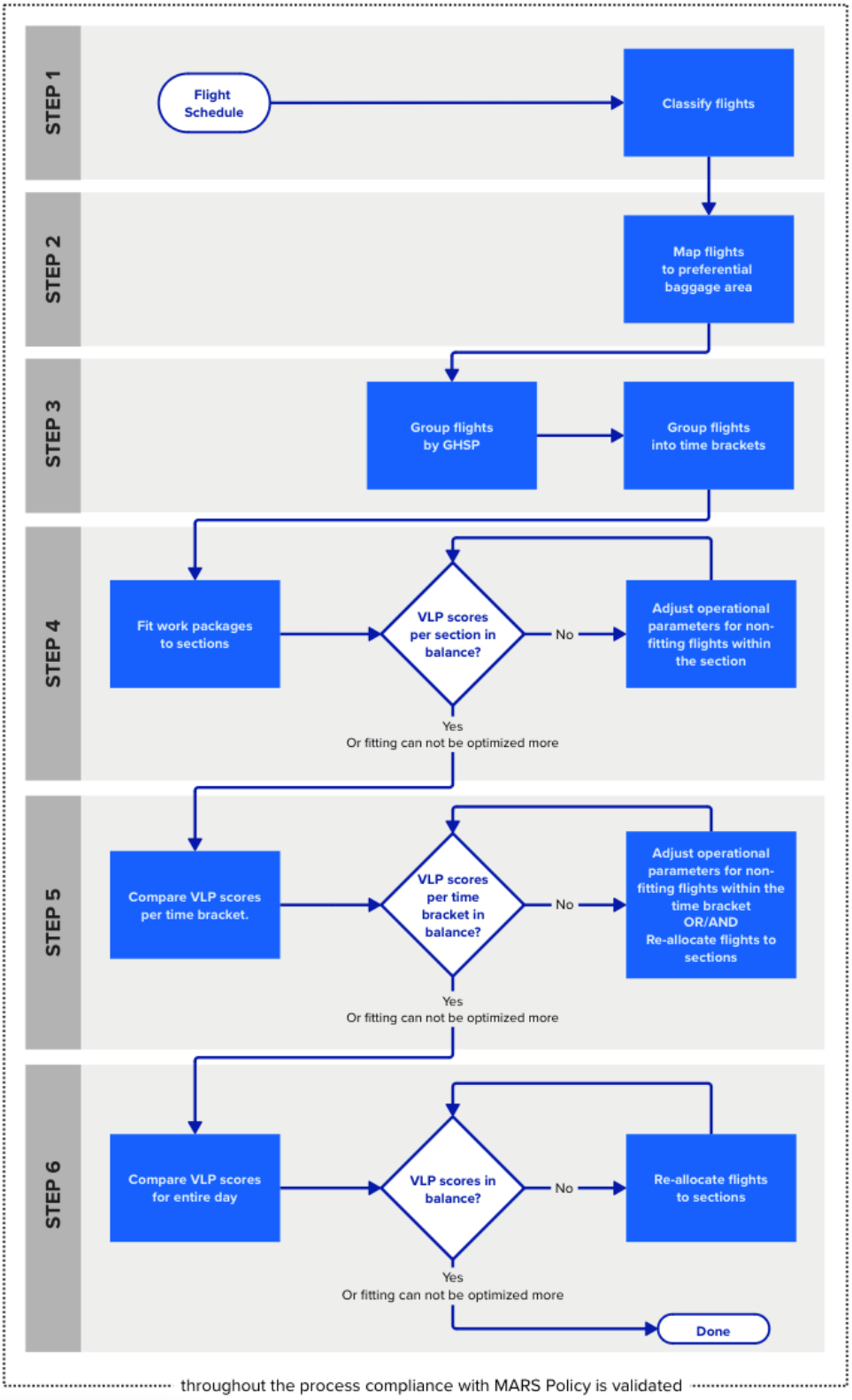


Diagram 1: Decision Logic (6 Steps)

4.4.1 The Decision Logic in 6 Steps

The makeup capacity allocation and planning decision logic comprises six steps. These six steps are summarized and illustrated in the diagram below. Each of the six steps in this process is described, illustrated and supplemented with examples in Appendix 9.3.

Step description:

1. Classify flights

Flights are classified in one of four profiles, as per the table below:

Profile	Characteristic
A	High-Risk flights
B	Multi-leg flights
C	Flights with a projected bag volume of 350 Bax or more
D	All other flights

Table 3: Flight profile classification

2. Map flights to preferential baggage area

The preferential baggage area is the baggage area where the departing flight should be made up, according to the dominant entry point of the flight's baggage (in line with Policy Principle 1, in section 4.1.2).

3. Group flights by GHSP and time bracket

Flights are grouped by the GHSP associated with the airline that operates the flight. In addition, flights are grouped into time brackets based on their Scheduled Time of Departure (STD). These time brackets are fixed:

This results in work packages: flights grouped by GHSP and time bracket, split by the tagging of their preferential baggage area and complemented with their Flight Profile.

4. Fit work packages to sections

Each work package is fitted to one or more makeup locations which are located adjacent, or as close as possible, to each other. This group of makeup locations is called a section. Fitting is performed by flight in order of Flight

Profile, starting with Profile A, and subsequently in alphabetical order. Each of the constituent elements of the VLP Indicator is used to determine the fit between a Flight and a Makeup Location: LUs required versus LU positions available (V), required versus available location (L) and required versus achievable productivity (P).

For more information, please refer to Appendix 9.1.

5. Optimize section plan

In order to achieve *maximized* capacity utilization during peak time brackets and *optimized* capacity utilization during off-peak time brackets, different ranges of acceptable VLP scores are set for each time bracket. The makeup plan for a time bracket is considered balanced if and when the average VLP score for each of the GHSPs operating in that time bracket falls within this acceptable range.

Appendix 9.1 describes the method that is applied to determine the aforementioned ranges of acceptable VLP scores.

If one or more VLP scores are sub-optimal, i.e. outside of the acceptable range, control measures are planned within the time brackets concerned.

For more information, please refer to Appendix 9.1.

6. Optimize daily plan

The ultimate objective is to achieve fair allocation of available makeup capacity across all flights on a day, such that each GHSP obtains an equitable share of optimal capacity, given the capabilities and constraints of the BHS. To measure if this objective is achieved, an overall acceptable range of VLP scores for the entire day is pre-defined by AAS. The makeup plan for the entire day is considered balanced, if the average VLP score for each of the GHSPs is within this acceptable range.

For more information on this step and for more on the method that is applied to determine the aforementioned range, please refer to Appendix 9.1.

4.5 Preferences – Airlines and/or Ground Handlers

Based on MARS, AAS will offer a makeup location to every flight. All requirements based on rules and regulations are incorporated in the planning, as described in sections 4.1 and 4.2. Nex to these requirements, airlines, GHSPs and/or other stakeholders may have preferences which lead to a preferred location. AAS determines what is possible based on best effort, but no guarantees can be made.

It is not possible to either have dedicated or excluded makeup locations and assets for specific airlines or flights, with the exception of High-Risk flights. Any historical or future agreement will be treated as preference. AAS will accommodate preferences if they meet the requirements below. The preference must:

- be in compliance with MARS;
- have no negative impact on makeup operations of other GHSPs;
- have no negative effect on total BHS capacity.

Temporary exceptions may be made in case of exceptional situations (e.g., crisis situations, works, contingency measures, etc.), but these will always have an intended end-date in order to return to 'normal' operations.

If a GHSP wishes to indicate or change a preference or request, or experiences an exceptional situation for which accommodation is required, they should contact opmaakplanning@schiphol.nl before D=0. AAS will act according to the “best effort” principle stated herein (see section 4.1).

4.6 If demand exceeds capacity

From sections 4.1, 4.2 and 4.3, all flights are assigned a makeup location and asset(s) which meet the most basic principles and restrictions. However, in peak periods or due to irregularities, demand could exceed capacity. AAS uses a range of control measures to address this, including but not limited to the following in order of which the measure is applied most frequently:

1. mandating the use of pre-makeup or post-makeup buffer capacity;
2. decrease of the separation time between flights on the same exit points;
3. adjustment of the exit point operating time;
4. adjustment of EBSS, D-buffer and South buffer storage and batch release parameters;
5. In exceptional and temporary cases, utilization of a portion of the designated flow carousel(s) for makeup may be agreed upon. Under exceptional circumstances, flow carousels may be used as contingency makeup capacity, but this would be decided on a case-by-case basis, and would include an “end date”, to be determined by AAS.

AAS will always focus on preserving overall safety and BHS integrity as a first priority. Therefore, the hierarchy in measures presented above may be deviated from if deemed necessary.

The overarching principle is to avoid changes to the optimized allocation of flights to exit points. Within the boundaries of this plan, AAS will first apply the methods described above to increase efficient use of the allocated capacity.

However, if the above methods are not sufficient to resolve the shortage of makeup capacity, re-allocation of flights to different sections is conducted in order of Flight Profile, starting with Profile D flights and then reverse alphabetical order.

Profile A (High-Risk) flights are exempted from either control measures or re-allocation measures, or both, until and unless no other alternative is available to resolve capacity shortage. In that case, control measures or re-allocations considered will require the approval of AAS Security before being applied.

5 Day of Operations: Assignment of Exit Points

On the day of operation, AAS will anticipate (expected) changes in schedules and disruptions, by changing the operational planning with as few consequences for airlines, GHSPs, and passengers as possible. This chapter describes the criteria applied to make a change to the operational planning and the criteria applied to update the exit point of a flight.

5.1 Decision to change the plan

AAS assigns a new exit point for the flight if there are conflicts in the planning. This can occur in the following cases:

5.1.1 Changed flight data

Flights for which flight data has changed since closure of the one-day-ahead planning, and which can no longer be allocated to the scheduled exit point based on the allocation conditions, may not claim the exit point. Changes affecting exit point allocation include, but are not limited to:

- Changes in number of expected bags onboard resulting in changes in number of LUs needed for make-up;
- Change in aircraft type resulting in a change in LU type;
- Change in number of segregations

A new exit point will be assigned following the general principles stipulated in Chapter 4.

5.1.2 Changed security conditions

Changes to the security regulations laid down by the Dutch government or any other relevant national or international authority may require a change to the makeup allocation plan. AAS aims to accommodate extra security checks by allocating an exit point which meets the security requirements stipulated by governmental bodies.

5.1.3 Delayed arrival or departure

Delayed arrival or departure could negatively impact the baggage makeup process, for example through potential turn-around delays and mishandled bags. All parties in the process are expected to take measures to mitigate these risks. A departure is considered delayed when the flight is delayed for 15 minutes or more. When makeup is impacted by this delay and this is reported more than 30 minutes before makeup location opening time, the GHSP will be consulted to determine whether the planned exit point allocation can be maintained, and for how long. AAS will take measures aimed at preventing a knock-on effect on subsequent flights. This may involve relocating the assigned exit point for the delayed flight.

5.1.4 Capacity optimization

AAS's makeup capacity is fully utilized at some times of the day. As a consequence, a required change to the makeup allocation plan may result in multiple updates to other flights to accommodate the change. This also includes aligning with passenger, baggage, and airside processes. AAS will prioritize a solution which results in the least number of changes.

5.1.5 Technical disruptions

When an exit point breaks down during the makeup process, AAS will take the exit point out of order. Reallocation of affected planned flights will be at the discretion of the BASS Regie.

5.2 Response to change

In the case of a required change to the makeup allocation plan, as a result of one of the conditions described in section 5.1, AAS will choose the least disturbing measure to accommodate the change. The measures that can be chosen and their conditions, if any, are listed in this chapter in order of priority. The measure with the highest priority will be applied if appropriate. Please note that all criteria from chapter 4 also apply to the makeup allocation plan on the day of operation.

5.2.1 Exit point change within baggage area

An exit point change is a common way to respond to a disrupting event with impact on makeup flows. AAS will aim to perform the least number of changes possible, especially last-minute makeup allocation changes. If an exit point change is required

on the day of operations, AAS will aim to limit the disruption caused for other GHSPs. AAS will prioritize keeping the new exit point within the baggage area.

5.2.2 Exit point change outside the initial allocated baggage area

When the available exit points in the allocated baggage hall are insufficient, AAS will explore options in other baggage areas. Whenever the new exit point will be allocated in another baggage area, AAS will contact the impacted GHSP.

6 Communication

6.1 Evaluation and announcement of season plan

Before the start of each new summer or winter schedule, AAS will present the season plan. Prior to the presentation, the GHSPs and/or airlines will be contacted to discuss any issues and agree on the season plan. Before the ratification of the season plan, the airlines, and the GHSPs themselves can submit requests for incorporation into the plan.

Structural changes or new circumstances may call for adjustments to the season preferences before the end of the summer or winter schedule. The parties directly involved in such interim changes will be consulted by the relevant AAS Customer Support Manager or Senior Asset Planner.

6.2 Operational communication

The operational planning will be published in the BHS from D-3 onwards. In case of any changes, the GHSP should contact AAS. Communication with AAS is arranged via opmaakplanning@schiphol.nl. Any information, queries and adjustments which have no relation to the day of operations may be announced via this e-mail address. On the day of operations, communication with AAS is arranged through the BASS Regie, who acts as the representative of AAS. BASS Regie is open 24 hours a day for operational information, queries and adjustments to makeup allocation and planning.

6.3 Continuous improvement and communication of policy updates

One of het main goals of MARS is to allocate a fair share of capacity to every handler based on the principles covered in previous chapters. These principles aim to cover all practical situations. In case the GHSP encounters operational issues due to principles applied through MARS, AAS will maximize its effort to make the necessary adjustments in cooperation with GHSPs and after testing the effects of the adjustments on the Schiphol system.

In order to maintain the most up-to-date principles and to account for future changes to the baggage system, airport and/or handler processes, as well as any changes to applicable laws and regulations, MARS will be reviewed on a regular basis. AAS may consult GHSPs and other relevant stakeholders and will communicate any formalized updates to the MARS policy.

6.4 Contact information

If you have any questions, the contact details for the MARS policy are given below. Of course, you may also always ask your AAS Customer Support Manager.

Senior Asset Planner or Process Owner, AAS Baggage Operations
opmaakplanning@schiphol.nl.

7 Reference Documents

Applicable laws and regulations

The MARS policy as well as all makeup allocation and planning decisions which follow, will be compliant with all applicable laws and regulations. These include (but are not limited to) the laws and regulations as named in Schiphol's License to Operate for Ground Handlers:

- The Aviation Act/Law;
- The Occupational Health and Safety Legislation;
- EU Commission Regulation (EU) No 139/2014;
- Schiphol Regulations;
- Schiphol Airport Charges and Conditions;
- Schiphol Access Policy and Admissions Regulations;
- Conditions Schiphol Pass Persons;
- The Baggage Terms and Conditions at Amsterdam Airport Schiphol

Further Reading

The documents below can be found on: https://www.schiphol.nl/en/operations

- Border zone
- Zoning structure
- GHSP license to operate
- CIDAR (Check-In Desk Allocation Regulation Schiphol)
- RASAS (Regulation Aircraft Stand Allocation Schiphol)

8 Glossary and Acronyms

AAS	Amsterdam Airport Schiphol
ACM	Authority for Consumers and Markets. The Dutch ACM ensures fair competition between businesses, and protects consumer interests.
Aircraft Stand	A location where passengers may board/disembark the aircraft.
AO&AP	Airport Operations & Aviation Partnerships
APOC	Airport Operations Centre
ARBO; Arbowet	Dutch term for Occupational Health: arbeidsomstandigheden; Arbeidsomstandighedenwet
Peak period	This term refers to the period(s) of highest volume of baggage traffic, typically occurring during peak travel seasons, holidays, and daily peaks for BHS. During these times, Schiphol experiences an increased number of flights and passengers, resulting in a higher volume of baggage being processed through the baggage handling system (BHS).
BASS	In Dutch: Bagage Afhandeling Systeem Schiphol

Bag arrival pattern	The pattern by which bags are entered into the BHS.
Bag drop pattern	Also commonly referred to as "dump profile". This is the pattern by which bags are dropped onto their assigned exit point(s).
BHS	Baggage Handling System
Buffer Rules	For West Hall, the allocation of buffer usage for specific flights, on a case-by-case basis, with a defined end-date.
Dominant entry point	The location at which the majority of the bags for a flight enters the BHS.
Dump Profile	The pattern of the frequency in time of arrival at ('dump on') an exit point of the bags for a particular flight
Exit Point	The physical asset which is used to collect bags for a particular flight and where to load bags into Loading Units. Exit Points can be either a: • Lateral • Carousel • Robot
FACT	Forecasting, Analysis & Capacity Management Team

Flight Profile	The profile of a flight is determined by assessing characteristics of the flight that may result in an increase of the effort needed to complete its makeup on time and in full (see Appendix 9.3)
Flow carousel	This term refers to a carousel which is designated to receive only those bags which cannot be processed in the baggage system.
GHSP(s)	Ground Handling Service Provider(s)
ICP	Integral Capacity Plan
LUs - Loading Units	This term refers to specific devices which are used in baggage makeup to store and transport baggage from the system to the designated aircraft.
LUP - LU Position	A physical space at an exit point where an LU is positioned so that it can be loaded with bags.
Makeup Location	The location at which the makeup of a flight is conducted. A makeup location consists of the following components: 1. The exit point 2. One or more makeup positions (MUPs) 3. One or more loading unit positions (LUPs)
MARS	Makeup Allocation Regulation Schiphol

Multi-leg	Refers to flights with multiple departure points using the same flight number.
MUP - Makeup Position	A position at an exit point at which a GHSP staff member loads bags into an LU.
NABO	Narrow-body aircraft
OS/OOG	Odd-size / Out of gauge (baggage). Baggage which is not suitable for the BHS and therefore is handled outside of the BHS. More information to be found in Baggage Terms & Conditions.
Post Makeup Buffer	A physical space at which one or more Loading Unit(s) containing the bags for a particular flight is parked until it can be taken to that flight's aircraft (stand) for loading of the bags into the aircraft.
Pre Makeup Buffer	A physical space at which one or more Loading Units are parked until they can be taken to an Exit Point or until they can be loaded with bags for a particular flight.
Section	A logical grouping of one or more adjacent makeup locations at which one GHSP performs makeup for one or more flights within a particular time bracket.
Segregation (or Subsortation)	These terms can be used interchangeably. They refer to the different categories used to separate baggage when making up a flight. Examples of

	segregations could include, but are not limited to, first class, business class, local, beyond transfer, etc.
STD	Scheduled Time of Departure
U/S	Under Service
VLP	VLP is a Key Performance Indicator which measures: 1. the degree to which a given flight is allocated to an exit point with a sufficient number of available LU positions (V for Volume); 2. the degree to which a given flight is allocated to an exit point that is optimally located considering its primary baggage entry point and aircraft stand (L for Location); 3. the degree to which a given flight can be made up against accepted productivity norms (P for Productivity).
WIBO	Wide-body aircraft

9 Appendix

9.1 VLP

KPI Decomposition

Component	Volume (V)
Meaning	Each flight gets allocated to an exit point with sufficient LU positions
Calculation	$\frac{\text{Number of LUs needed for the flight}}{Number\ of\ LU\ Positions\ allocated}$

Component	Location (L)	
Meaning	Each flight gets allocated to an exit point that is optimal in relation to the flight's VOP and Bag Entry Point (Check-In or Transfer)	
Calculation	**Score**	**Reason**
	1,0	Optimal exit point location in relation to dominant baggage entry point
	1,25	Exit point location requires a longer process time than optimal
	1,5	Non-preferential exit point location (or BRR due to restricted system availability)
	1,75	Exit point location requires baggage travelling via a critical capacity route (backbone or non-redundant line)
	2,0	Exit point location requires baggage travelling via a critical capacity route AND requires a longer process time than optimal
	3,0	Flight is allocated to a flow carousel

Component	Productivity (P)
Meaning	All bags for a flight can be loaded in the designated runtime against agreed productivity norms
Calculation	$\frac{\text{Productivity needed to make up the flight}}{Productivity\ Norm\ for\ the\ allocated\ MUPs}$

VLP	
KPI Calculation	$VLP = \frac{\text{Volume} + \text{Location} + \text{Productivity}}{3}$

KPI Interpretation

A VLP score of 1 reflects that a given flight is allocated to an optimal makeup location which ensures the flight can be loaded on-time and in-full by its designated GHSP.

A VLP score that is higher than 1 reflects that a given flight is allocated to a makeup location at which the flight can only be loaded on-time and in-full through additional measures and potentially activities by its designated GHSP. This can be assessed through any or all of the VLP indicator's components:

- if V is higher than 1, then the number of LU positions needed for the flight exceeds the number of LU positions available at the makeup location. Additional measures such as pre-makeup and/or post-makeup buffering may be required;

- if L is higher than 1, then the makeup location is not in its preferential baggage area. Additional movement of equipment and baggage, as well as longer travel distances within the BHS from the baggage entry point(s) and/or to the aircraft stand may result;

- if P is higher than 1, then the productivity required to make up the flight on-time and in-full is higher than the accepted norm. Additional staff and/or additional makeup locations may be required;

A VLP score that is lower than 1 reflects that a given flight is allocated to makeup location at which the flight can be loaded on-time and in-full, yet that the makeup location provides larger capability than what is required for this flight. This can be assessed through any or all of the VLP indicator's components:

- if V is lower than 1, then the number of LU positions needed for the flight is lower than the number of LU positions that the designated makeup location provides;

- L cannot be lower than 1, since a score of 1 means that the makeup location is located in its preferential baggage area and any deviation results in an increase of this score;

- If P is lower than 1, then the productivity required to make up the flight on-time and in-full is lower than the accepted norm.

VLP Range Setting

VLP ranges are calculated for peak time-brackets and off-peak time brackets separately, as well as for an entire day of operations. These ranges provide the upper bounds and lower bounds of VLP scores that are considered acceptable for their respective time brackets, or for the entire day.

The calculation described in this section is set as a baseline and will be subject to change based on periodic evaluation.

The VLP ranges are calculated by applying the logic below.

1. During peak time-brackets, maximized capacity utilization may result in a higher number of flights allocated to makeup locations that are sub-optimal in order to ensure all flights are allocated to at least one makeup location. This is reflected in VLP scores that are allowed to be higher than 1, but not above an upper bound that is equal to the 85th percentile value calculated across all VLP scores for all flights of a given day.

2. During peak time-brackets under-utilisation of makeup capacity is undesirable. This is reflected in VLP scores that are allowed to be lower than 1, but not below a lower bound that is equal to the 50th percentile value calculated across all VLP scores for all flights of a given day.

3. During off-peak time brackets makeup capacity utilization should be optimized, which is reflected in VLP scores that should not be above 1. VLP scores are allowed to be below 1, however a lower bound equal to the 15th percentile value calculated across all VLP scores for all flights on a given day is maintained.

4. Across the entire day of operations, the average VLP scores of the different GHSPs should be as close to each other as possible. This is reflected in a narrower range of acceptable VLP scores. The following preliminary range is set:

    a. Upper Bound: equal to the 85th percentile value calculated across all VLP scores for all flights of a given day;

    b. Lower Bound: equal to the 20th percentile value calculated across all VLP scores for all flights of a given day.

9.2 Planning Control Measures

From section 4.1, 4.2 and 4.3, AAS, in collaboration with the GHSPs as appropriate, has made a feasible baggage makeup capacity planning. In order to optimize the airport processes in the most integral way possible, AAS takes into account the effects on all airport stakeholders, as much as reasonably possible. This is done in the day-ahead planning in different ways. The order in which control measures are taken for these flights is determined by AAS in partnership with the impacted GHSP, and depends on the cause of the suboptimal VLP score as well as on the control measures which are available[7]. The control measures listed below are sorted in priority as much as possible.

Clustering

Flights handled by the same baggage handling company will be clustered, when possible, as to streamline handler-related processes. This leads to less cutting losses in the overall aircraft turnaround process.

Opening & closing exit point times

AAS may modify the opening times of different assets on different days to ensure efficiency, accommodate works, and to optimize capacity of the BHS.

In case opening times must be adjusted, AAS will notify GHSP in advance and GHSP will cooperate in finding and implementing suitable mitigating measures (such as, but not limited to, pre- and after-makeup buffering processes)

Plan stability

The makeup capacity plan must be as stable as possible meaning that AAS will work to minimize changes to the baseline planning within the D-7 scope.

Asset sharing

When two GHSPs are sequentially scheduled on the same lateral, a separation time is maintained in order to make the planning robust for small deviations. The intended separation time 10-minutes, is based on the scheduled check-in and departure time. The separation time may be different if the situation asks for it (e.g., 4.4).

System Stability

The aim is to limit the number of crossflows of baggage within the BHS in order to avoid strain on the backbone and other critical inter-area connections.

Optimize robots

The use of robots supports employee health and experience objectives while also providing efficiency in the baggage makeup process. The aim is to make optimal use of the robot(s), which can be done by maximizing their utilization. Currently, robots are used in conjunction with a buffer.

[7] Profile A flights (High-Risk) are exempted from control measures, until and unless no other alternative is available to improve the section's VLP score. In that case, control measures considered will require the approval of AAS Security before being applied.

9.3 Decision Logic

The makeup capacity allocation and planning decision logic comprises six steps. These six steps are summarized below.

1. Classify flights

   The profile of a flight is determined by assessing characteristics of the flight that may result in an increase of the effort needed to complete its makeup on time and in full. The table below contains these characteristics. The assessment follows a 'waterfall' approach: the first characteristic in the table that is true for the flight determines its profile. Characteristics listed after the one that has been found to be true, are then not considered any more.

   Flights are classified in one of four classes, as per the table below:

Profile	Characteristic
A	High-Risk flights
B	Multi-leg flights
C	Flights with a projected bag volume of 350 Bax or more
D	All other flights

Table 4: Flight profile classification

2. Map flights to preferential baggage area

   The preferential baggage area is the baggage area where the departing flight should be made up, according to the dominant entry point of the flight's baggage (in line with Policy Principle 1, in section 4.1.2).

3. Group flights by GHSP and time bracket

   Flights are grouped by the GHSP associated with the airline that operates the flight. In addition, flights are grouped into time brackets based on their Scheduled Time of Departure (STD). These time brackets are fixed:

   This results in work packages: flights grouped by GHSP and time bracket, split by the tagging of their preferential baggage area and complemented with their Flight Profile.

4. Fitting work packages to Sections

After a first fitting iteration, the average VLP score is determined for the section to which a work package is allocated. If one or more VLP scores are sub-optimal, control measures are taken within the sections concerned. These control measures include adjustments of one or more of the following operational parameters:

- exit point operating time
- release of batches from the buffer
- make-up separation time between subsequent flights on the same exit point
- LU buffering (pre- and/or post make-up)
- staffing
- other parameters, as appropriate.

Control measures are taken by the appropriate flight (for more information, see Appendix 9.2).

5. Optimizing Section Plans

These control measures include adjustments of one or more of the following operational parameters:

- exit point operating time
- release of batches from the buffer
- make-up separation time between subsequent flights on the same exit point
- LU buffering (pre- and/or post make-up)
- staffing
- other parameters, as appropriate.

Control measures are taken by the appropriate flight (for more information, see Appendix 9.2). If the control measures do not result in a balanced plan for the time bracket, individual flights may be moved between sections in the same time bracket. In addition, after one or more flights have been moved, new control measures can be applied within any of the affected sections. Re-allocation of flights to different sections is conducted in order of Flight Class, starting with Class D flights and then in reverse alphabetical order. Class A flights (High-Risk) are exempted from re-

allocation and/or control measures, until and unless no other alternative is available to optimize VLP scores across the flight schedule for the given day. In that case, re-allocation and/or control measures considered will require the approval of AAS Security before being applied.

6. Optimize Daily Plan

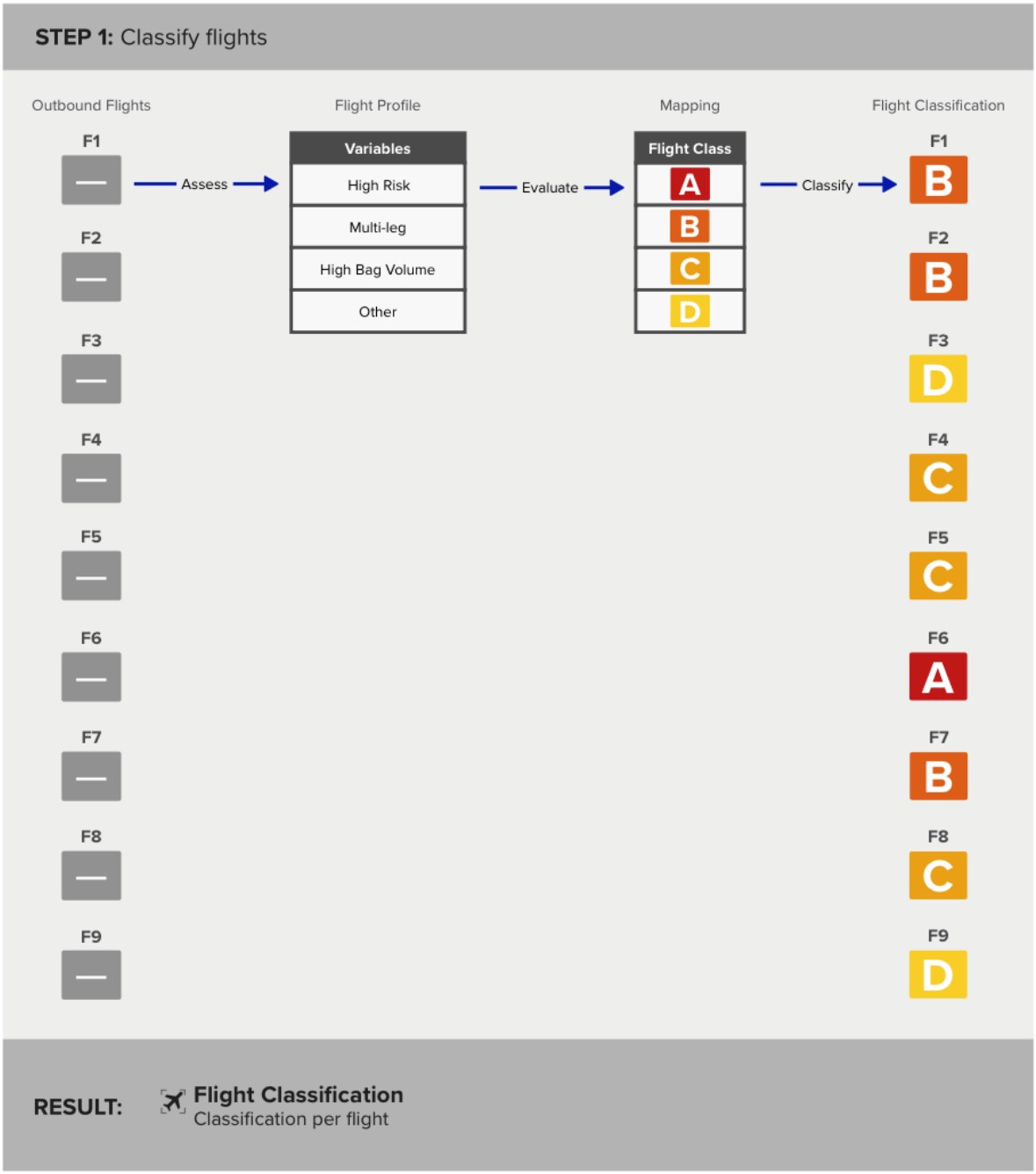
If the fitting in steps 4 and 5, including control measures, does not result in a balanced plan for the entire flight schedule for the given day, individual flights may be moved (again) between sections in the same time bracket.

In addition, after one or more flights have been moved, new control measures may be applied within any of the affected sections. Re-allocation of flights to different sections is conducted in order of Flight Class, starting with Class D flights and then reverse alphabetical order. Class A flights (High-Risk) are exempted from re-allocation and/or control measures, until and unless no other alternative is available to optimize VLP scores across the flight schedule for the given day. In that case, re-allocation and/or control measures considered will require the approval of AAS Security before being applied.For control measures, see Appendix 9.2.

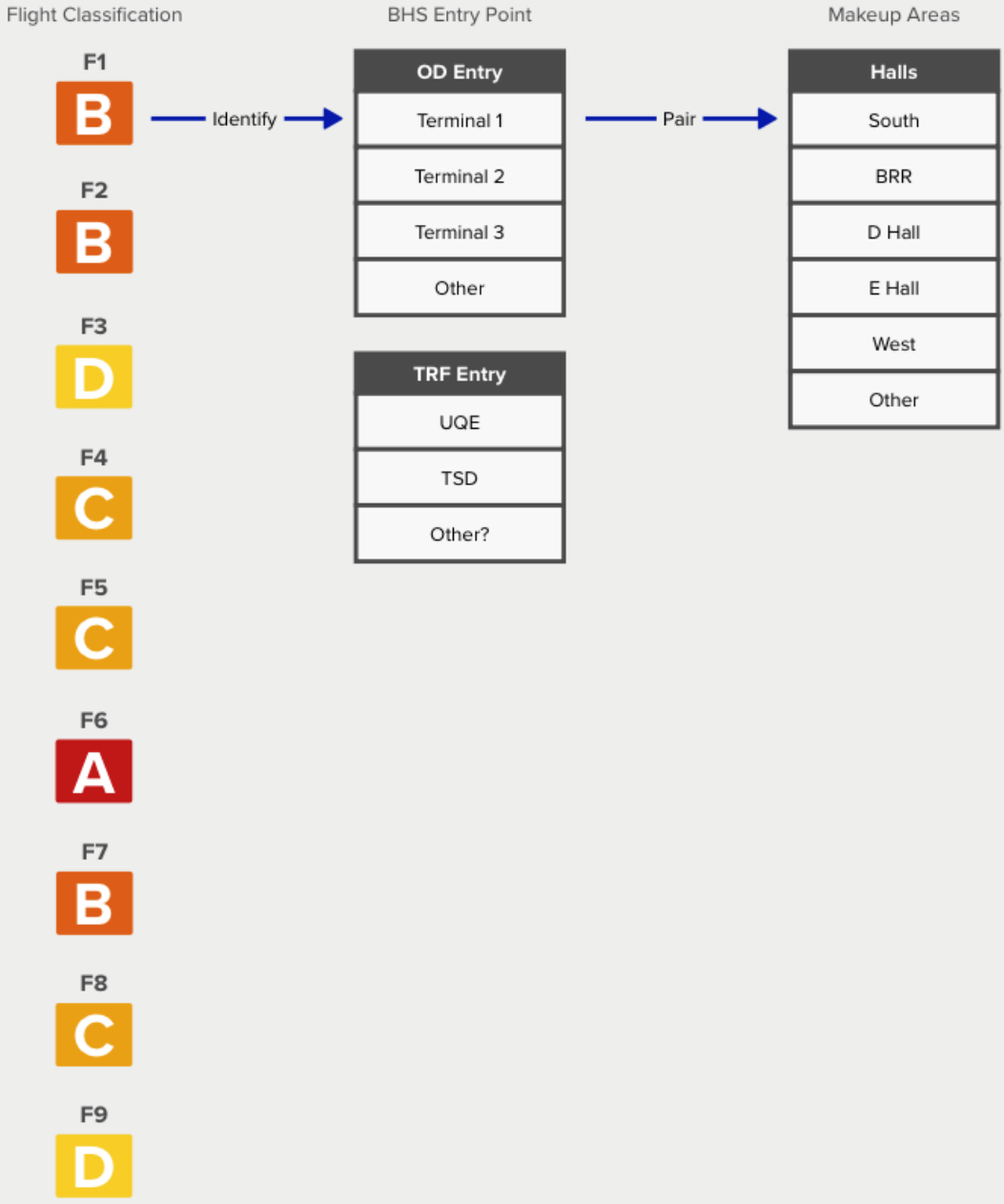
In the makeup capacity allocation process, the following parameters are considered:

1) BHS integrity, including:
    a) shortest time in the system
    b) acceptable load on all components of the system, such that system capacity limits are not exceeded
    c) minimized use of non-redundant lines
    d) minimized traffic and baggage cross-flows
2) Effectiveness of GHSPs, including:
    a) preferential makeup areas
    b) clustering of makeup operations on groups of adjacent makeup locations (‘sections’)
    c) pre-makeup / post-makeup buffering and LU shunting.
3) Flight characteristics, including:
    a) bag volumes
    b) bag arrival patterns
    c) number and purpose of segregations
    d) transfer or local check-in
    e) single or multiple destinations (‘multi-leg’)
4) Makeup location characteristics, including:

a) exit point type (lateral, carousel, robot)
b) capacity (LU positions, makeup positions, throughput)
c) location
d) capabilities and constraints (e.g. workspace)

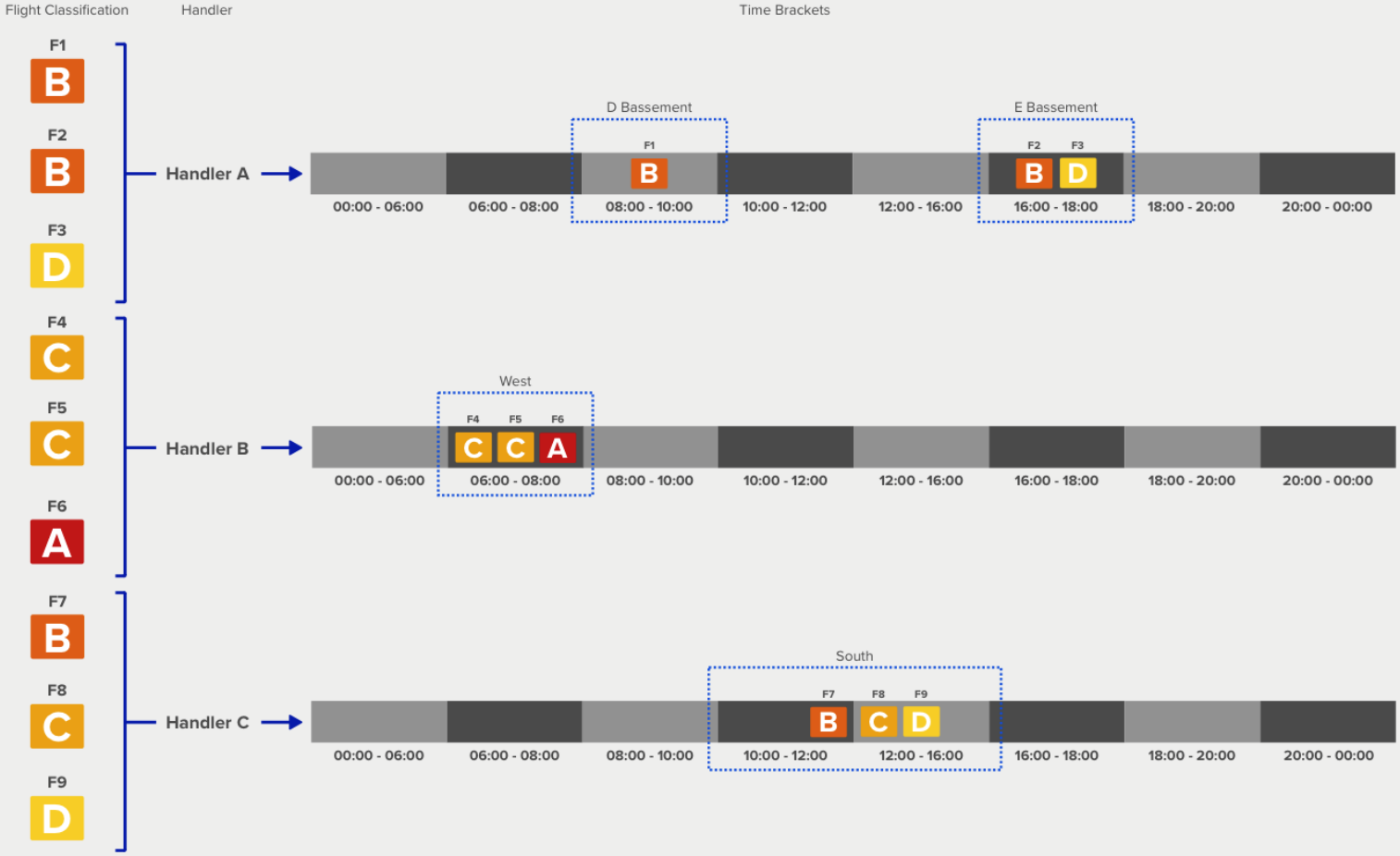


STEP 2: Map flights to preferential baggage area



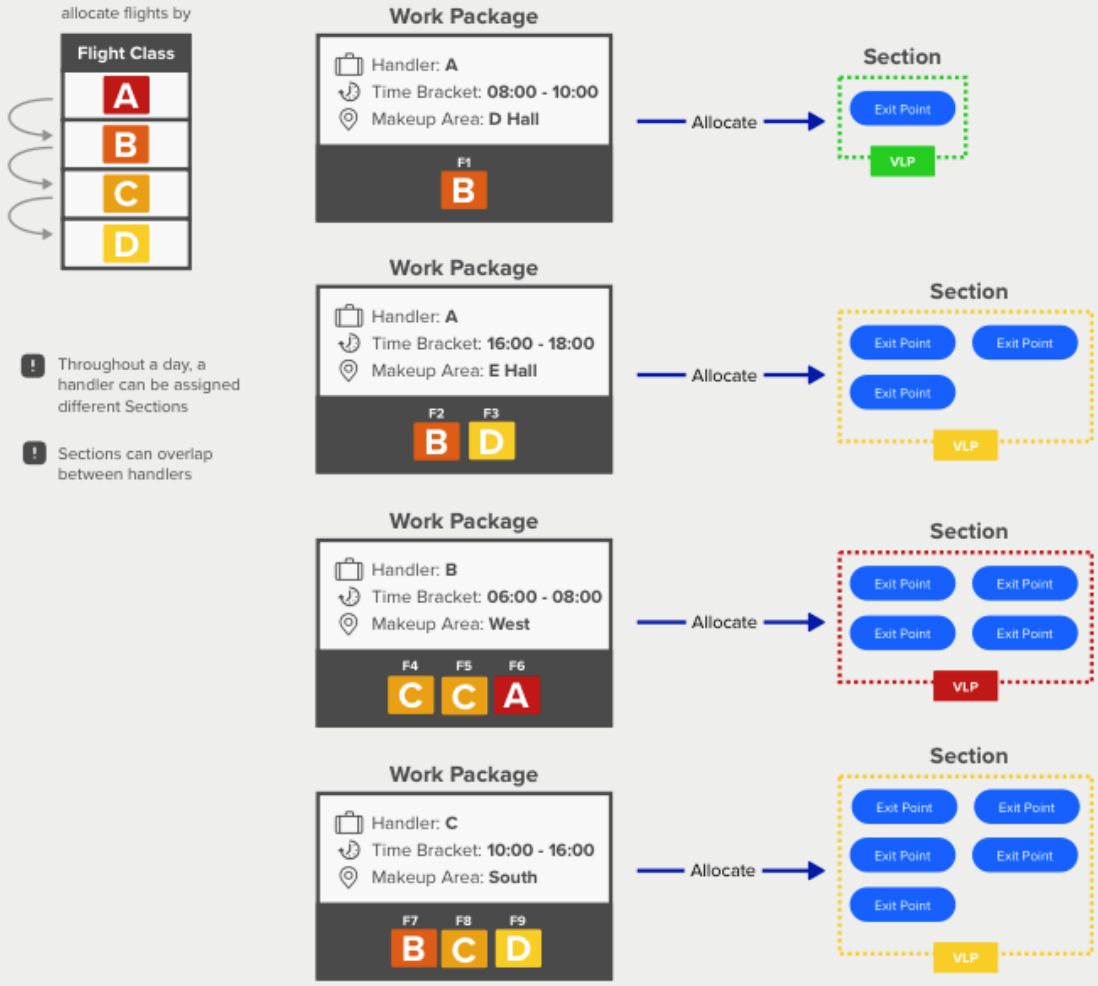
RESULT: **Flights by Makeup Area**
Profile classification and makeup area per flights

STEP 3: Group flights by Handler and Time Bracket



RESULT: **Work Package**
Time-bound grouping of profile classified flights by Handler by Makeup Area

STEP 4: Fit work package to exit points section

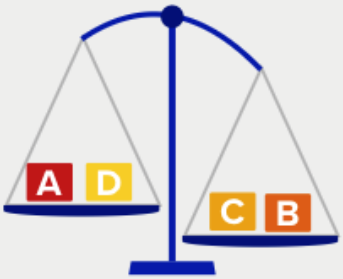


Throughout a day, a handler can be assigned different Sections

Sections can overlap between handlers

Control measures to fit flights within the section

1. Determine nature of the cause for an unfavourable VLP score
2. Review the flights that are affected
3. Apply control measures to affected flights



Parameters that can be adjusted as appropriate:

- Exit point operating time
- Buffer-batch release
- Makeup lag-time
- LU buffering
- Staffing
- Other parameters at discretion of AAS

RESULT: **Draft Section Plan**
Day-level

STEP 5: Optimize section plan

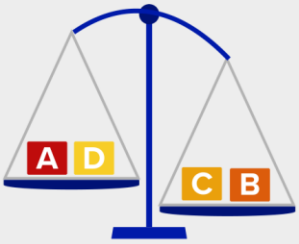
Average VLP Score

	00:00 - 06:00	06:00 - 08:00	08:00 - 10:00	10:00 - 12:00	12:00 - 16:00	16:00 - 18:00	18:00 - 20:00	20:00 - 00:00
Handler A	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP
Handler B	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP
Handler C	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP

! VLP scores need to be compared per time bracket, to ensure that within the time bracket the allocation is fair.

Control measures to fit flights within the time bracket

1. Determine nature of the cause for an unfavourable VLP score
2. Review the flights that are affected
3. Apply control measures to affected flights

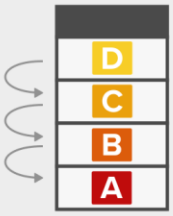


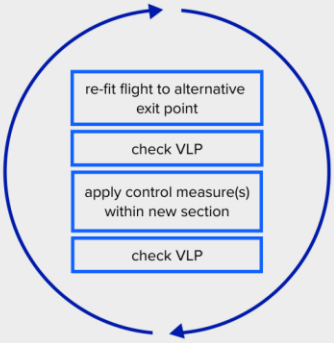
Parameters that can be adjusted as appropriate:

- Exit point operating time
- Buffer-batch release
- Makeup lag-time
- LU buffering
- Staffing
- Other parameters at discretion of AAS

Re-allocate flights to sections within time brackets

reallocate flights by





! Continue this process until the incremental value of additional optimization is close to zero.

understanding

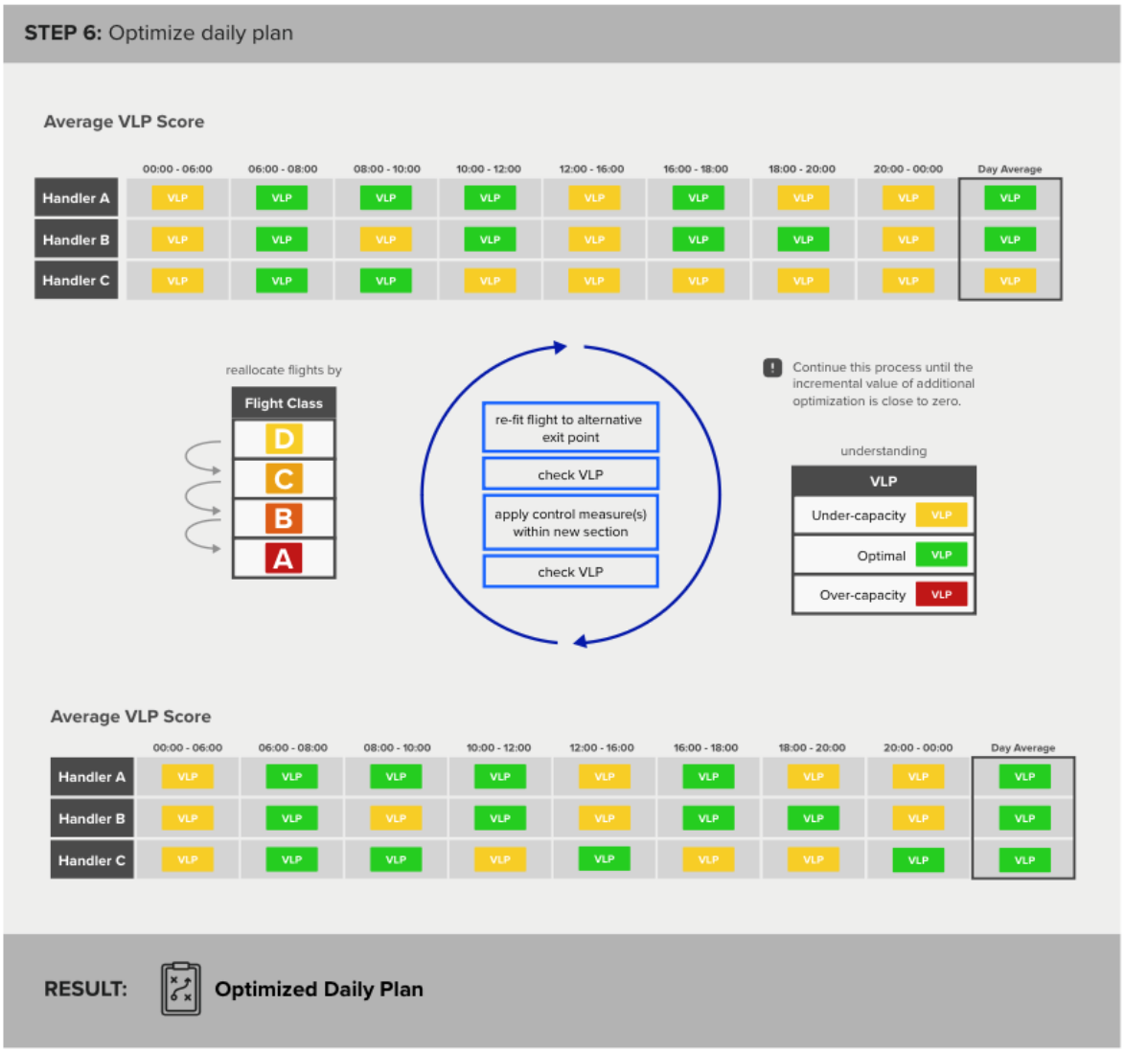
VLP	
Under-capacity	VLP
Optimal	VLP
Over-capacity	VLP

Average VLP Score

	00:00 - 06:00	06:00 - 08:00	08:00 - 10:00	10:00 - 12:00	12:00 - 16:00	16:00 - 18:00	18:00 - 20:00	20:00 - 00:00
Handler A	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP
Handler B	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP
Handler C	VLP	VLP	VLP	VLP	VLP	VLP	VLP	VLP

RESULT: **Draft Daily Plan**

STEP 6: Optimize daily plan



RESULT: **Optimized Daily Plan**