



Integrated Planning & Forecasting at Schiphol

*T-Systems Aviation User Days
September 7th & 8th, 2023*

Schiphol

T Systems

ARC



Schiphol's complexity

2023

430.000 – 445.000
flights a / year

60 – 64 million
passengers



Goal today

Integrated Planning & Forecasting wants to improve the preparation, monitoring and alterations of the operational process planning at Schiphol airport.

Start project

Solutioning

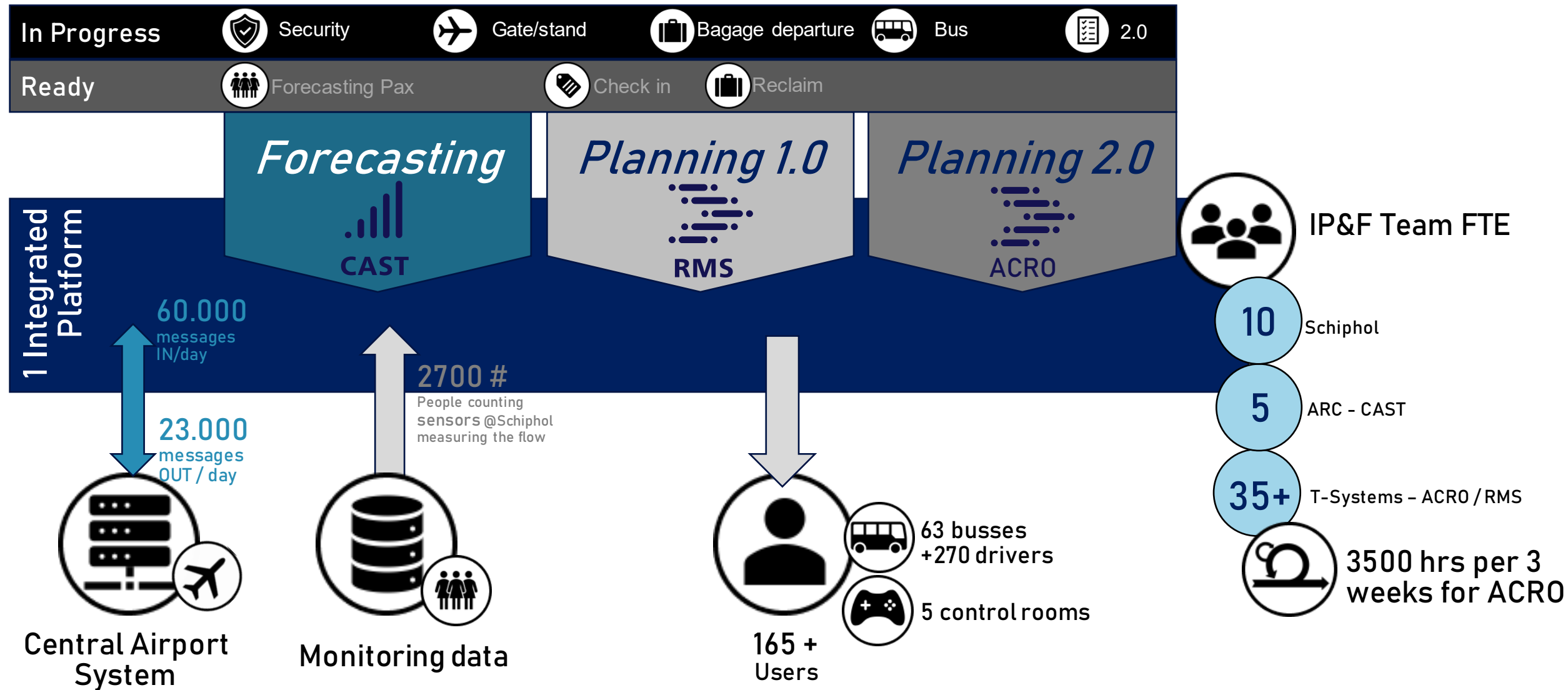
Future

IP&F: How it works



IPF The Movie

Fact and Figures of IP&F – Tools & Team



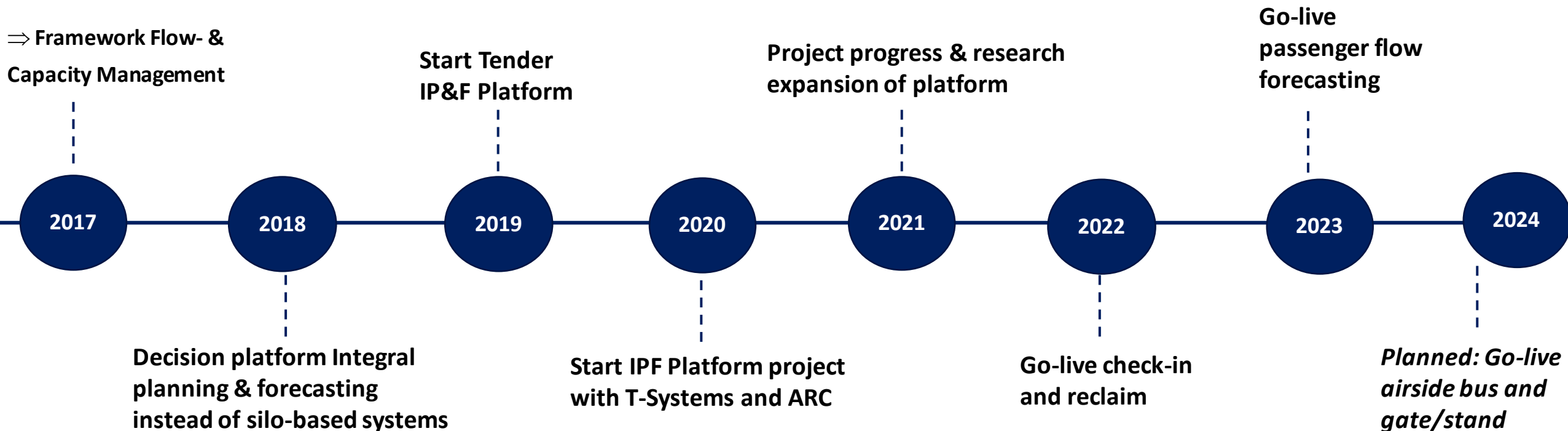
IP&F Introduction...Back in time...

Motivation in 2017: Year with many capacity bottlenecks

- Busy may holiday with a lot of media attention
- Expectation to eventually grow to 600,000 flight movements per year
- Need for increased control

GOAL:

- Integrate planning & forecasting over all process steps in the airport process
- Integral planning over all timeframes years foresights - until day of operation



Best Value with 5 objectives

Maximum facilitation of
further development of the
Platform



Maximum
user-friendliness



Forecasting and planning
capabilities which **balance**
KPI's



Long-term **partnership**



Maximum **integration** in the
current and future **IT**
environment



The platform parts

CAST CLASSIC

3D Flow simulation & forecasting

- Insight into the impact of spatial changes
- Insight into the impact of substantial adjustments to processes
- Mainly used for strategic (mid term) planning and in large (mostly spatial) projects.



CAST EXPRESS

Fast/Operational Flow simulation & forecasting

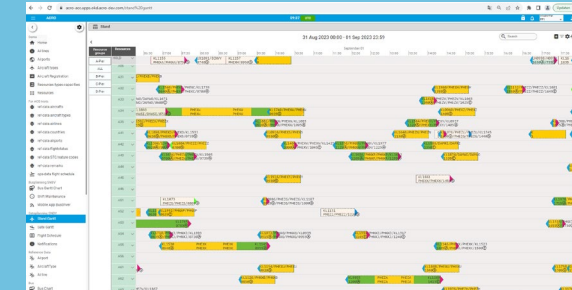
- Insight into what number of passengers will be at which touchpoint at what time
- Calculating various scenarios within existing frameworks (what if)
- Primarily used for tactical and operational purposes
- Frequent updates



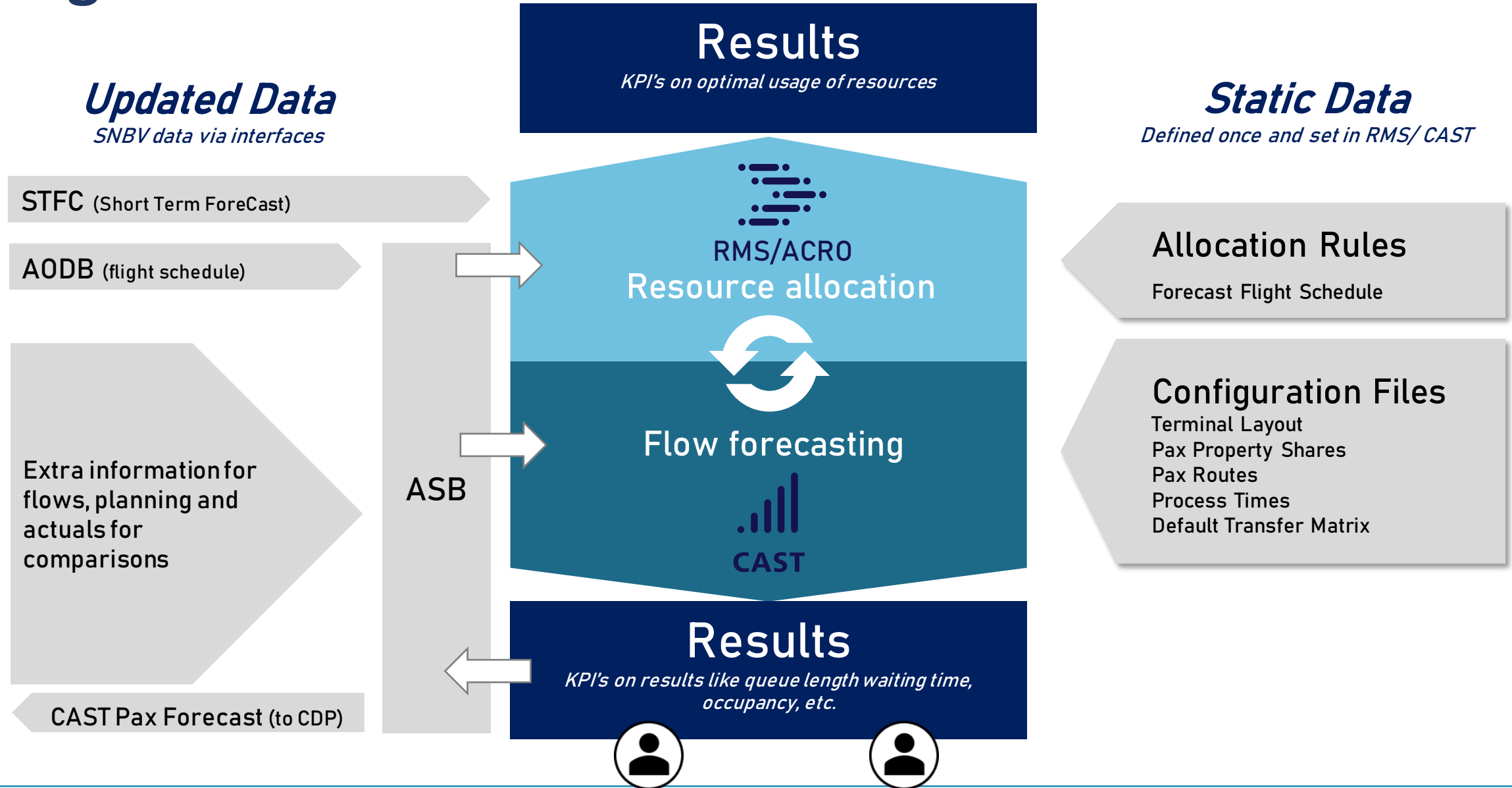
RMS/ACRO

Resource allocation

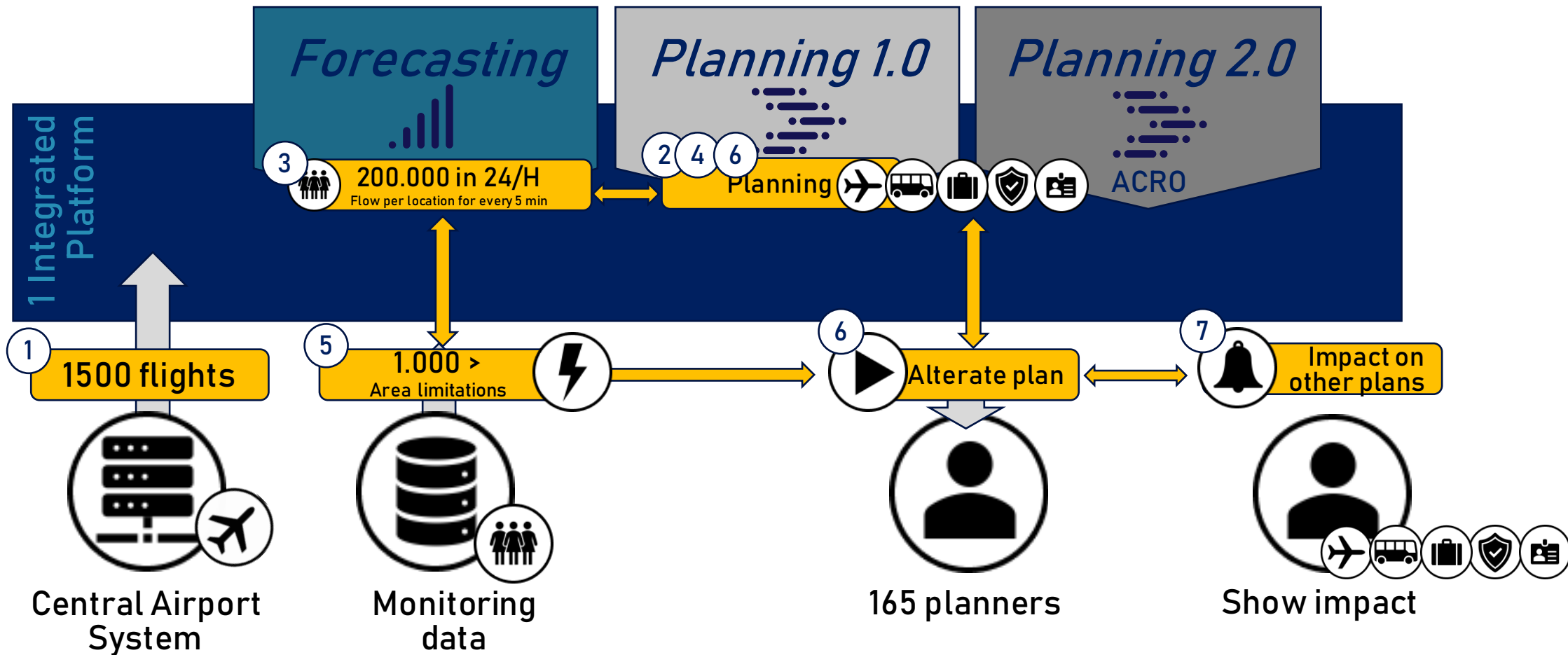
- Allocates flights to the available resources as efficiently and qualitatively as possible based on a set of input parameters.



Integration



How would this work?





Benefits



BETTER COOPERATION



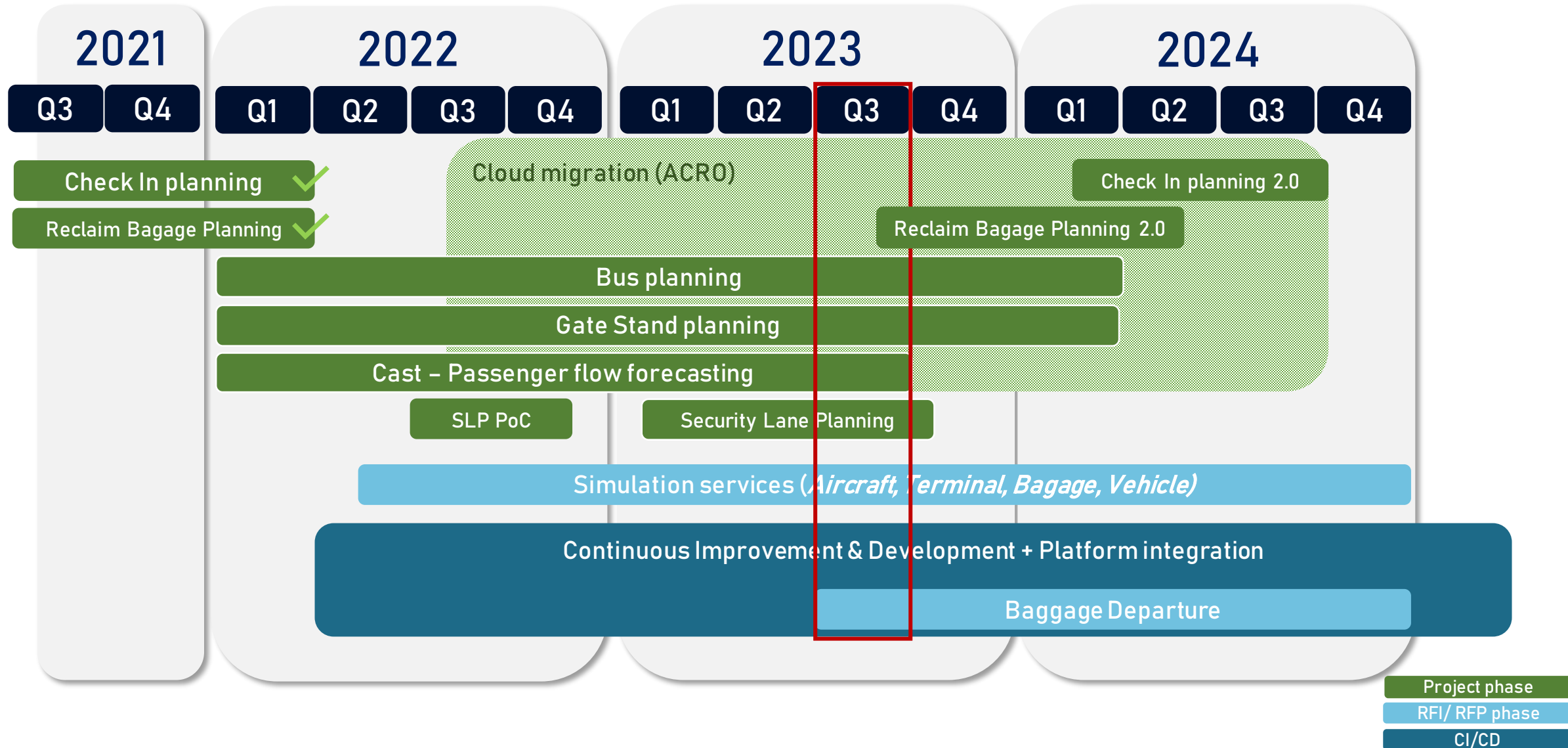
FLEXIBILITY



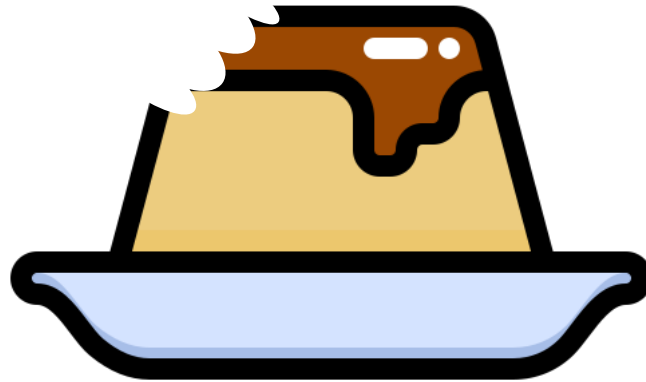
CUSTOMER FOCUSED



Roadmap IP&F



The Proof of the pudding is...

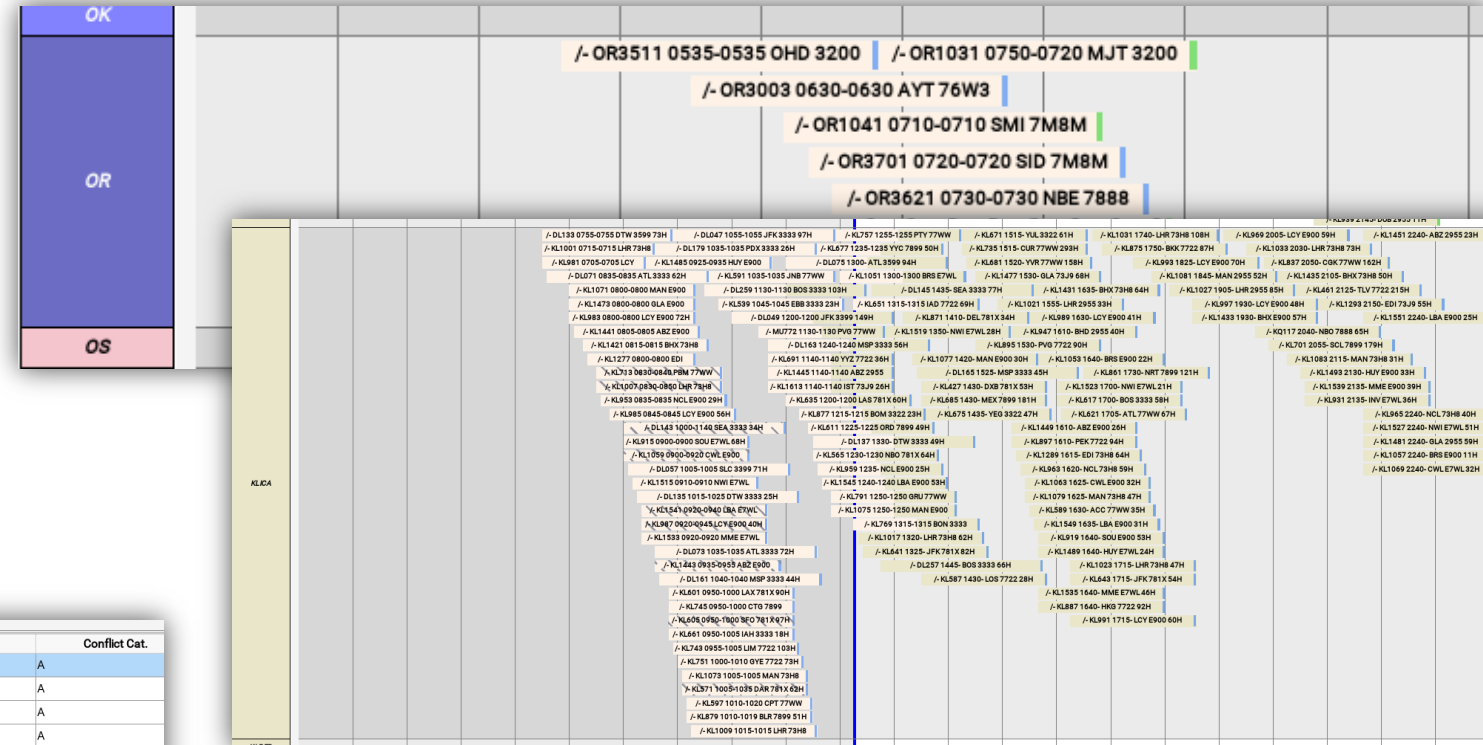




RMS & IP&F

Business rules overhaul and policymaking

Short Description	Long Description	Start	End	Preference	Pref.	Conflict Cat.
RABAS 3.2 Only European flights RC1	Flight not having a EUROPEAN origin must not be planne...			<input type="checkbox"/>		A
RABAS 3.2 Nightly closing of Reclaim Hall 1	Reclaim Hall 1 must not be used if ALLOC END is between...	24/01/23	25/03/23	<input type="checkbox"/>		A
RABAS 3.2 Nightly closing of Reclaim Hall 2	Reclaim Hall 2 must not be used if ALLOC END is between...			<input type="checkbox"/>		A
RABAS 3.2 Nightly closing of Reclaim Hall 2	Reclaim Hall 2 must not be used if ALLOC END is between...	23/01/23	25/03/23	<input type="checkbox"/>		A
RABAS 3.2 Nightly closing of Reclaim Hall 2	Reclaim Hall 2 must not be used if ALLOC END is between...			<input type="checkbox"/>		A
RABAS 4.1.3 Pref Handler allocation RC1	The reclaim allocation plan must minimizes the number o...			<input checked="" type="checkbox"/>	300	A
RABAS 4.1.3 Pref Handler allocation RC2	The reclaim allocation plan must minimizes the number o...			<input checked="" type="checkbox"/>	999	A
RABAS 4.1.3 Pref Handler allocation RC3	The reclaim allocation plan must minimizes the number o...			<input checked="" type="checkbox"/>	150	A
RABAS 4.1.3 Reclaim allocation Dnata	The reclaim allocation plan must minimizes the number o...			<input type="checkbox"/>		A
RABAS 4.1.3 Reclaim allocation Dnata	The reclaim allocation plan must minimizes the number o...			<input type="checkbox"/>		A
RABAS 4.1.3 Reclaim allocation Menzies	The reclaim allocation plan must minimizes the number o...			<input type="checkbox"/>		A
RABAS 4.1.3 Reclaim allocation Menzies	The reclaim allocation plan must minimizes the number o...			<input type="checkbox"/>		A
RABAS 4.2.1 OD pax more than 100 not in...	Flights with more than 100 OD passengers must be assi...			<input type="checkbox"/>		A
RABAS 4.2.1 OD pax more than 250 Two ...	Flights with more than 250 OD passengers must be assi...			<input type="checkbox"/>		A
RABAS 4.2.1 OD Pax more than 350 to Re...	Flights with more than 350 OD passengers must be assi...			<input type="checkbox"/>		A
RABAS 4.2.1 OD pax more than 60 not on ...	Flights with more than 60 OD passengers may not be as...			<input type="checkbox"/>		A
RABAS 4.2.2 Only 100% allocation 22C	Flights must not be planned on 22C if not indicated as 10...			<input type="checkbox"/>		A
RABAS 4.2.2 100% allocation 22C only	100% flight must be allocated to arrival-belt 22C			<input type="checkbox"/>		A
RABAS 4.2.3 High Risk flights needs two q...	High Risk flights (Israel) must be allocated to an arrival-b...			<input type="checkbox"/>		A



Common Check-In areas
make planning easier

and more...



CAST & IP&F



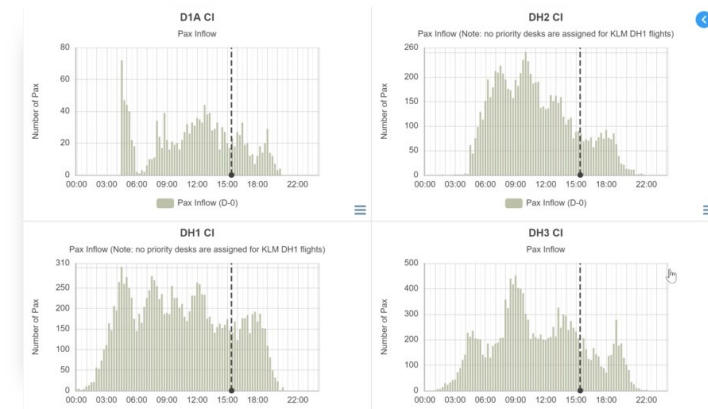
Integration with planning
in place of imports



Added Check-in areas to the tool



Every 5 min instead of every 15 min



PowerBI reporting



CAST Future

Adding...



Airside



Reclaim Halls

ACRO Remake of the Busdriver App

Schiphol INFORM GmbH
Bus 841 13:30

Aankomende Vlucht

Vlucht	Herkomst	AC-Type	Registratie
KL 1218	TRF	F70	PHXZS

STA	EIBT	In Blocks	Pax.
13:30	13:32	13:32	50

Van	Naar	Bus	Start	Eind
B74	-> A04	1/1	13:31	13:42

Ja

Start instappen passagiers

More intuitive and more
informative and better looking 😊

Integrated Planning & Forecasting

Schiphol T-Systems 138 ACRO Bus Interface 28 July 2022, 10:10

Current task

KL1234 NCE E90 PHEZS OB 14:00 S

Today's shift : 14:00 to 18:00

Flight	Time	Gate
KL3524 MRS	14:00	G34 - B09
KL1235 MRS	14:20	B07 - A45
BREAK	15:00	15:15

15:45 A45 16:00

KL1235 MRS E90 PHEZS OB 14:50 S

14:20 B07 14:35 A45

Drive to Gate B07

Start drive

1 121 Completed

2 138 Accepted

3 119 Drop off

4 120 Driving

5 95 Deboarding

Preferences

Exit bus


Inbox


Raise issue




Call me





ACRO Insight in complete Bushhandling


 KL1235
MRS
E90
PHEZS


OBT 14:50 


14:20 B07   143  14:35 A45

 Preferences

 Exit bus

 Inbox

 Raise issue

 Call me

Drive to
Gate B07

Start drive

1 121 Completed

2 138 Accepted

3 119 Drop off

4 120 Driving

5 95 Deboarding

1 121 Completed

2 138 Arr at origin

3 119 Drop off

4 120 Driving

5 95 Deboarding

All drivers can see how the handling of the flight is going.

ACRO: Inclusion of user preferred features

The image displays two overlapping windows from the ACRO system interface.

Chart settings (top window): This window is used for configuring chart displays. It has tabs for View, Bar Layout, Filters, and Color Rules. The Color Rules tab is active, showing a search bar and a list of rules. The 'Available Rules' list includes 'Completed', 'KL airline', 'Transavia Airline', 'All CAT4 or small AC', and 'All CAT5 and big AC'. The 'Primary Rules' list shows 'Completed' and 'Transavia Airline' selected. The 'Secondary Rules' list is currently empty.

Chart settings (bottom window): This window shows the configuration for the chart layout. It has tabs for View, Bar Layout, Filters, and Color Rules. The Bar Layout tab is active, showing a table with two rows of data fields. The table has columns for datafield(left), datafield(center-left), datafield(center-right), and datafield(right). The first row is labeled 'Row 1' and the second row is labeled 'Row 2'. The table contains the following data:

Row	datafield(left)	datafield(center-left)	datafield(center-right)	datafield(right)
Row 1	Arr flt/Tow	Arr AircraftType	Dep Registration	Dep flt/Tow
Row 2	Arr Flight Time	Arr Flight Status	Dep Flight Status	Dep Flight Time

Buttons for '+', 'Cancel', and 'Save' are visible at the bottom right of the window.

Allocation details (right window): This window shows the details for a specific allocation. It has a header with 'Stand: S2', '10:00', and '12:00'. Below the header, there is a table with columns for 'Stand', 'IBT', and 'OBT'. The table contains the following data:

Stand	IBT	OBT
S2	10:00	12:00

Below the table, there is a 'Comment' section. The comment text is: 'OS723 is not allowed on S2', 'Ad. conf: Allocation restricted', 'OS724 is not allowed on S2', and 'OS723 is not allowed on S2'. Below the comment, there is a table with columns for 'Call sign', 'Registration', and 'A/C type'. The table contains the following data:

Call sign	Registration	A/C type
GOAIR2	VT-JKH	B747

Below the table, there is a 'Routing' section. The routing text is: 'BLR - MUM - DXB - AMS'. Below the routing, there is a table with columns for 'Milestone', 'Timing', 'Handling type', and 'Handler'. The table contains the following data:

Milestone	Timing	Handling type	Handler
LDT	09:50	CI	KLM
IBT	10:00	PAX	KLM
RAMP		RAMP	KLM

Below the table, there is a table with columns for 'Call sign', 'Registration', and 'A/C type'. The table contains the following data:

Call sign	Registration	A/C type
GOAIR2	VT-JKH	B747

Below the table, there is a 'Routing' section. The routing text is: 'AMS - PER - MEL - SIN'. Below the routing, there is a table with columns for 'Milestone', 'Timing', 'Handling type', and 'Handler'. The table contains the following data:

Milestone	Timing	Handling type	Handler
OBT	11:50	CI	KLM
SAT	11:50	PAX	KLM
SRT	11:50	RAMP	KLM
TOT	12:10		

Cooperation: Visits & Pressure Cooker

Day 1

07:00	
08:00	
09:00	Roomreservation VZ SHG C154 (16p)
10:00	
11:00	
12:00	
13:00	
14:00	
15:00	
16:00	
17:00	

Mobile App
UX meeting Ayush; Micrc
Lunch
Refinement Busplanner

Day 2

07:00	
08:00	
09:00	Roomreservation VZ SHG C154 (16p)
10:00	
11:00	
12:00	
13:00	
14:00	
15:00	
16:00	
17:00	

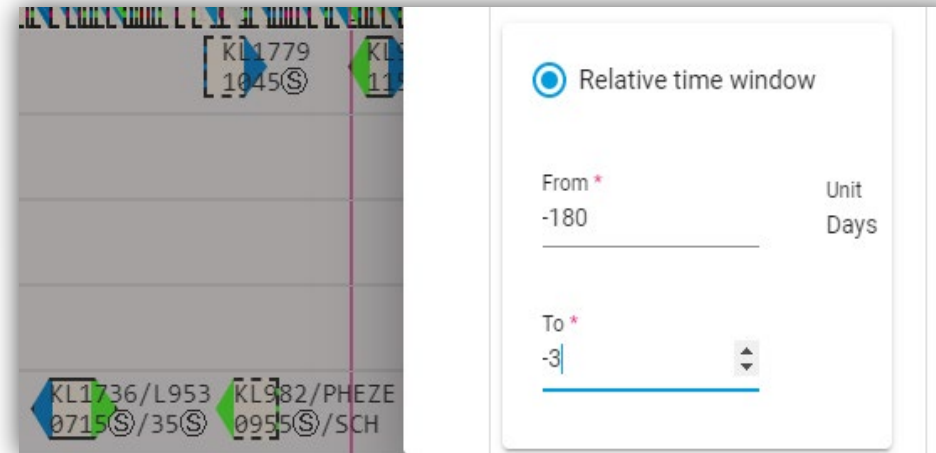
Mobile App 2.0 & UX
OPTION: Testen met Thor
Microsoft Teams Meeting
Demo Bus; Microsoft Tea
End User Testing
Conclusion



Future wishlist



Aircraft Tow Automation Rules



Planning 180 days in the future

- IPF-381 GEN - Add Tags/categories or other
- IPF-422 GEN - Make multiple Infocards po
- IPF-566 BUS - Interface BUMS/Splunk to g
- IPF-724 GEN - Add Resources group attrib
- IPF-800 GEN - Right mouse click on table
- IPF-804 BUS - Sorting by a handling to all
- IPF-805 GEN - Add a filter or category for
- IPF-806 GEN - Add a tab on process type f
- IPF-441 G/S - Create Tow Rules for splitting
- IPF-488 G/S - Add Camera links or Camera
- IPF-546 BUS - Add an history functionality
- IPF-801 BUS - Sent a message with one clic
- IPF-861 GEN - ICD Melding via RMS
- IPF-916 BUS - Report on Raise Issue notific
- IPF-545 BUS - Add a Timer for the Busdriv
- IPF-746 G/S - Add seperation score to the
- IPF-747 G/S - Add a general score to the p
- IPF-748 BUS - Mobile App: Add a map of t
- IPF-749 BUS - Mobile App: the status of th
- IPF-423 GEN - Make the Infocard flexible i
- IPF-750 BUS - Mobile App: Route planner

A photograph of an airport terminal interior. In the foreground, a man in a blue beanie and a woman in a teal sweater are embracing. The man is carrying a large backpack. To their right, a woman with curly hair is leaning on a glass railing, looking at her phone. In the background, there are large windows showing an airport tarmac with planes. A yellow sign hangs from the ceiling with arrows and text. A digital screen displays flight information. The word 'Questions?' is written in large white letters across the center of the image.

Questions?

Schiphol

T Systems

ARC



Thank you!

Schiphol

T Systems

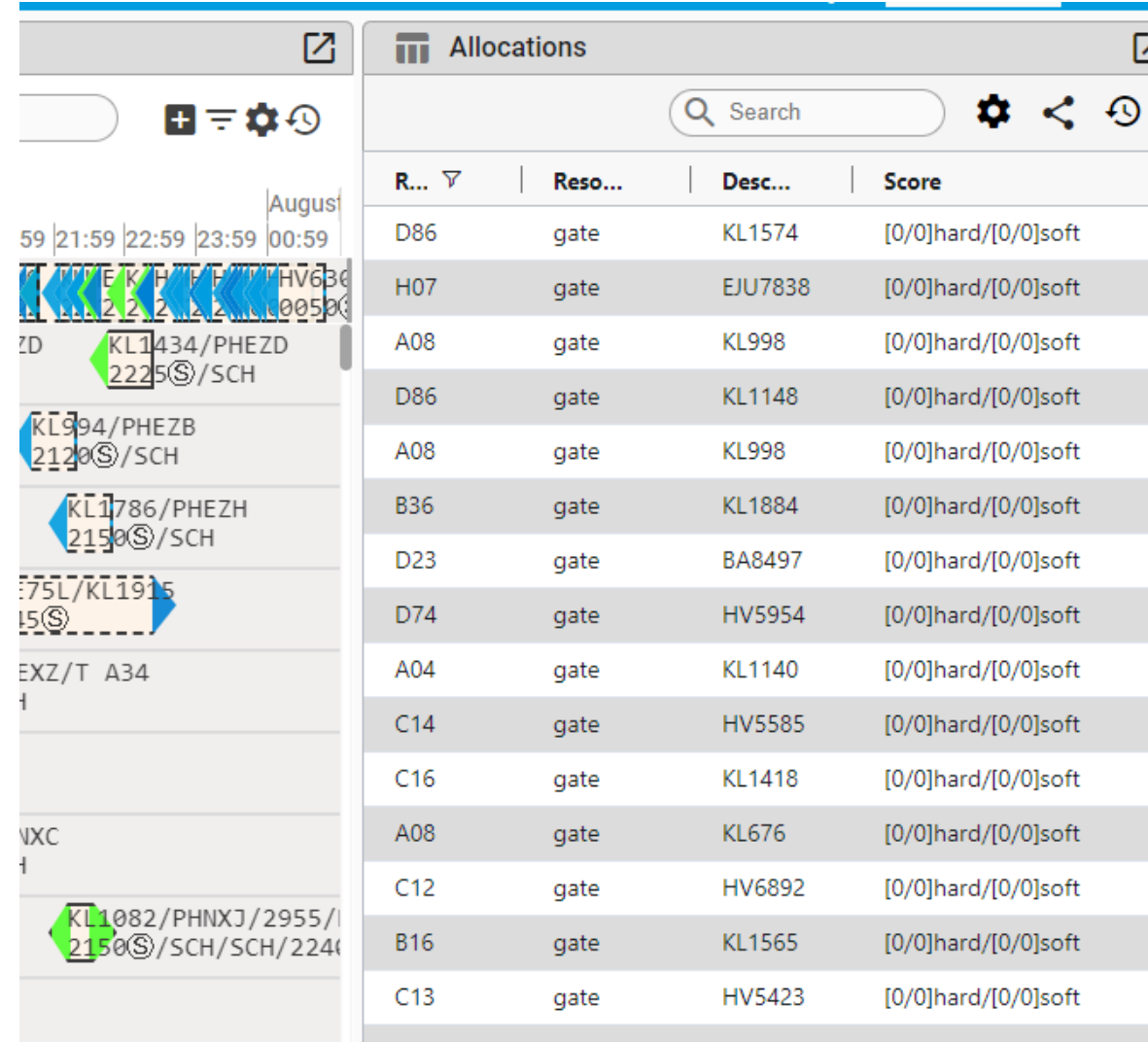
///ARC

ACRO RMS: Integrated Event List

“Putting the i in IP&F”

Assisting planners to managing
40+ drivers or 100+ stands AND other
resources

to see where there attention is needed
.... or where they can optimize.



The screenshot displays the ACRO RMS interface. On the left, a timeline view shows various events and resources over time, with labels like 'KL1434/PHEZD', 'KL994/PHEZB', 'KL1786/PHEZH', 'KL1915', 'EXZ/T A34', 'VXC', and 'KL1082/PHNXJ/2955/1'. On the right, the 'Allocations' table lists resources and their associated scores.

R...	Reso...	Desc...	Score
D86	gate	KL1574	[0/0]hard/[0/0]soft
H07	gate	EJU7838	[0/0]hard/[0/0]soft
A08	gate	KL998	[0/0]hard/[0/0]soft
D86	gate	KL1148	[0/0]hard/[0/0]soft
A08	gate	KL998	[0/0]hard/[0/0]soft
B36	gate	KL1884	[0/0]hard/[0/0]soft
D23	gate	BA8497	[0/0]hard/[0/0]soft
D74	gate	HV5954	[0/0]hard/[0/0]soft
A04	gate	KL1140	[0/0]hard/[0/0]soft
C14	gate	HV5585	[0/0]hard/[0/0]soft
C16	gate	KL1418	[0/0]hard/[0/0]soft
A08	gate	KL676	[0/0]hard/[0/0]soft
C12	gate	HV6892	[0/0]hard/[0/0]soft
B16	gate	KL1565	[0/0]hard/[0/0]soft
C13	gate	HV5423	[0/0]hard/[0/0]soft