Network Manager
nominated by
the European Commission

EUROCONTROL

EUROCONTROL Call Sign Similarity Project

Call Sign Similarity Tool (CSST)

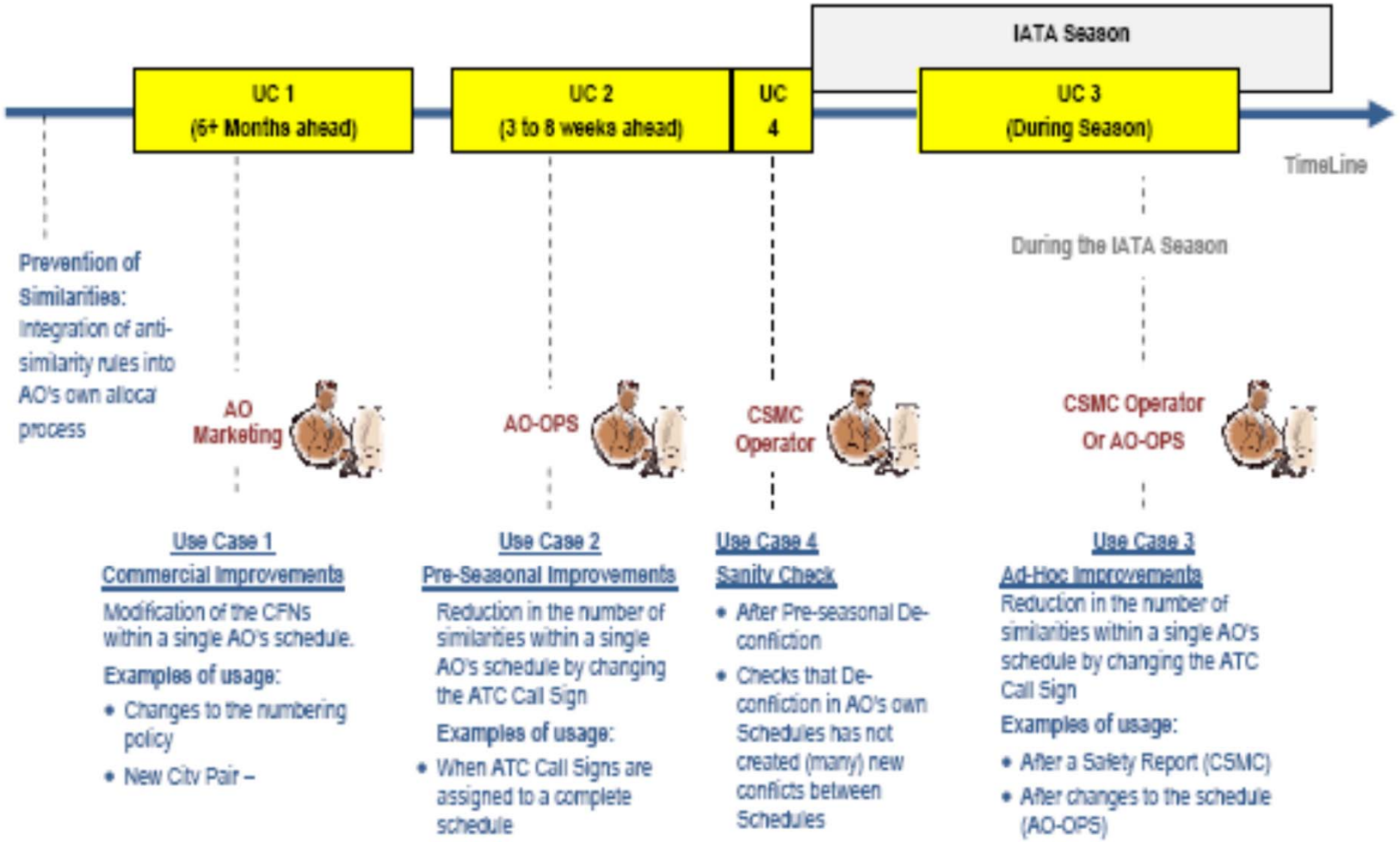
ICAO MID Region 1st Call Sign Confusion Ad-hoc Working Group

Abu Dhabi, United Arab Emirates

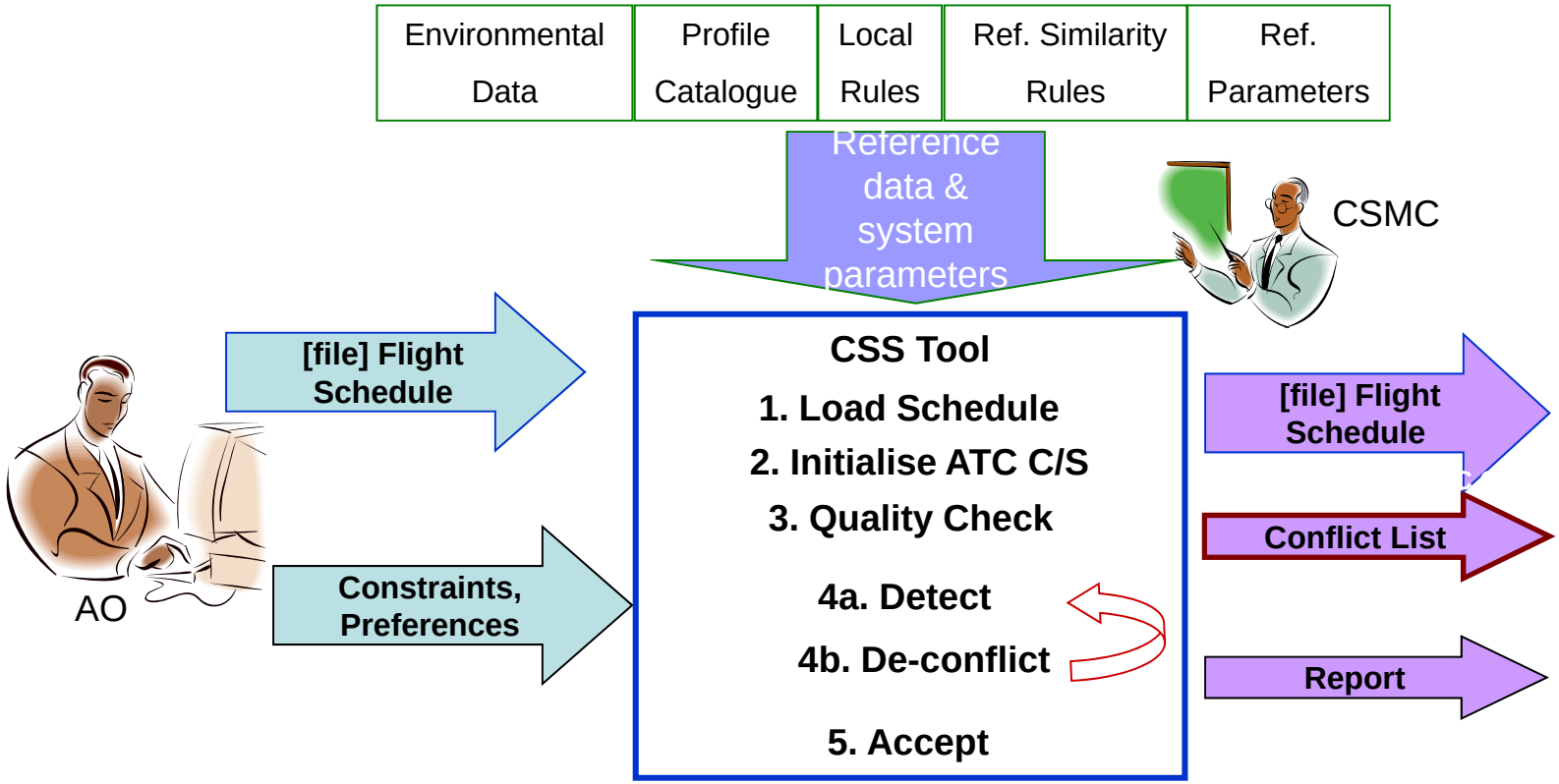
16- 18 February 2015

Richard Lawrence
Call Sign Similarity Project Manager
NMD/NOM/SAF

Operational Concept – Use Cases



CSS Tool Overview



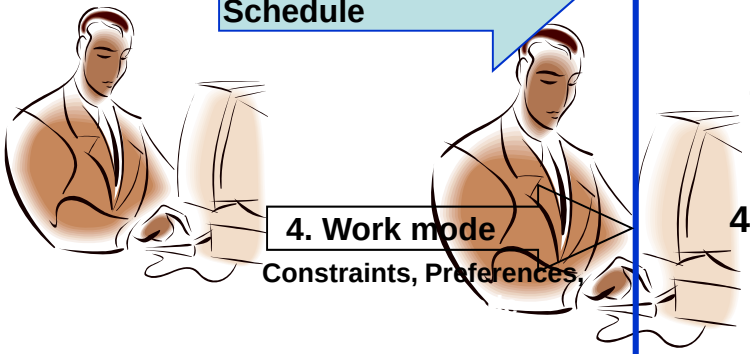
CSS Tool Overview

NM/CSMC

ENV Data	Profile Catalogue	ANSP/State constraints	Similarity Rules	Tuning Parameters

System parameters

1. [file] Flight Schedule



4. Work mode

Constraints, Preferences,

CSS Tool

1. Load Schedule

2. Initialise ATC C/S

3. Detect conflicts

4a. Input work mode

4b. De-conflict

5. Accept & Terminate

5. [file] Flight Schedule

5. Conflict List

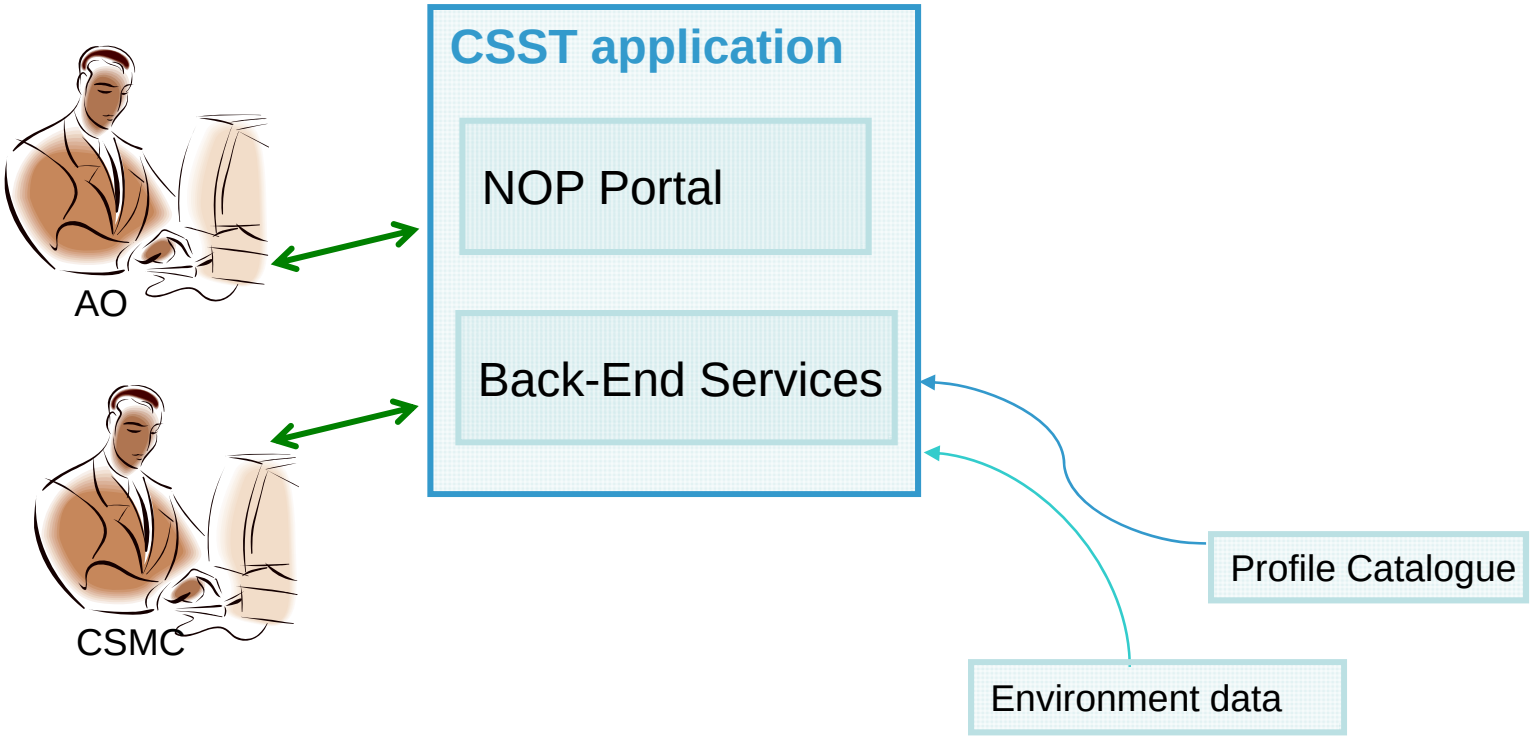
5. Report

Flight Schedule

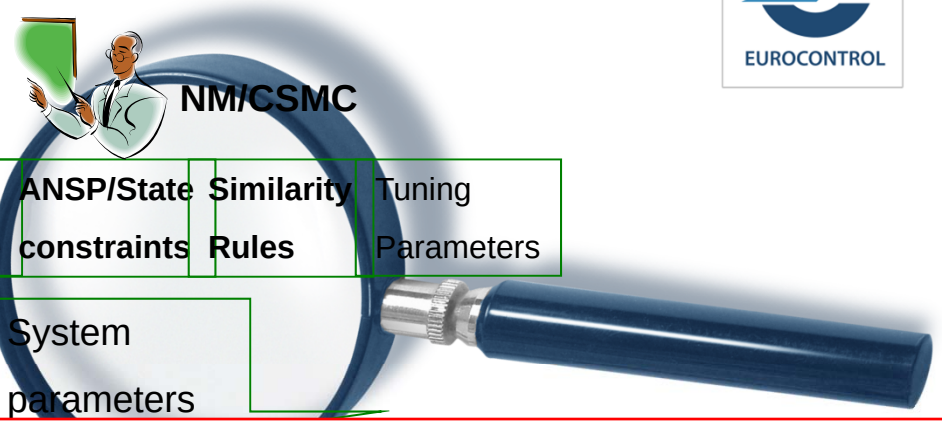
Conflict List

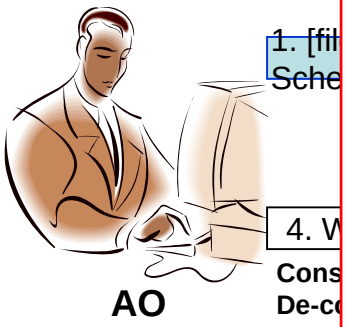
CSS Tool

- CSST is an application hosted in the Network Manager (NM) NOP Portal.



CSS Tool Overview





Similarity rules

- **Conflicts between flights**
- **Conflict within one flight**

  e.g. use of letters 1& I, runway designator, flight levels

- **All rules considered for Detection;**

ANSPs' constraints

- **Constraints on Flight Id (Call Sign) Composition**

  e.g. no use of alphanumeric, use of Bigrams in France, use of final letters in NATS

CSS Tool Overview

NM/CSMC

ENV Data	**Profile Catalogue**	ANSP/State constraints	Similarity Rules	Tuning Parameters

System parameters

AO

Environmental Data

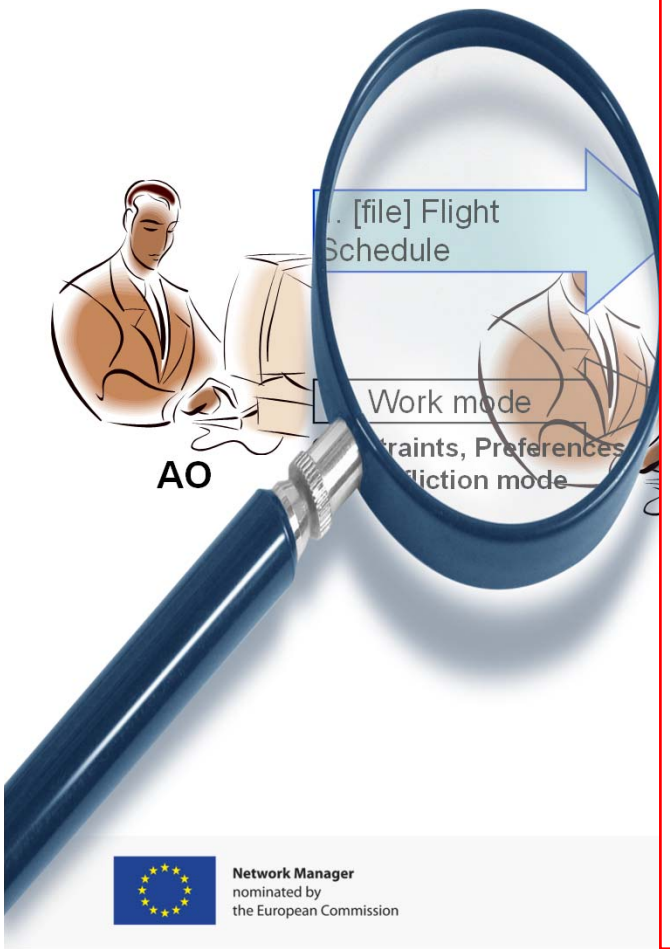
- **Timings**
- **Overlaps**
- **Buffers – for delays etc**

Profile Catalogue

- **CFMU Information Reporting catalogue covering ECAC area: default = ATC Unit Airspace (AUA)**
- **Routeing information – ‘city pairs’**

CSS Tool Overview

NM/CSMC



AO preferences

- De-selection of individual rules

Provide some flexibility in the de-confliction;

- Related conflicts are not considered for de-confliction

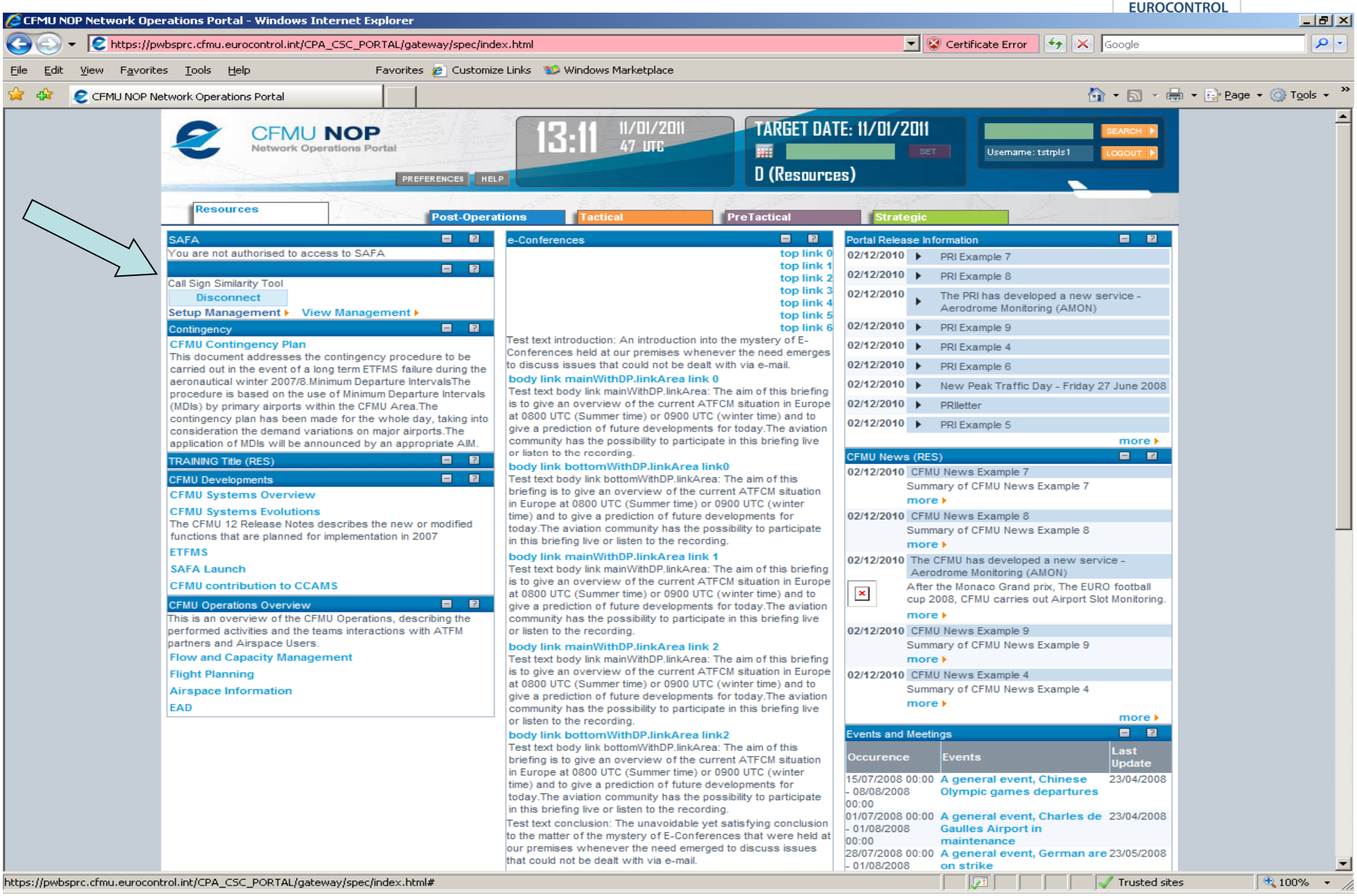
- Preferences in format and data content

De-confliction modes:

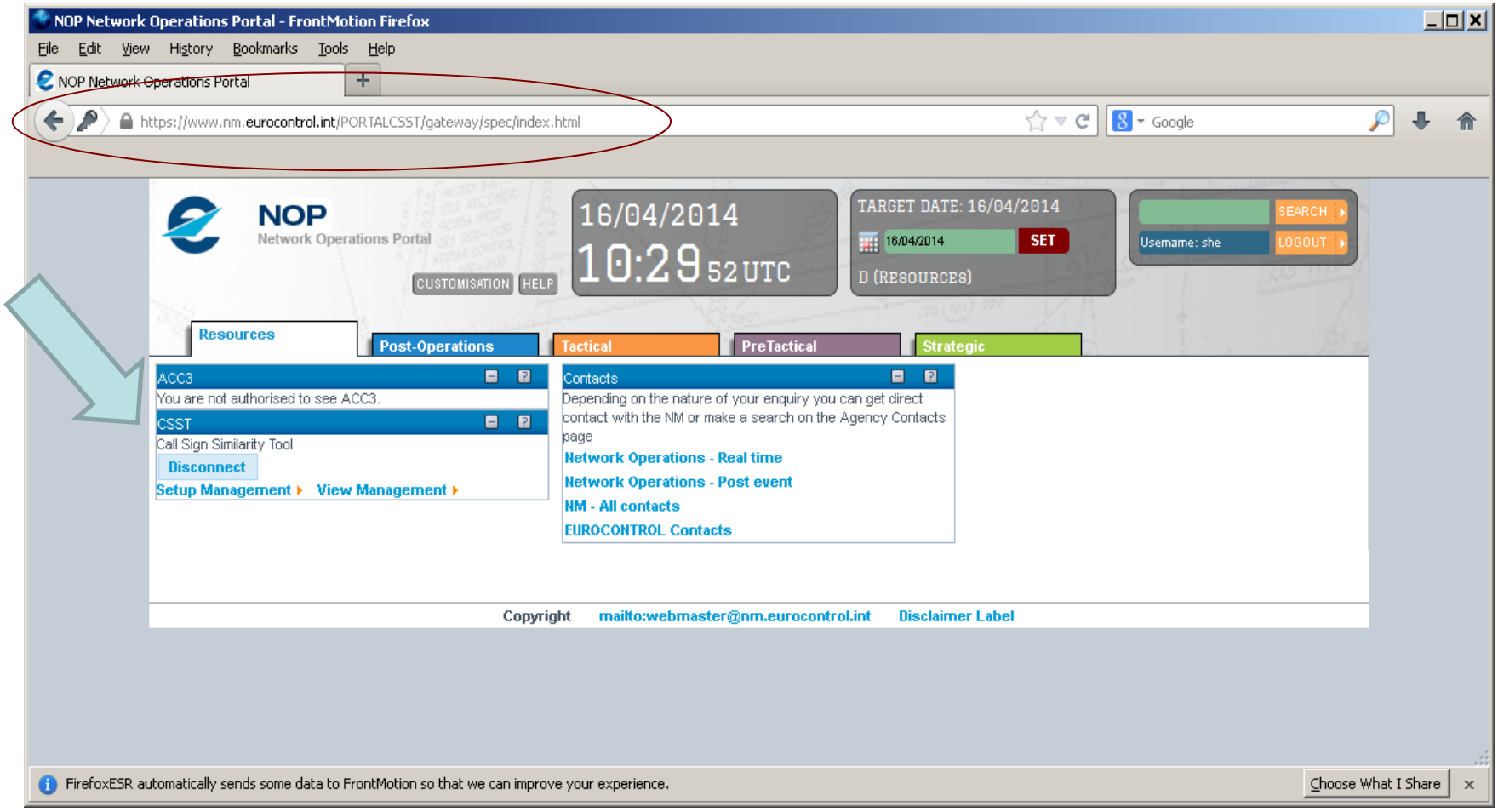
- Full Automatic, Semi-Automatic, Manual

- Flight Selection Criteria – determines which call sign to change

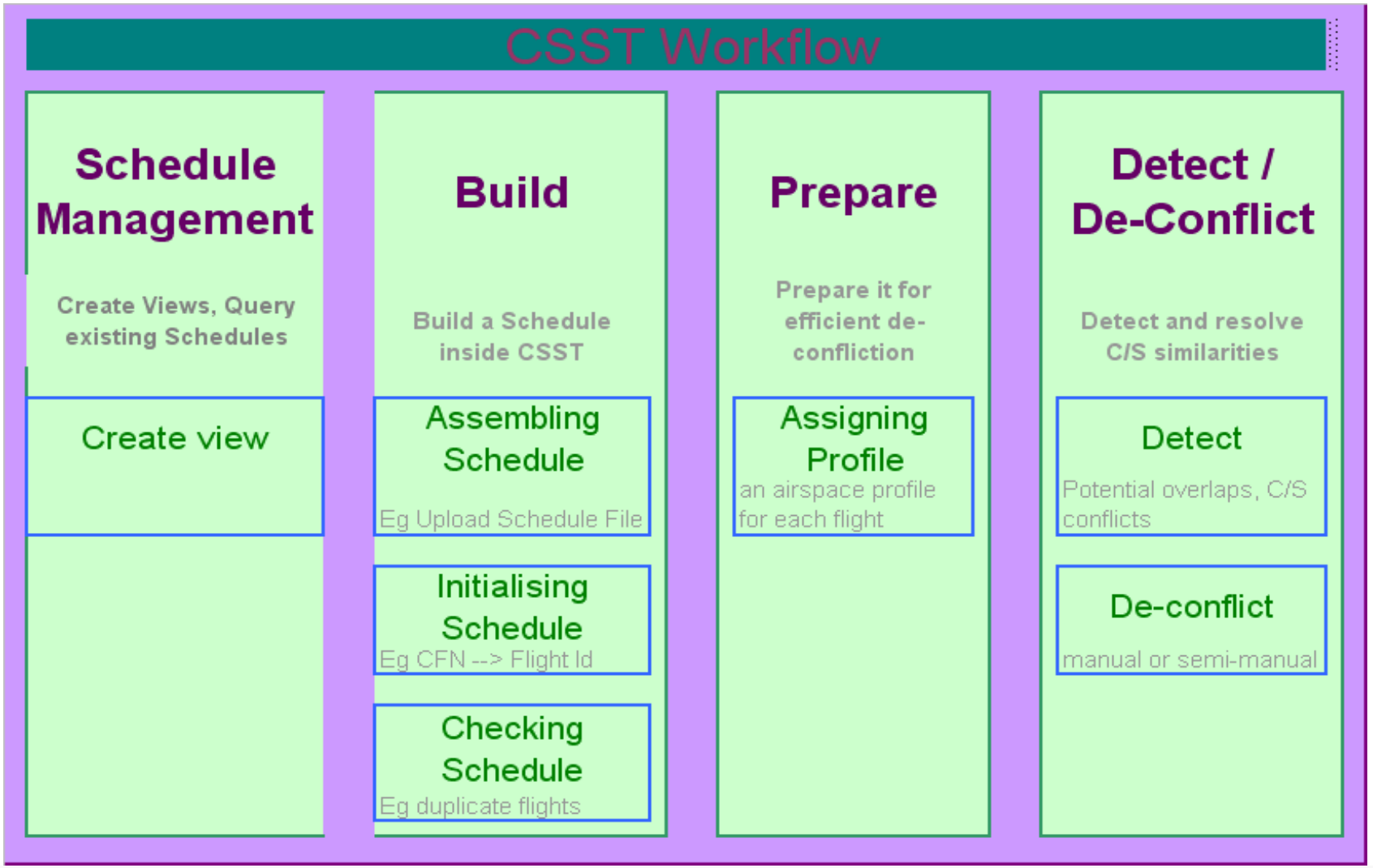
NOP Portal Access



NOP Portal Access



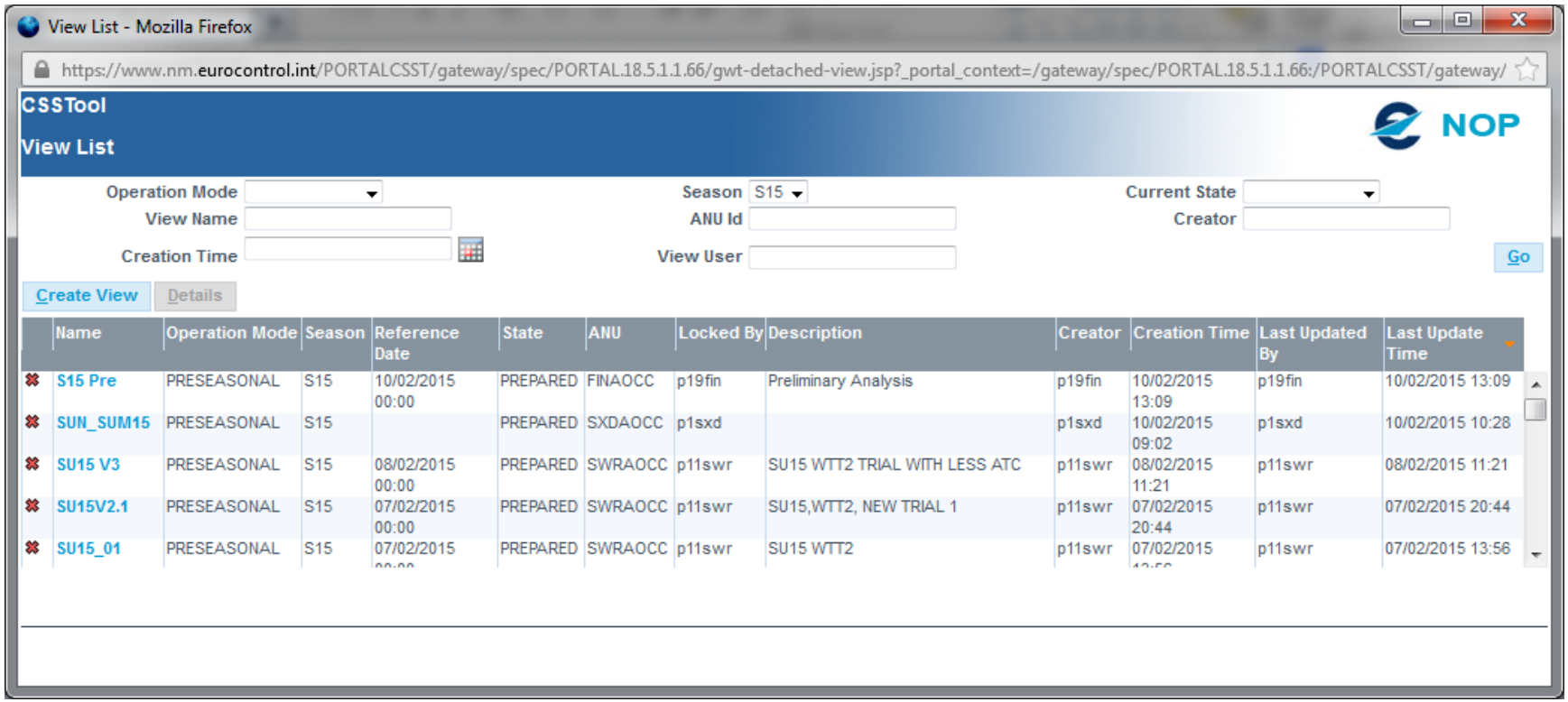
CSS Tool Workflow



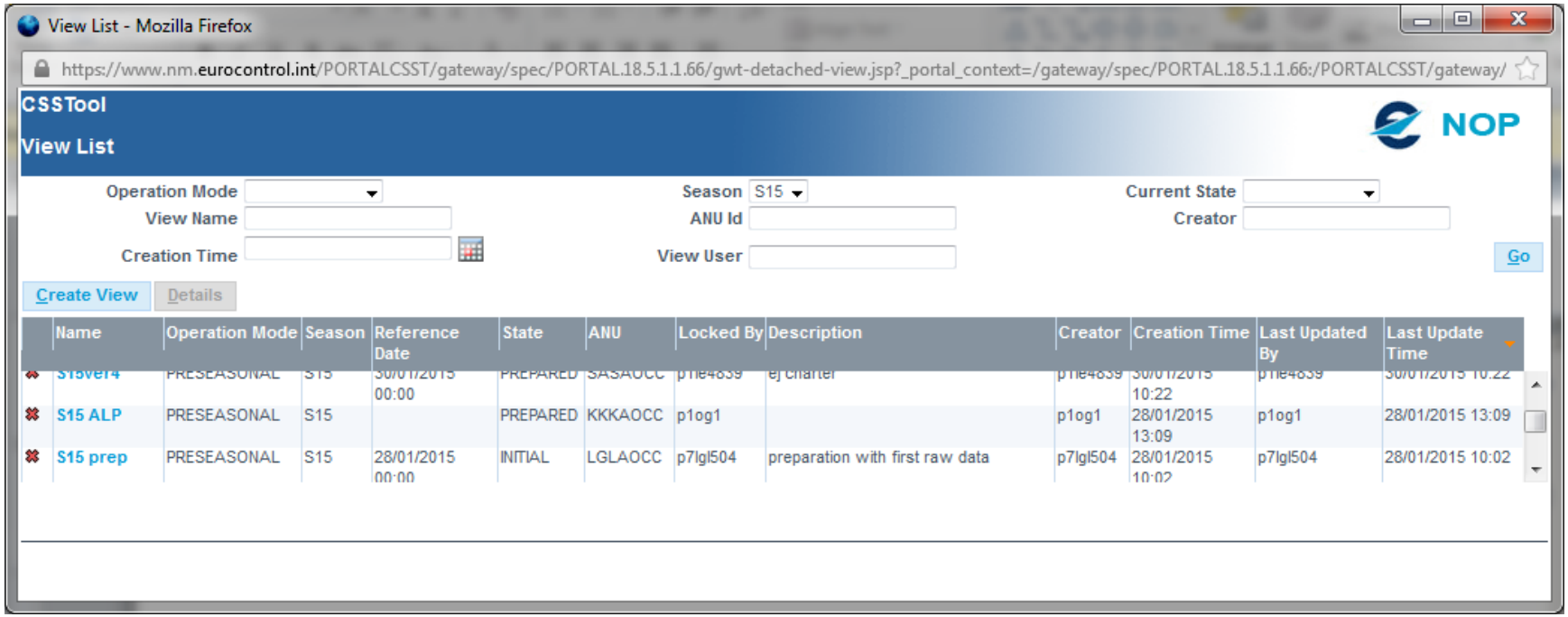
AO Flow

- **Schedule Management**
  1. **Create view**.
- **Build**
  1. **Upload schedule into the view.**
  2. **Initialise.**
  3. **Quality Check.**
- **Prepare**
  1. **The tool associates an airspace profile, to each flight in the schedule. Profiles are obtained from profile catalogue.**

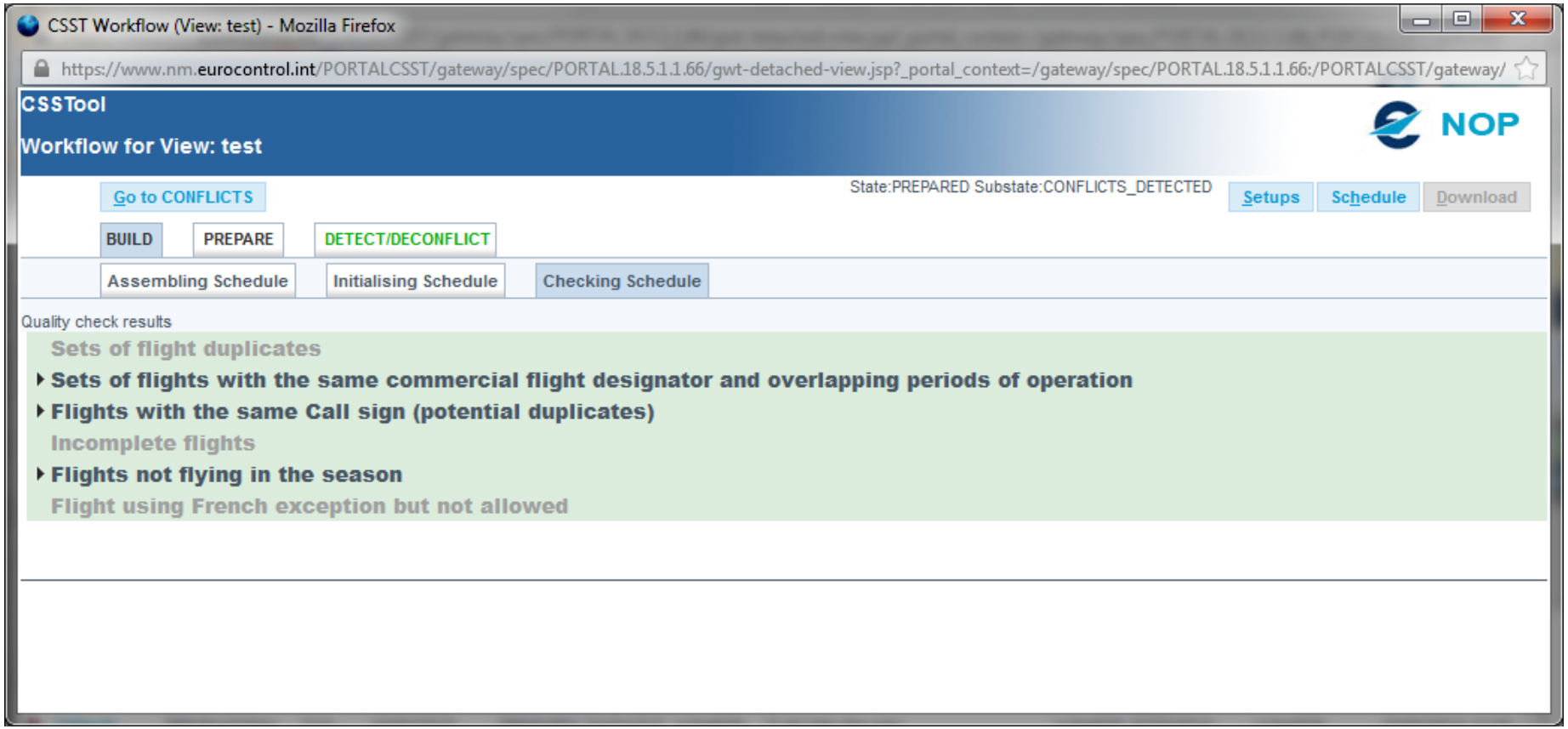
View Management



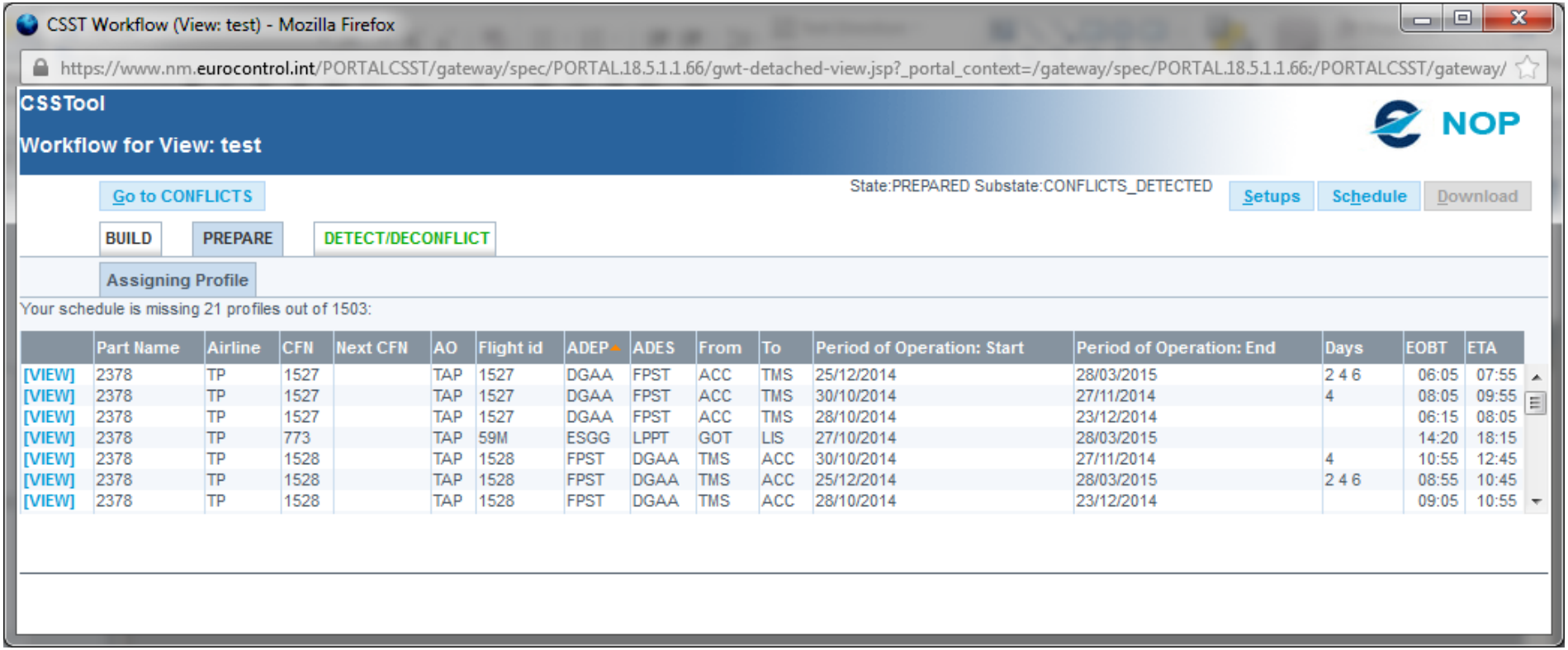
Create a Flight Schedule



Checking a Schedule



Assign Flight Profile to a schedule

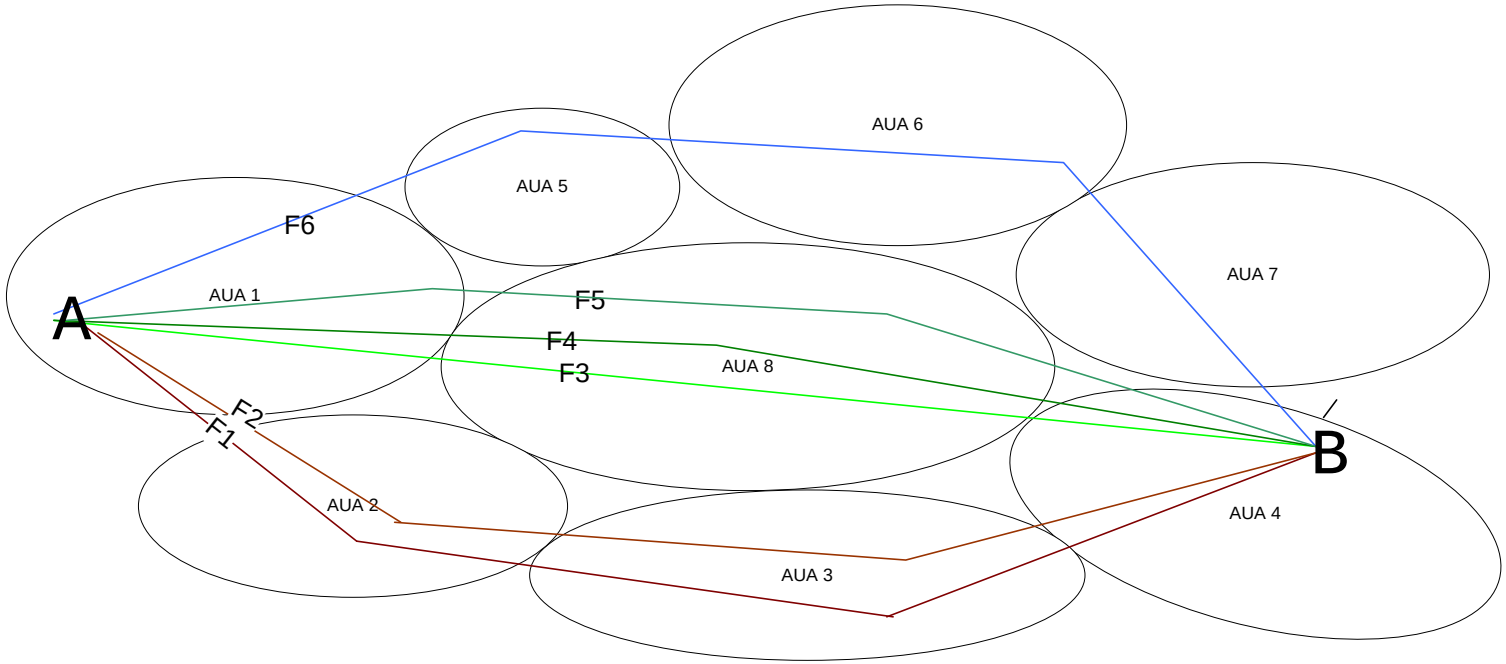


	Part Name	Airline	CFN	Next CFN	AO	Flight id	ADEP	ADES	From	To	Period of Operation: Start	Period of Operation: End	Days	EOBT	ETA
[VIEW]	2378	TP	1527		TAP	1527	DGAA	FPST	ACC	TMS	25/12/2014	28/03/2015	2 4 6	06:05	07:55
[VIEW]	2378	TP	1527		TAP	1527	DGAA	FPST	ACC	TMS	30/10/2014	27/11/2014	4	08:05	09:55
[VIEW]	2378	TP	1527		TAP	1527	DGAA	FPST	ACC	TMS	28/10/2014	23/12/2014		06:15	08:05
[VIEW]	2378	TP	773		TAP	59M	ESGG	LPPT	GOT	LIS	27/10/2014	28/03/2015		14:20	18:15
[VIEW]	2378	TP	1528		TAP	1528	FPST	DGAA	TMS	ACC	30/10/2014	27/11/2014	4	10:55	12:45
[VIEW]	2378	TP	1528		TAP	1528	FPST	DGAA	TMS	ACC	25/12/2014	28/03/2015	2 4 6	08:55	10:45
[VIEW]	2378	TP	1528		TAP	1528	FPST	DGAA	TMS	ACC	28/10/2014	23/12/2014		09:05	10:55

CSST - Prepare: Assigning a profile

- NM Profile Catalogue: flown profiles of previous season. Approx 180.000 profiles.
- For a city pair and an aircraft type (turbo or jet) associate an airspace profile.
  - This is the most flown profile.
  - Flying duration in the airspace is an average of all flights using the given profile.
  - The airspace profile consists only of airspaces type AUA (TMA, CTA). But can be customised for example for London AUA.

CSST - Assigning a profile



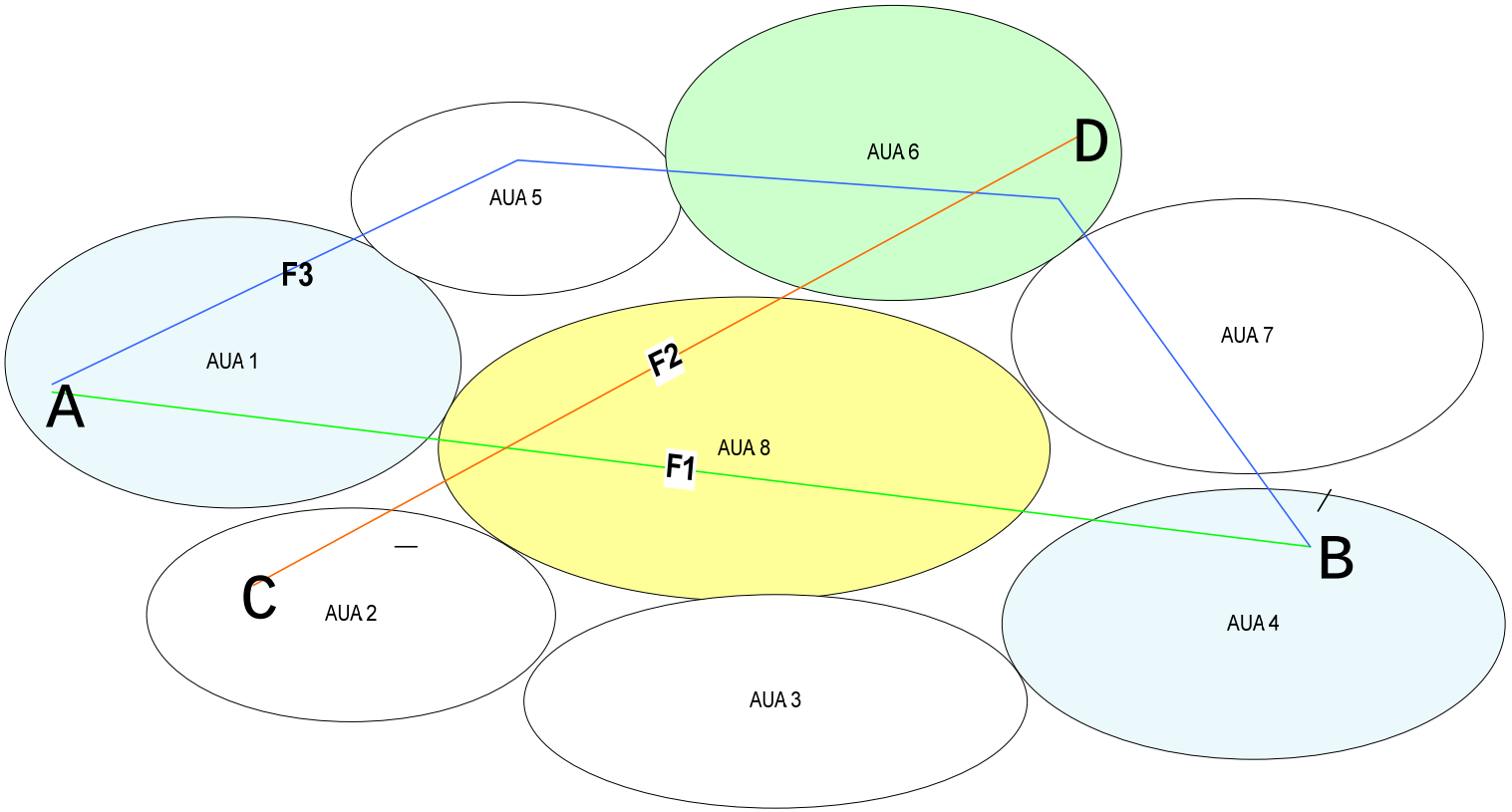
- Profile most flown for city pair A-B : AUA1, AUA8, AUA4
- Airspace profile is a list of airspaces and its flying time
- Flying time i.e. in AUA8 = [duration (F3) + duration (F4) + duration (F5)] /3

AO Flow

- **DETECT**

1. **The tool computes the potential overlaps.**
   - Result: Flights that overlap in space (aerodromes and airspaces) and time.
2. **For the overlapping profiles, it computes Callsign conflicts by applying the Similarity Rules.**
   - Results: Lists of ‘flight’ and ‘entity’ conflicts.
   - Two kinds of conflicts are detected.
     - Reference conflicts : conflicts with regard to the CSMC reference detection setups.
     - AO conflicts: conflicts with regards to user-relaxed or hardened setups.

CSST - Detect



Overlap in space

F1 and F2 in airspace AUA 8,

F1 and F3 in aerodromes A, B

F2 and F3 in airspace AUA 6

Overlap in time

F1 06:00 EOBT

F2 06:30 EOBT

F3 22:00 EOBT

Potential conflict F1-F2

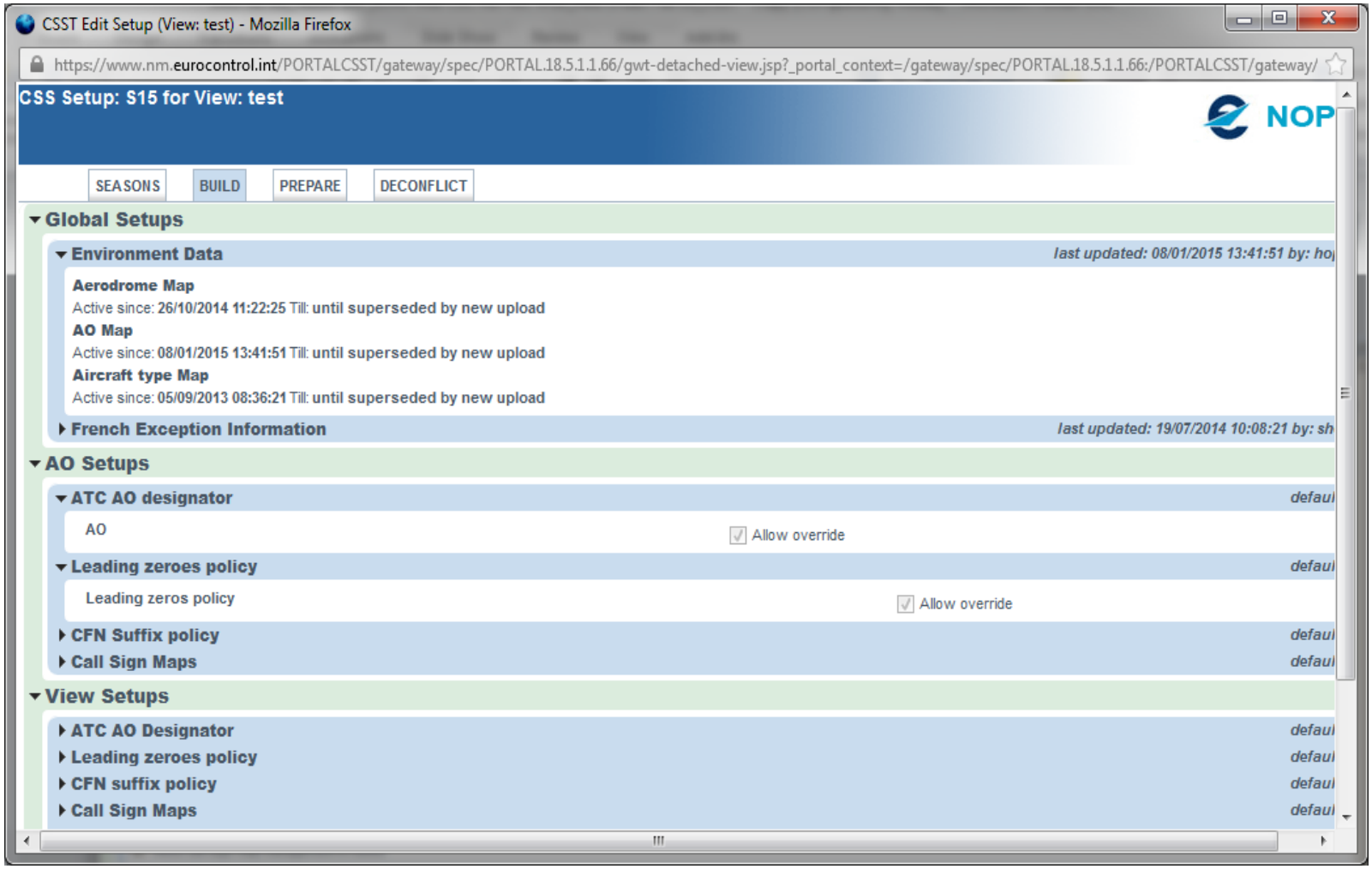
C/S conflicts

AF 123 (F1)

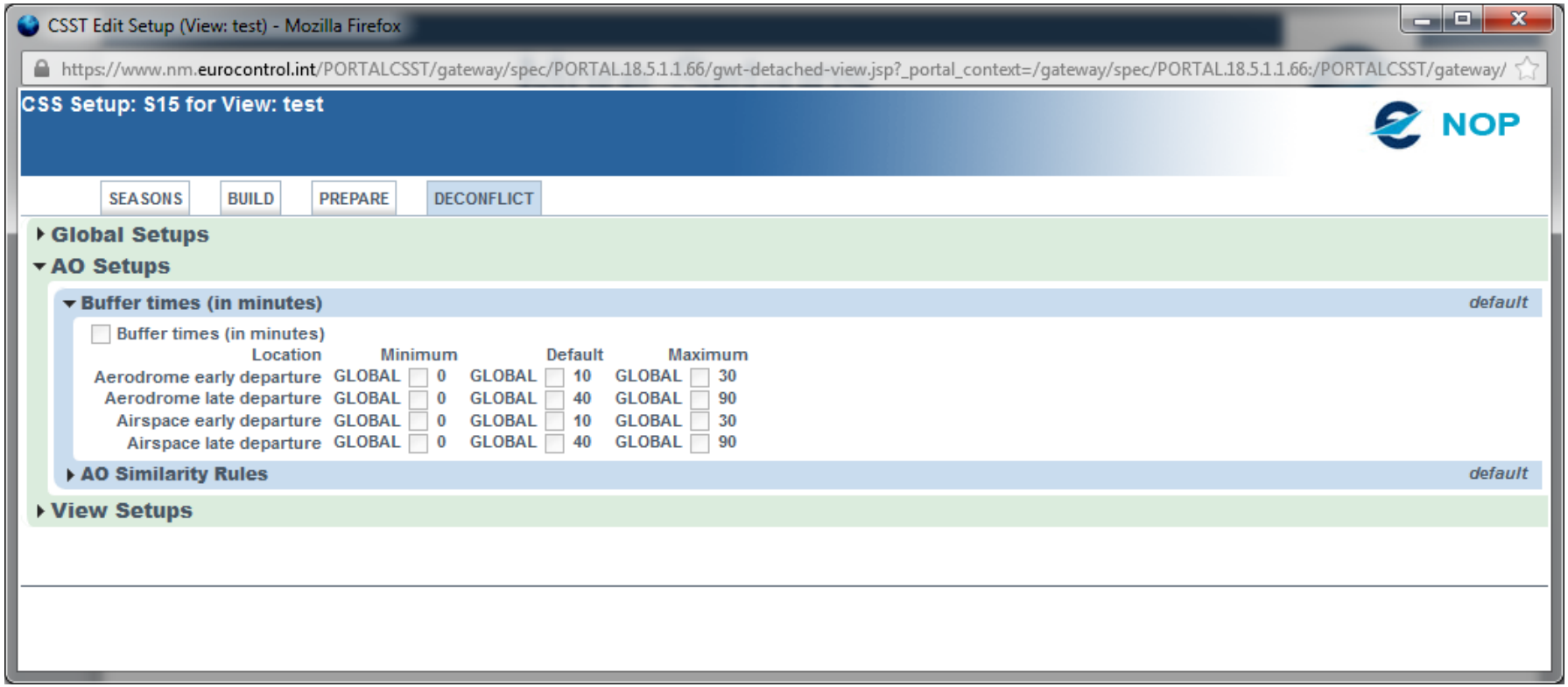
AF 213 (F2)

Conflict F1-F2 identified

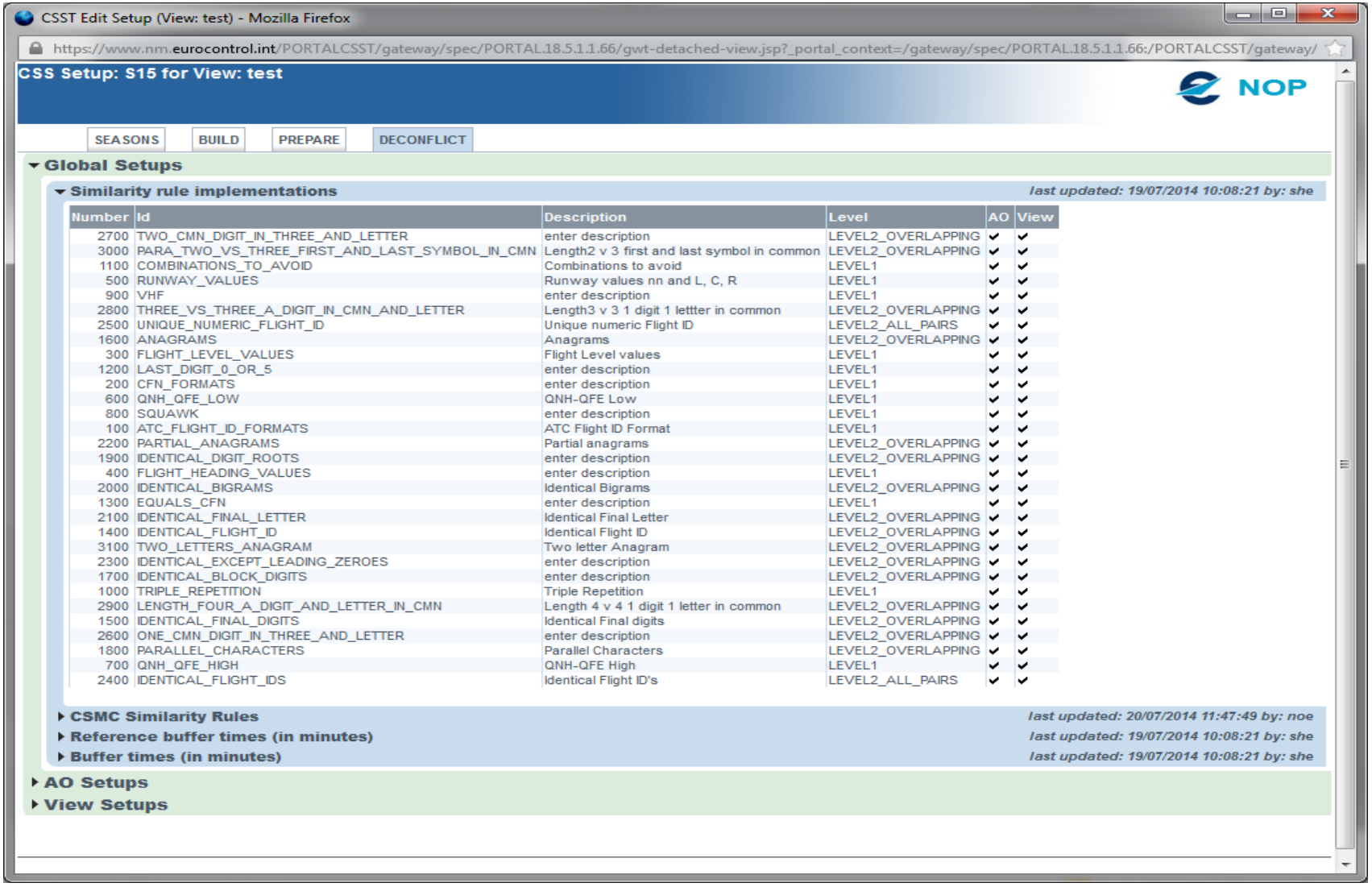
Customising CSS Tool Set-ups



More Set-ups

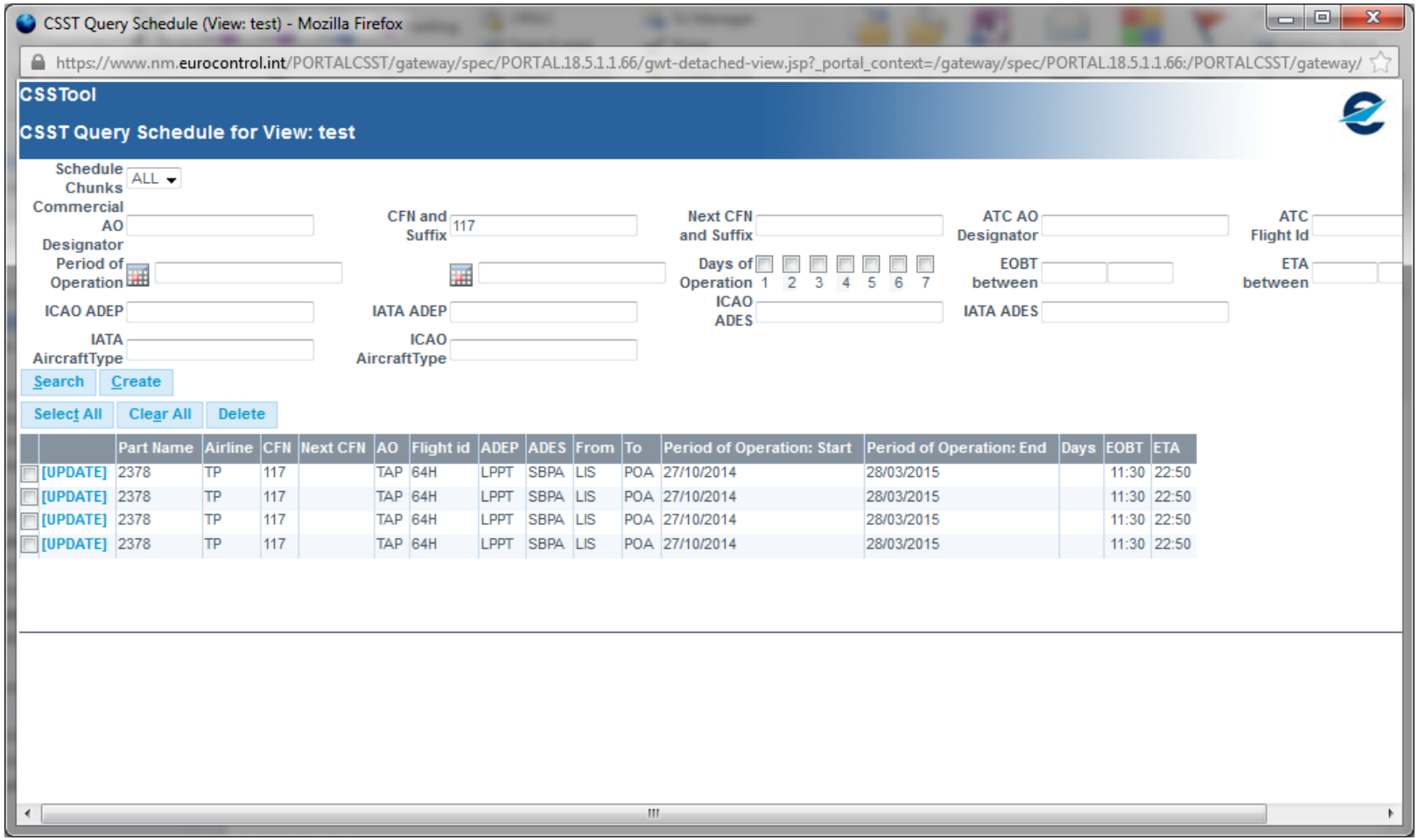

CSST Edit Setup (View: test) - Mozilla Firefox
https://www.nm.eurocontrol.int/PORTALCSST/gateway/spec/PORTAL.18.5.1.1.66/gwt-detached-view.jsp?_portal_context=/gateway/spec/PORTAL.18.5.1.1.66:/PORTALCSST/gateway/
CSS Setup: S15 for View: test
NOP
SEASONS
BUILD
PREPARE
DECONFLICT
Global Setups
AO Setups
Buffer times (in minutes)
default
Buffer times (in minutes)
Location Minimum Default Maximum
Aerodrome early departure GLOBAL 0 GLOBAL 10 GLOBAL 30
Aerodrome late departure GLOBAL 0 GLOBAL 40 GLOBAL 90
Airspace early departure GLOBAL 0 GLOBAL 10 GLOBAL 30
Airspace late departure GLOBAL 0 GLOBAL 40 GLOBAL 90
AO Similarity Rules
default
View Setups

Similarity Rules Set-up



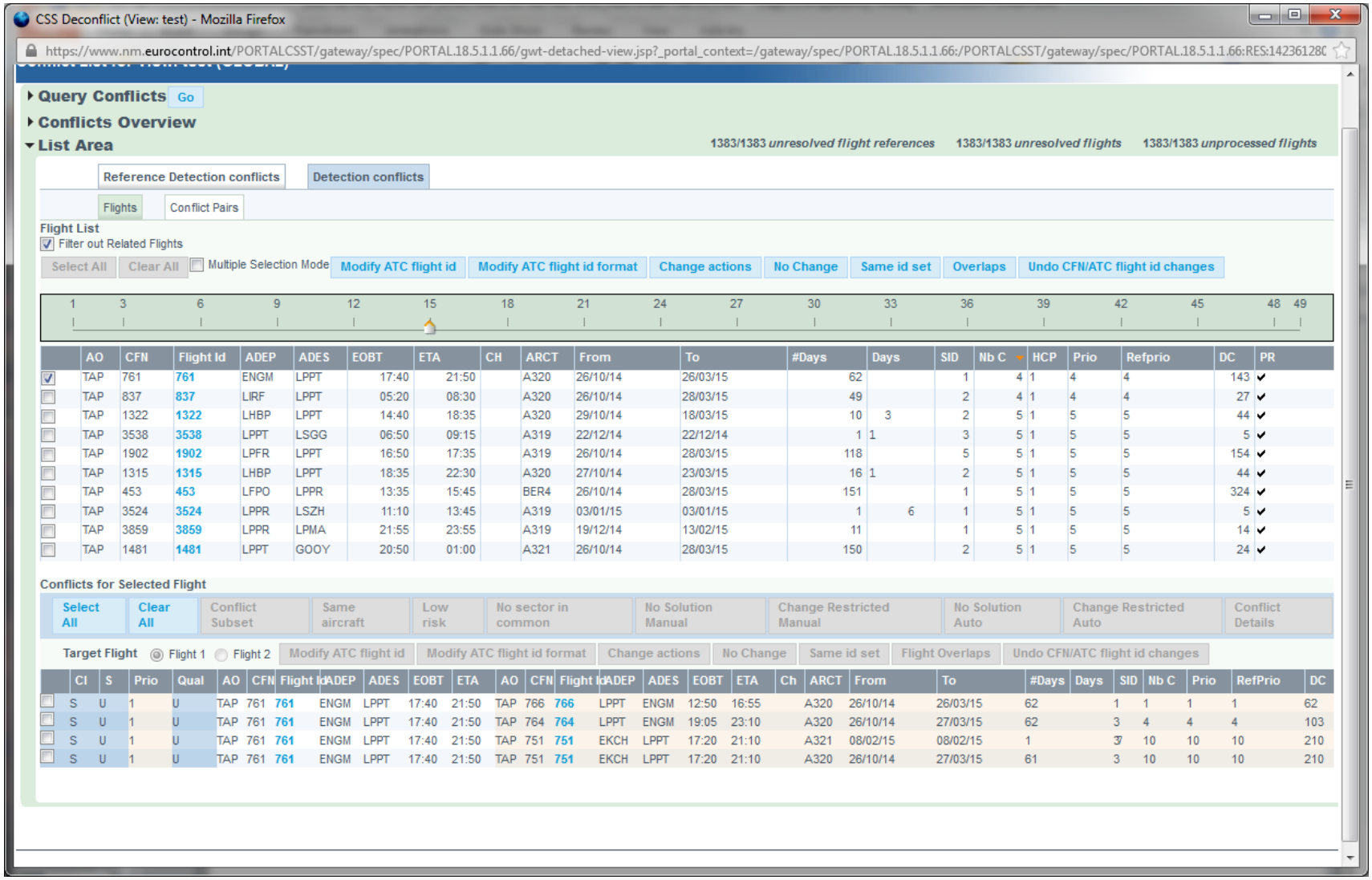
Number	Id	Description	Level	AO	View
2700	TWO_CMN_DIGIT_IN_THREE_AND_LETTER	enter description	LEVEL2_OVERLAPPING	✔	✔
3000	PARA_TWO_VS_THREE_FIRST_AND_LAST_SYMBOL_IN_CMN	Length2 v 3 first and last symbol in common	LEVEL2_OVERLAPPING	✔	✔
1100	COMBINATIONS_TO_AVOID	Combinations to avoid	LEVEL1	✔	✔
500	RUNWAY_VALUES	Runway values nn and L, C, R	LEVEL1	✔	✔
900	VHF	enter description	LEVEL1	✔	✔
2800	THREE_VS_THREE_A_DIGIT_IN_CMN_AND_LETTER	Length3 v 3 1 digit 1 lettter in common	LEVEL2_OVERLAPPING	✔	✔
2500	UNIQUE_NUMERIC_FLIGHT_ID	Unique numeric Flight ID	LEVEL2_ALL_PAIRS	✔	✔
1600	ANAGRAMS	Anagrams	LEVEL2_OVERLAPPING	✔	✔
300	FLIGHT_LEVEL_VALUES	Flight Level values	LEVEL1	✔	✔
1200	LAST_DIGIT_0_OR_5	enter description	LEVEL1	✔	✔
200	CFN_FORMATS	enter description	LEVEL1	✔	✔
600	QNH_QFE_LOW	QNH-QFE Low	LEVEL1	✔	✔
800	SQUAWK	enter description	LEVEL1	✔	✔
100	ATC_FLIGHT_ID_FORMATS	ATC Flight ID Format	LEVEL1	✔	✔
2200	PARTIAL_ANAGRAMS	Partial anagrams	LEVEL2_OVERLAPPING	✔	✔
1900	IDENTICAL_DIGIT_ROOTS	enter description	LEVEL2_OVERLAPPING	✔	✔
400	FLIGHT_HEADING_VALUES	enter description	LEVEL1	✔	✔
2000	IDENTICAL_BIGRAMS	Identical Bigrams	LEVEL2_OVERLAPPING	✔	✔
1300	EQUALS_CFN	enter description	LEVEL1	✔	✔
2100	IDENTICAL_FINAL_LETTER	Identical Final Letter	LEVEL2_OVERLAPPING	✔	✔
1400	IDENTICAL_FLIGHT_ID	Identical Flight ID	LEVEL2_OVERLAPPING	✔	✔
3100	TWO_LETTERS_ANAGRAM	Two letter Anagram	LEVEL2_OVERLAPPING	✔	✔
2300	IDENTICAL_EXCEPT_LEADING_ZEROES	enter description	LEVEL2_OVERLAPPING	✔	✔
1700	IDENTICAL_BLOCK_DIGITS	enter description	LEVEL2_OVERLAPPING	✔	✔
1000	TRIPLE_REPETITION	Triple Repetition	LEVEL1	✔	✔
2900	LENGTH_FOUR_A_DIGIT_AND_LETTER_IN_CMN	Length 4 v 4 1 digit 1 letter in common	LEVEL2_OVERLAPPING	✔	✔
1500	IDENTICAL_FINAL_DIGITS	Identical Final digits	LEVEL2_OVERLAPPING	✔	✔
2600	ONE_CMN_DIGIT_IN_THREE_AND_LETTER	enter description	LEVEL2_OVERLAPPING	✔	✔
1800	PARALLEL_CHARACTERS	Parallel Characters	LEVEL2_OVERLAPPING	✔	✔
700	QNH_QFE_HIGH	QNH-QFE High	LEVEL1	✔	✔
2400	IDENTICAL_FLIGHT_IDS	Identical Flight ID's	LEVEL2_ALL_PAIRS	✔	✔

Schedule Query

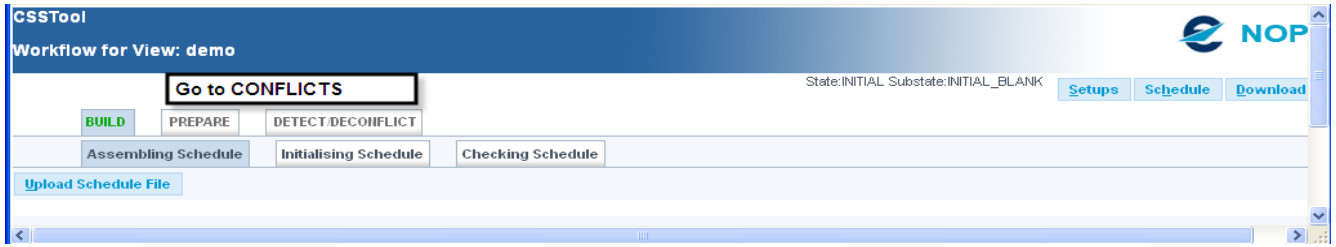


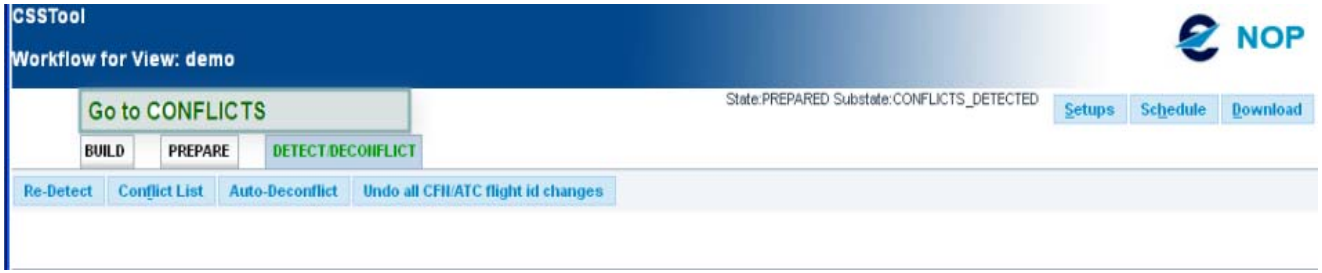
	Part Name	Airline	CFN	Next CFN	AO	Flight id	ADEP	ADES	From	To	Period of Operation: Start	Period of Operation: End	Days	EOBT	ETA
[UPDATE]	2378	TP	117		TAP	64H	LPPT	SBPA	LIS	POA	27/10/2014	28/03/2015		11:30	22:50
[UPDATE]	2378	TP	117		TAP	64H	LPPT	SBPA	LIS	POA	27/10/2014	28/03/2015		11:30	22:50
[UPDATE]	2378	TP	117		TAP	64H	LPPT	SBPA	LIS	POA	27/10/2014	28/03/2015		11:30	22:50
[UPDATE]	2378	TP	117		TAP	64H	LPPT	SBPA	LIS	POA	27/10/2014	28/03/2015		11:30	22:50

Conflict List



New button ‘Go To Conflicts’ will fast track to conflicts list.





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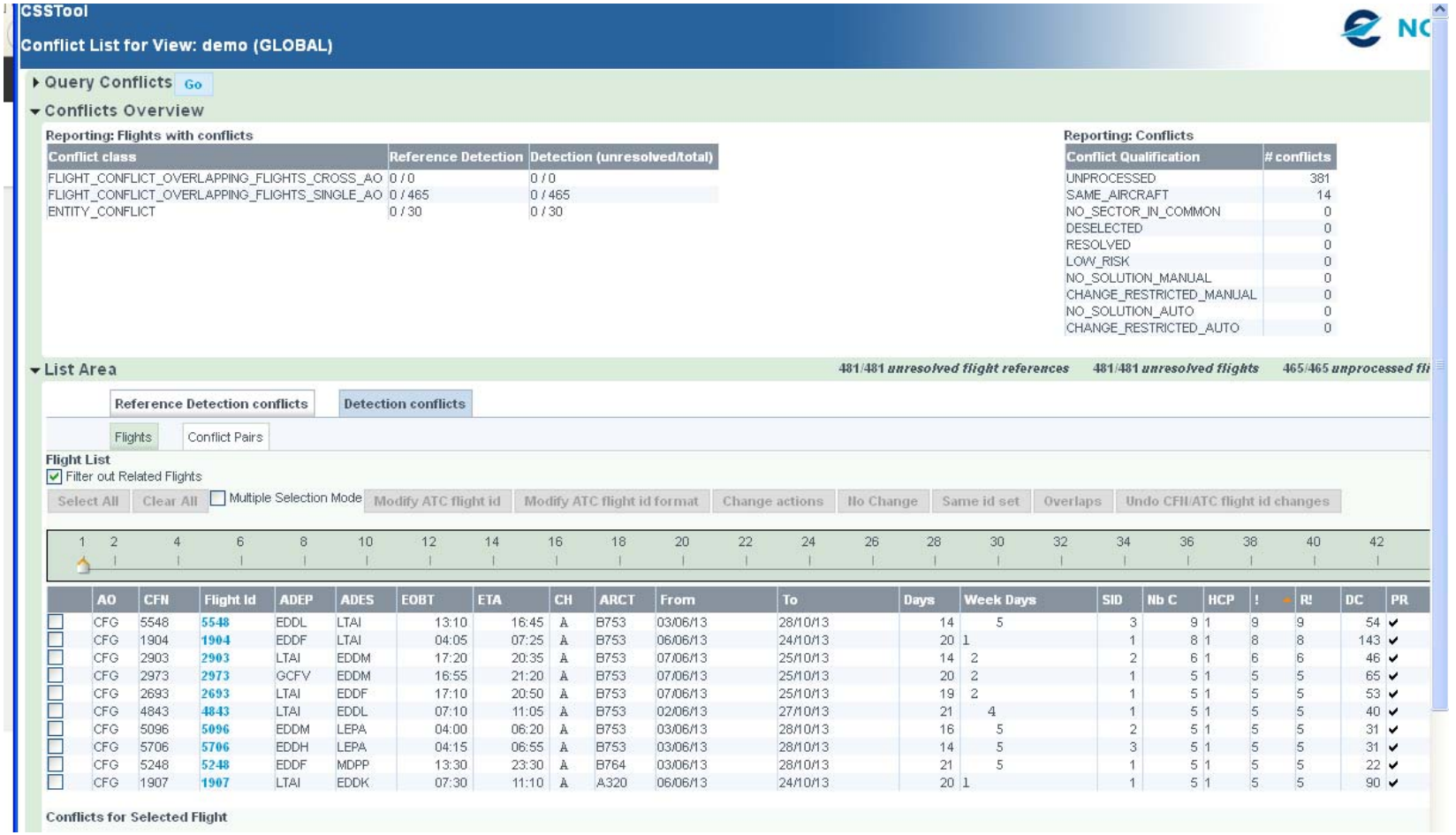
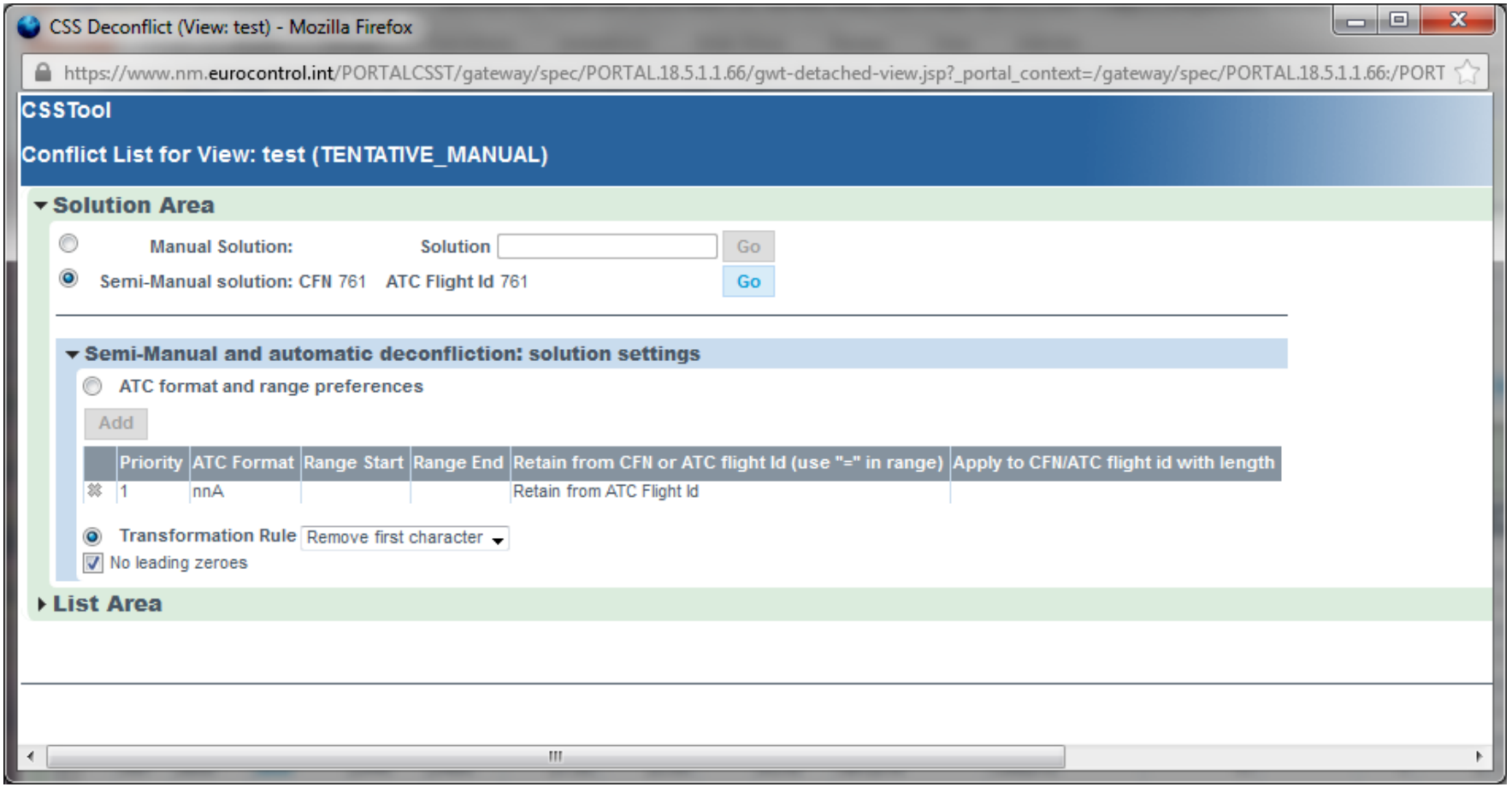


AO Flow

- **DE-CONFLICT**

1. **The Flight Ids are modified to resolve/improve the conflict.**
   - Manually or
   - Semi-manually: The Tool proposes some ATC Flight Ids and lets the user select.
   - Automatic: The tool automatically de-conflicts the schedule.

De-conflict Solution Area



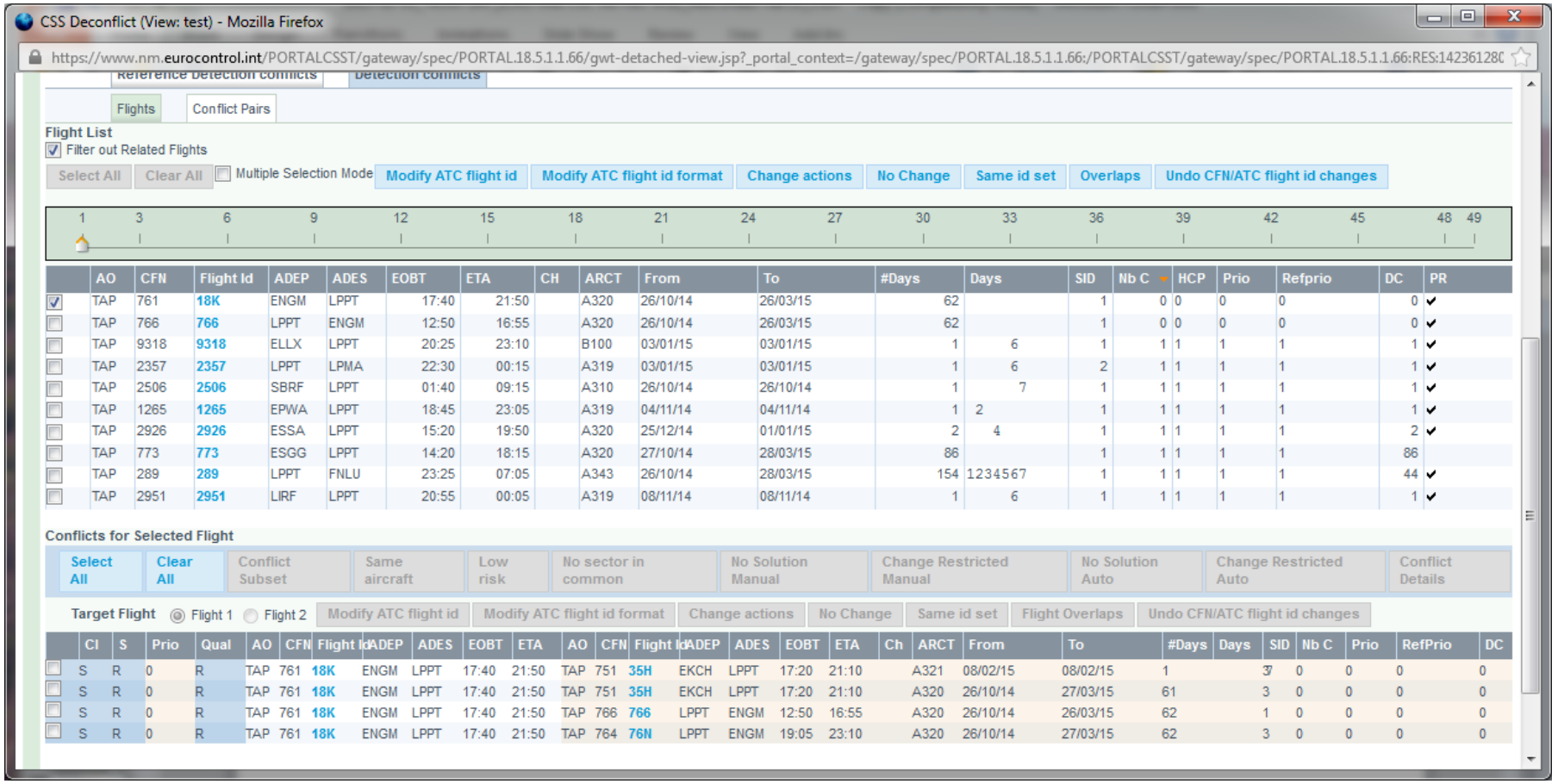
No solutions found

- Possible actions when no solution is found
  - Try to change the other flight
    - If possible, and not done yet
  - Extend search space for C/S
    - Try other C/S ranges
    - Allow more C/S format
    - (Remove link with CFN) if any
  - Reduce “conflicts” with other flights
    - Dropping / De-selecting some “minor” similarity rules
    - Reducing buffer time parameters
    - (Note: A priori De-confliction uses the same rules/parameters as for Conflict Detection)
  - Accept the situation
    - Disregard the conflict

De-confliction – which flight

- Processing a Level A conflict: which flight to change
  - Not the one with No_change indicator set
  - Not the one subject to ANSP constraint « C/S = CFN »
  - Not the one with over flight permission (preferably)
  - Not the one with airport restrictions (preferably)
- Heuristics
  - The one with the most conflicts (as will eliminate more conflicts)
  - The one with the least frequency in the schedule (operating days)
    - ➔ Least impact on the schedule
  - The most recent one (the newest city pair in schedule)
  - The second one in FIR (First come First served)
  - Medium-Haul, then Long-Haul, then Domestic
    - Some indicates L-H as last to be changed
    - What when both same type? E.g. M-H, M-H?

De-confliction Results



	AO	CFN	Flight Id	ADEP	ADES	EOBT	ETA	CH	ARCT	From	To	#Days	Days	SID	Nb C	HCP	Prio	Refprio	DC	PR
☑	TAP	761	18K	ENGM	LPPT	17:40	21:50		A320	26/10/14	26/03/15	62		1	0	0	0	0	0	✔
☐	TAP	766	766	LPPT	ENGM	12:50	16:55		A320	26/10/14	26/03/15	62		1	0	0	0	0	0	✔
☐	TAP	9318	9318	ELLX	LPPT	20:25	23:10		B100	03/01/15	03/01/15	1	6	1	1	1	1	1	1	✔
☐	TAP	2357	2357	LPPT	LPMA	22:30	00:15		A319	03/01/15	03/01/15	1	6	2	1	1	1	1	1	✔
☐	TAP	2506	2506	SBRF	LPPT	01:40	09:15		A310	26/10/14	26/10/14	1	7	1	1	1	1	1	1	✔
☐	TAP	1265	1265	EPWA	LPPT	18:45	23:05		A319	04/11/14	04/11/14	1	2	1	1	1	1	1	1	✔
☐	TAP	2926	2926	ESSA	LPPT	15:20	19:50		A320	25/12/14	01/01/15	2	4	1	1	1	1	1	2	✔
☐	TAP	773	773	ESGG	LPPT	14:20	18:15		A320	27/10/14	28/03/15	86		1	1	1	1	1	86	
☐	TAP	289	289	LPPT	FNLU	23:25	07:05		A343	26/10/14	28/03/15	154	1234567	1	1	1	1	1	44	✔
☐	TAP	2951	2951	LIRF	LPPT	20:55	00:05		A319	08/11/14	08/11/14	1	6	1	1	1	1	1	1	✔

	CI	S	Prio	Qual	AO	CFN	Flight Id	ADEP	ADES	EOBT	ETA	AO	CFN	Flight Id	ADEP	ADES	EOBT	ETA	Ch	ARCT	From	To	#Days	Days	SID	Nb C	Prio	RefPrio	DC
☐	S	R	0	R	TAP	761	18K	ENGM	LPPT	17:40	21:50	TAP	751	35H	EKCH	LPPT	17:20	21:10		A321	08/02/15	08/02/15	1	3	0	0	0	0	0
☐	S	R	0	R	TAP	761	18K	ENGM	LPPT	17:40	21:50	TAP	751	35H	EKCH	LPPT	17:20	21:10		A320	26/10/14	27/03/15	61	3	0	0	0	0	0
☐	S	R	0	R	TAP	761	18K	ENGM	LPPT	17:40	21:50	TAP	766	766	LPPT	ENGM	12:50	16:55		A320	26/10/14	26/03/15	62	1	0	0	0	0	0
☐	S	R	0	R	TAP	761	18K	ENGM	LPPT	17:40	21:50	TAP	764	76N	LPPT	ENGM	19:05	23:10		A320	26/10/14	27/03/15	62	3	0	0	0	0	0

CSS Tool - Wrap-Up

- Easily accessible via NOP Portal.
- Rich ‘city pair’ profile catalogue - full ECAC coverage.
- Worldwide aerodrome detection.
- Full automatic ; semi-manual or manual .
- Highly configurable.

CSS Tool/Service - Benefits to Users

- Centralised service, managed and maintained by CSMC (EUROCONTROL).
- Uses CSS UG agreed set of call sign similarity rules.
- Cross AO ‘Sanity Check’ performed by CSMC
- Economies of scale.
- Implements the safety objective – anticipated 75% reduction in similarities.

CSST Access

- Access using NM token id enabled for CSST (free for existing tokens)

- NM Service Request Form at:

http://www.eurocontrol.int/network-operations/access-service-request-form

- Stand alone url at: https://www.nm.eurocontrol.int/PORTALCSST/gateway/spec/index.html

Table of Contents

- Disclaimer
- Changes and Updates
- Network Manager
- The Portal
- Header
- Portlets and Detached Views
- Portlets from A to Z
  - Access Request
  - ACC Info
  - AIM
  - Airport Info
  - Airspace Data
  - Airspace Structure
  - ANM
  - ATFCM Daily Plan
  - ATFCM Events
  - ATFCM Network Situation
  - ATFCM Situation Data
  - ATFCM Scenarios
  - Calendar
  - Contingency
  - CSST
  - DMEAN Best Practices
  - EAD
  - EAUP
  - E -conference
  - E - Helpdesk
  - Events and Meetings
  - F A Q
  - Flights
  - Flight Planning
  - Main Reports
  - Measures
  - Network Axis Management
  - Network Headline News
  - Network Operations Strategic
  - Network Operations Weather

NOP Portal - Help

CSST

See Also Send Feedback

NOP - On Line Help

Portlets from A to Z > CSST

Typical Scope: RES

CSST is all about de-conflicting flight schedules. A flight schedule describes the flights that an aircraft operator intends to implement in a seasc

Access to the **CSST** Portlet is restricted by security profile. This section may therefore not concern you.

Accessing the CSST

The URL to the CSST is

https://www.cfmu.eurocontrol.int/PORTALCSST/gateway/spec/index.html

Enter your UserName and Passcode, then select the **csmc_role** in the **SATI** dom

Go next to the **Resource Tab**.

This is how the **CCST** Porlet looks like:

Lastly, click on the **Connect** button to access the CSST.

You may be prompted to **Reconnect** or **Cancel** - in cas there a session was

When successfully (re)connected, this is what the Porlet looks like, allowing you t

- Disconnect
- Setup Management
- View Management

See Also

NETWORK
OPERATIONS
CSST USER GUIDE

EUROCONTROL

Edition validity date: 23 September 2014

Edition N°: 3.0

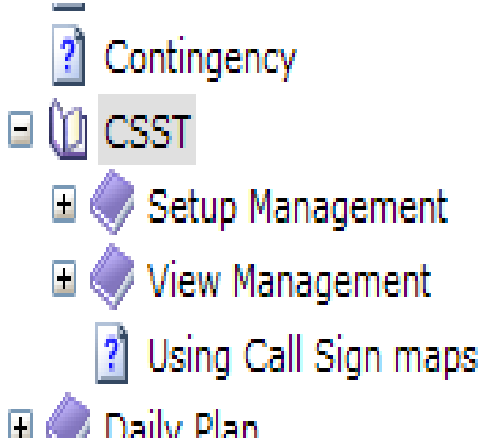
User Guide

CSST User Manual /Web based help

- User Manual updated and online at the public website:

http://www.eurocontrol.int/lists/publications/network-operations-library?type=3320&keyword

- Web based help at:

https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/index.html

(Workflow description Portlets and animated case studies)