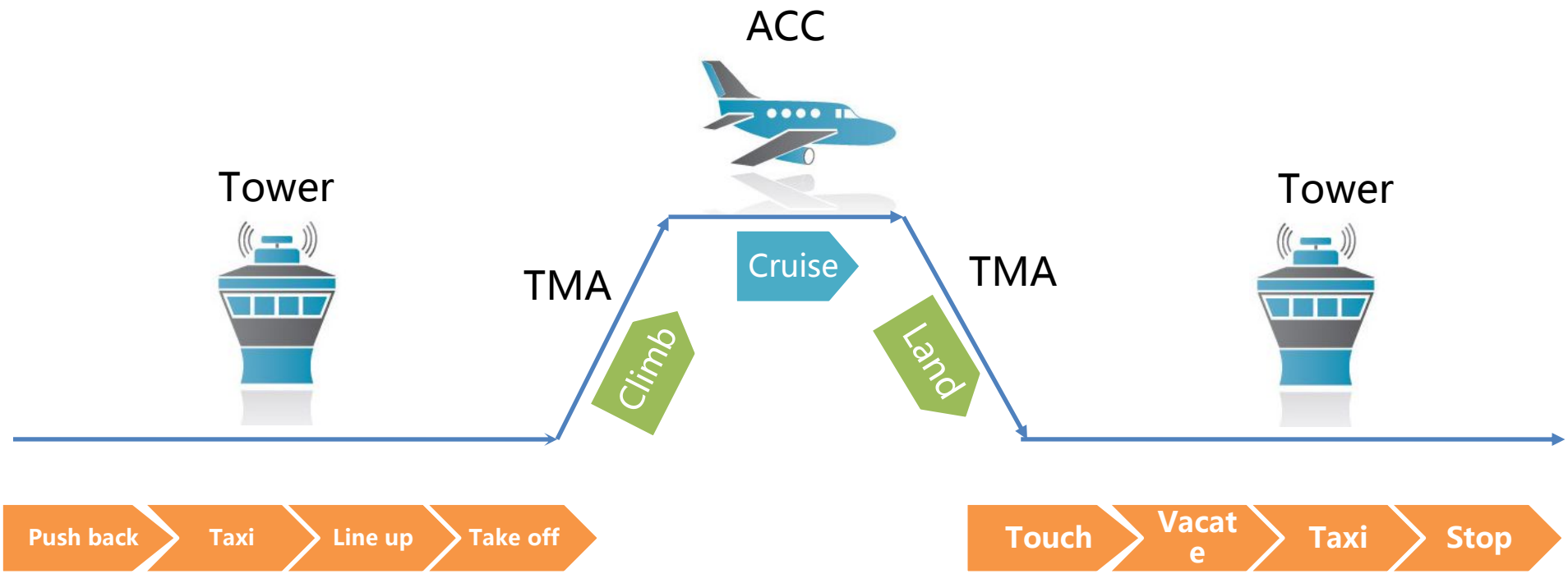
Tower Operation Management System

(TOMS)

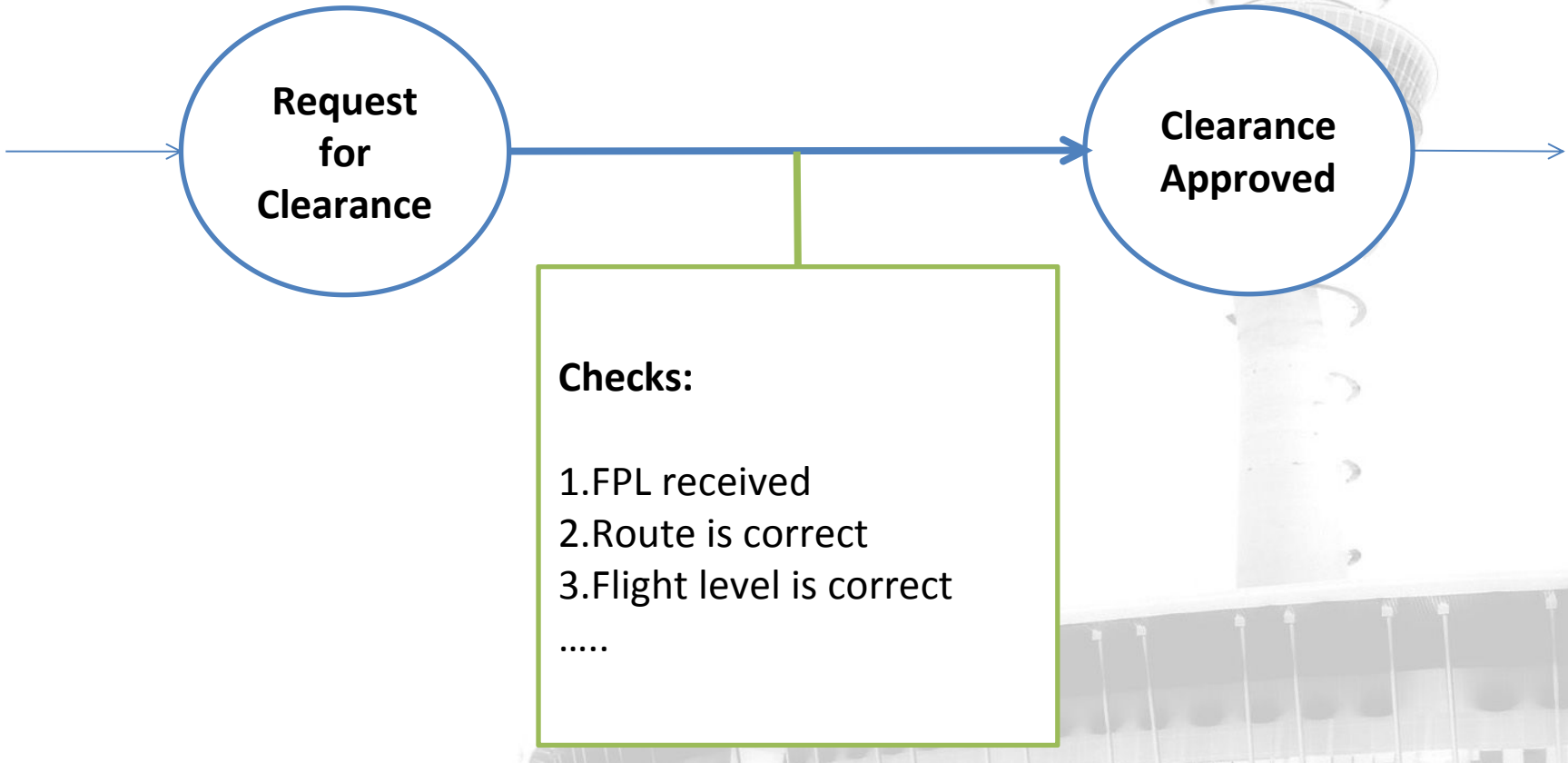
Hu Yuming, China

Background

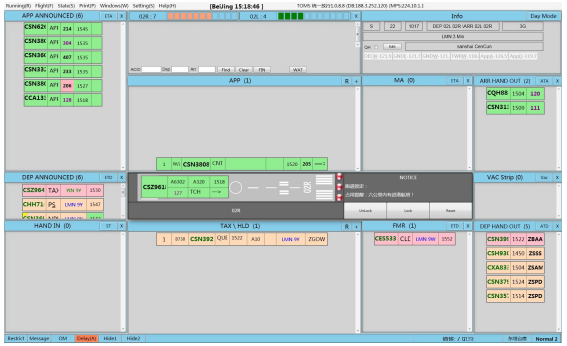
Tower control is one of the most **complex** parts in ATC service. A typical tower control consists of many particular **procedures and steps**.



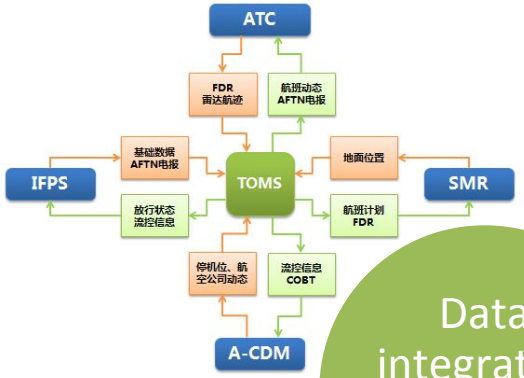
Finite State Machine Concept



Tower Operation Management System



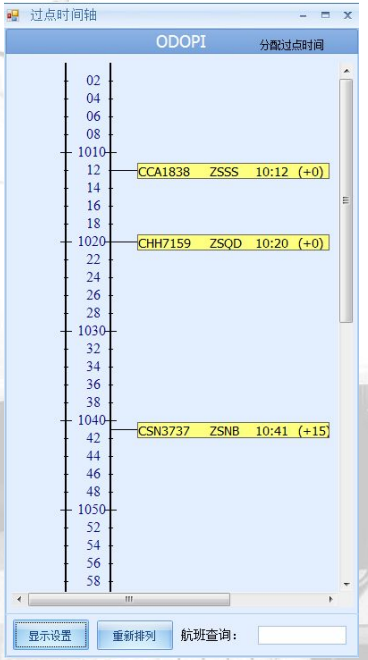
Electronic flight strip



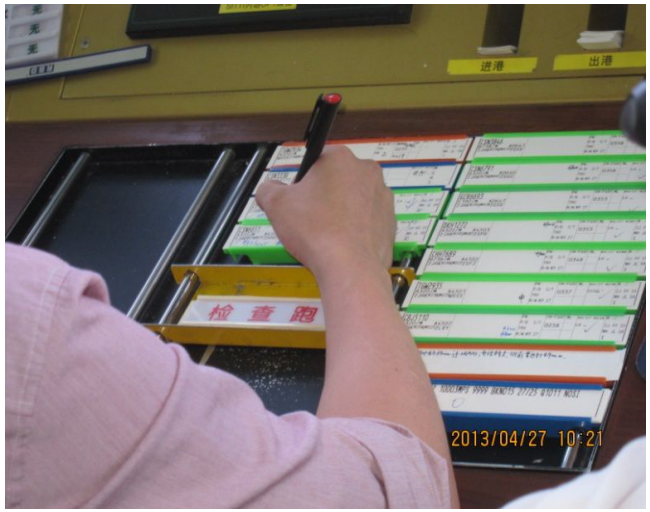
TOMS

Data integration & exchange

Decision making support



Goals



Standardizatio
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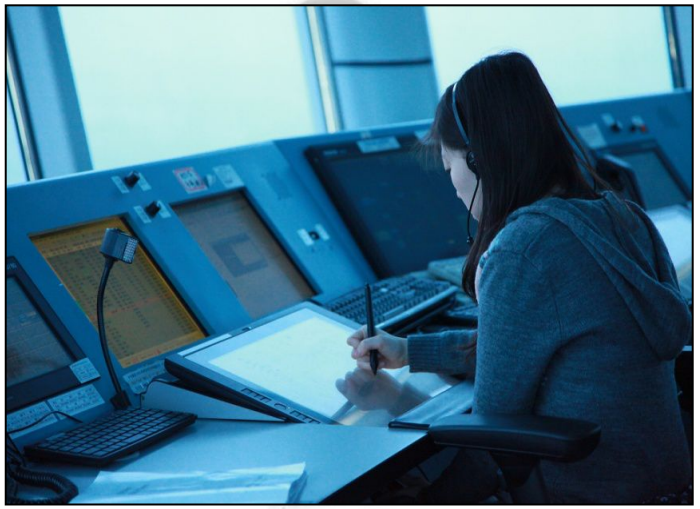
Collaboration

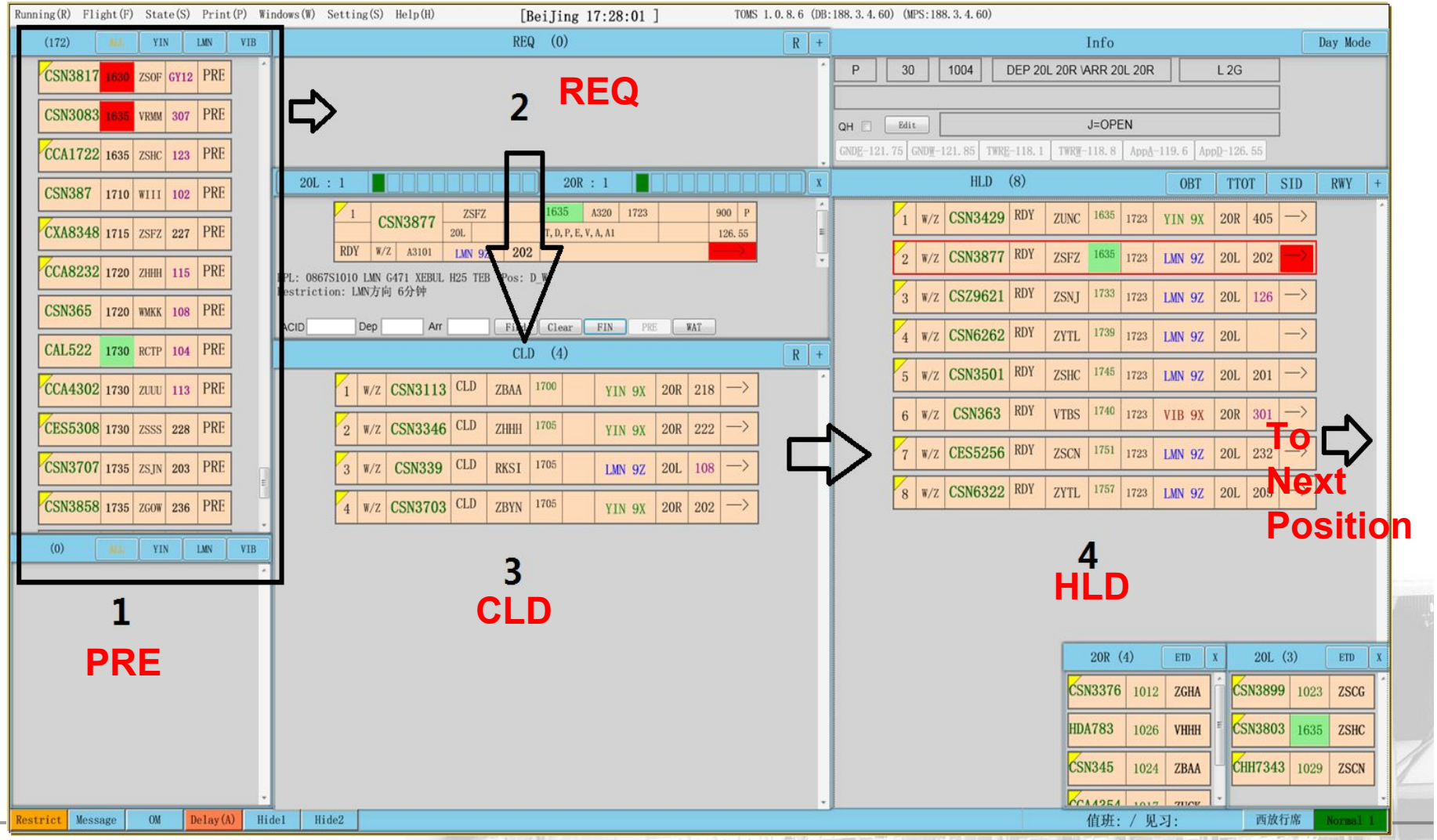
Simplification



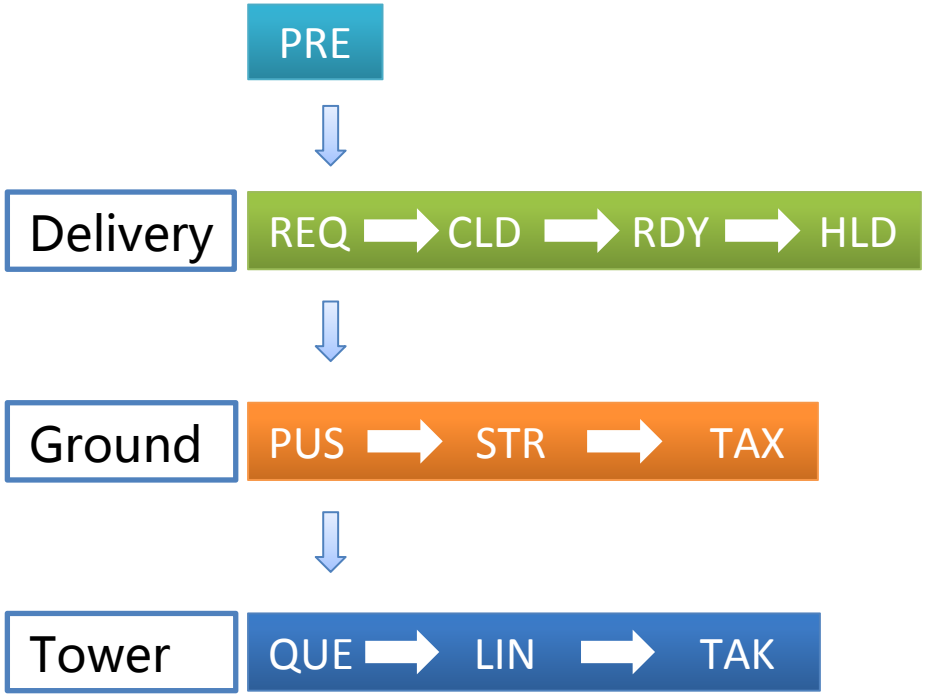
Flight state definition

CATEGORY	CODE	DESCRIPTION
Departure	FPL	Flight plan has been received by ATC.
Departure	PRE	Pre-Active, usually 30 minutes before EOBT.
Departure	REQ	The Pilot requested a departure clearance to ATC.
Departure	CLD	Departure clearance is approved.
Departure	RDY	The Pilot reported that the flight is ready to push back.
Departure	HLD	The flight is ready, but has to be held at the gate for some reason.
Departure	NPU	The flight is transferred to ground control and wait for push back.
Departure	PUS	The flight is approved to push back.
Departure	STR	The flight is approved to start its engine.
Departure/Arrival	TAX	The flight is approved to taxi out.
Departure/Arrival	STP	The ground control stopped the flight's taxing for some reason.
Departure/Arrival	CRS	The flight is approved to cross a runway during its taxing.
Departure	QUE	The flight has joined a departure queue out of a runway after taxing.
Departure/Arrival	CON	The pilot has made contact with tower control in order to take off or land.
Departure	LIN	The departure flight is approved to enter the runway and line up.
Departure	TAK	The flight is approved to take off.
Departure	ABT	The flight's taking off is aborted for some reason.
Arrival	APP	The flight is in approach control for arrival.
Arrival	LND	The flight is approved to land.
Arrival	TCH	The flight is touching the runway.
Arrival	VAC	The flight is vacating the runway after landing.
Arrival	MSA	The flight has missed its approach.
Arrival	TNG	The flight has touched the runway, but failed to land successfully and needs to pull up again.
Departure/Arrival	FIN	All works finished. The flight is out of tower's control.

Controller operation



Flight States (Departure)



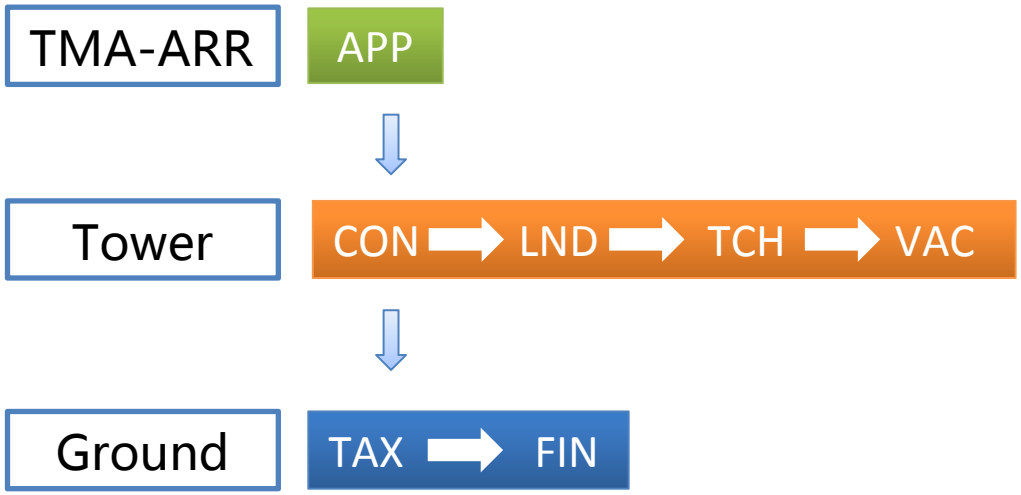
PRE : PRE Active

REQ : Request clearance
CLD : Clearance approved
RDY : Flight ready
HLD : Gate Hold

PUS : Push back
STR : Engine Start
TAX : Taxi out

QUE : Queue
LIN : Line up
TAK : Take off

Flight States (Arrival)



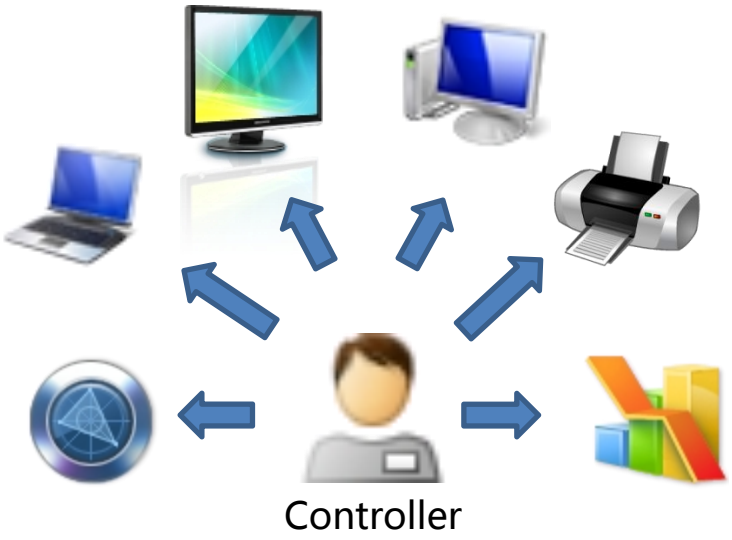
APP : Approach

CON : Contact
LND : Landing approved
TCH : Touch runway
VAC : vacate runway

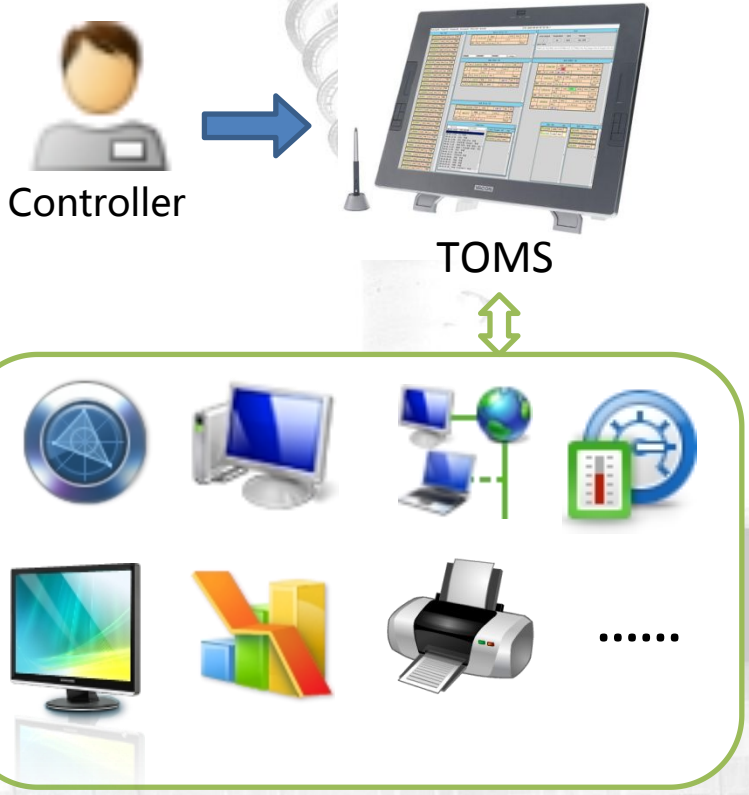
TAX : Taxi in
FIN : Finish

Data Integration & Exchange

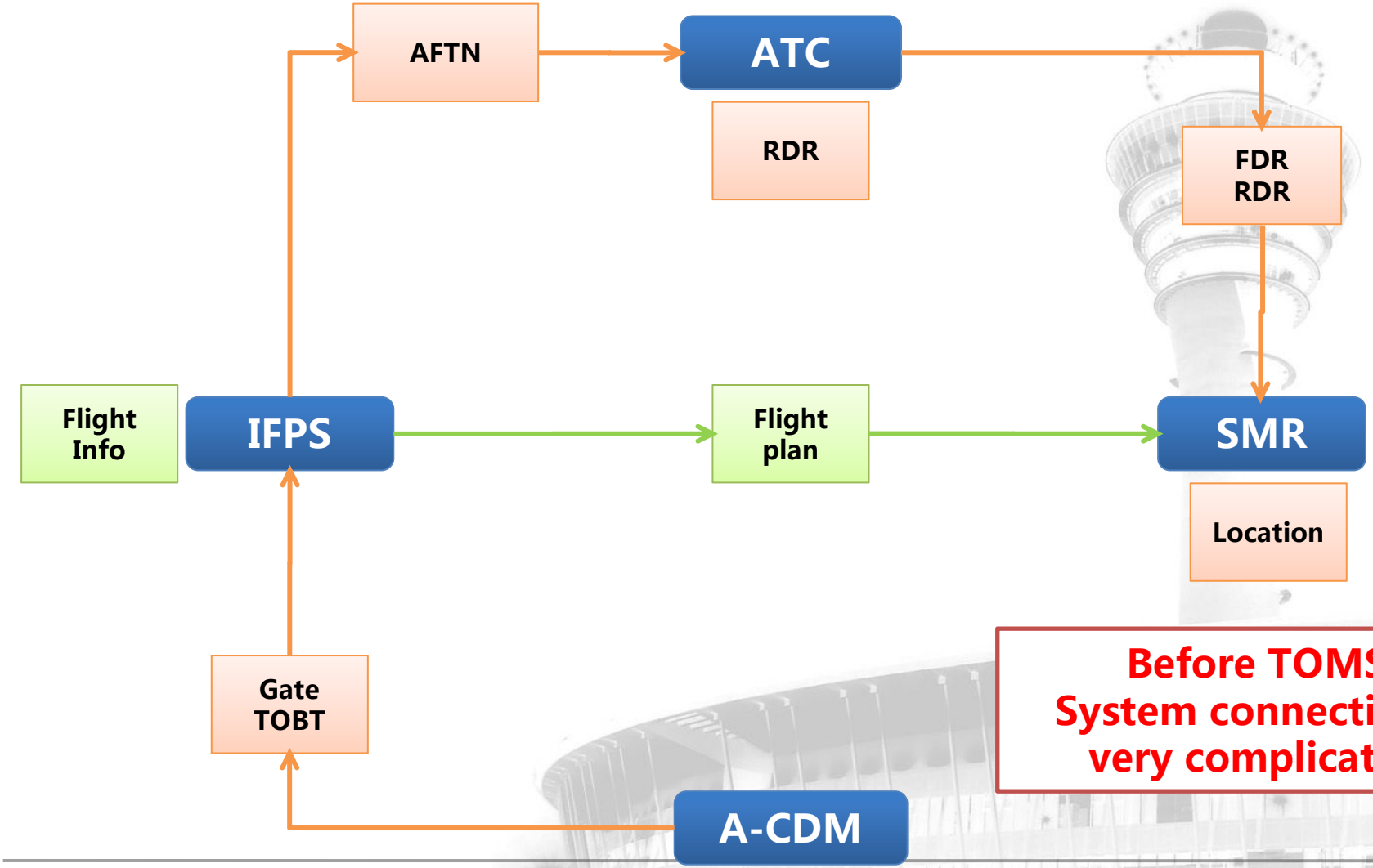
Before



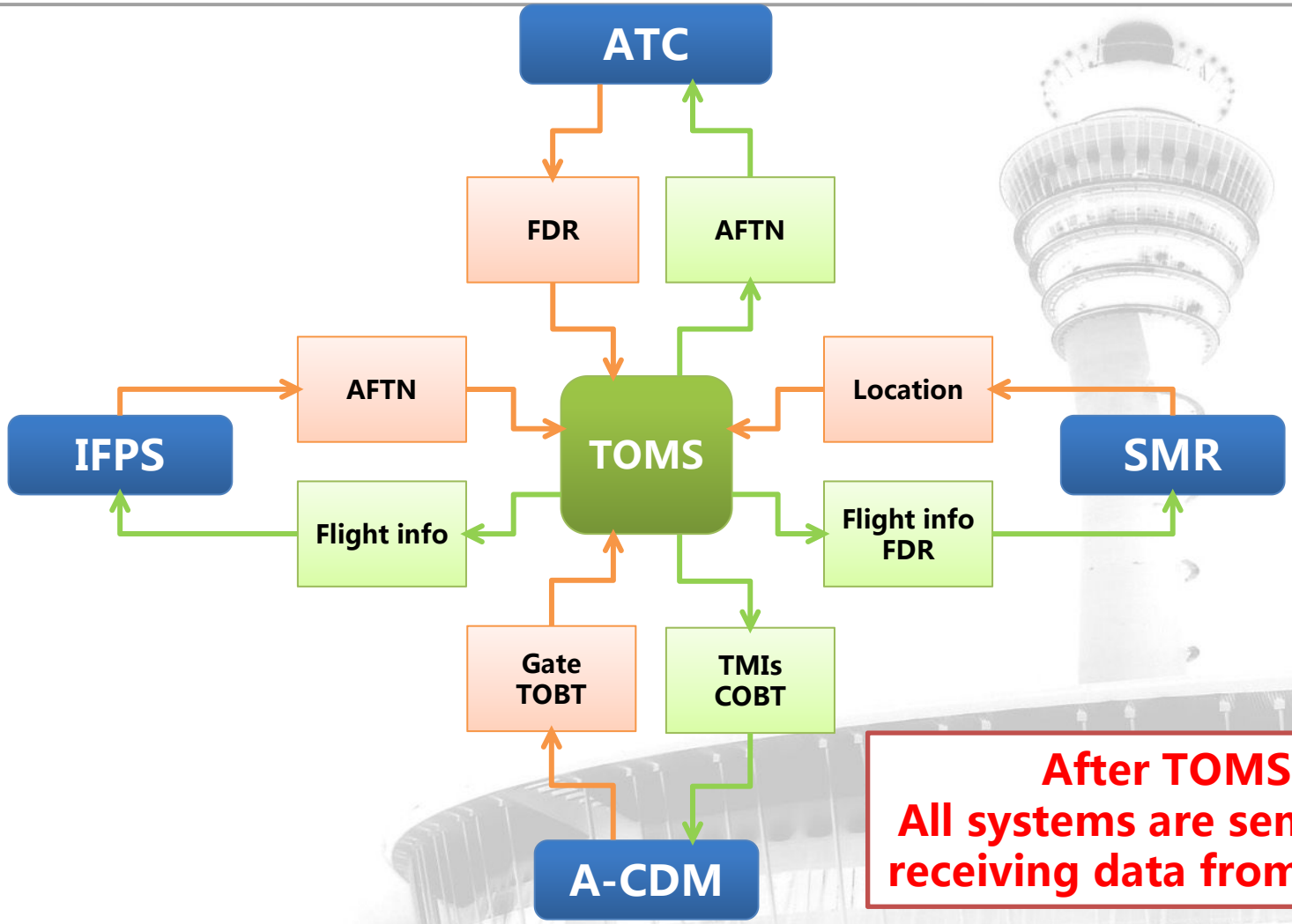
After



Data Integration & Exchange

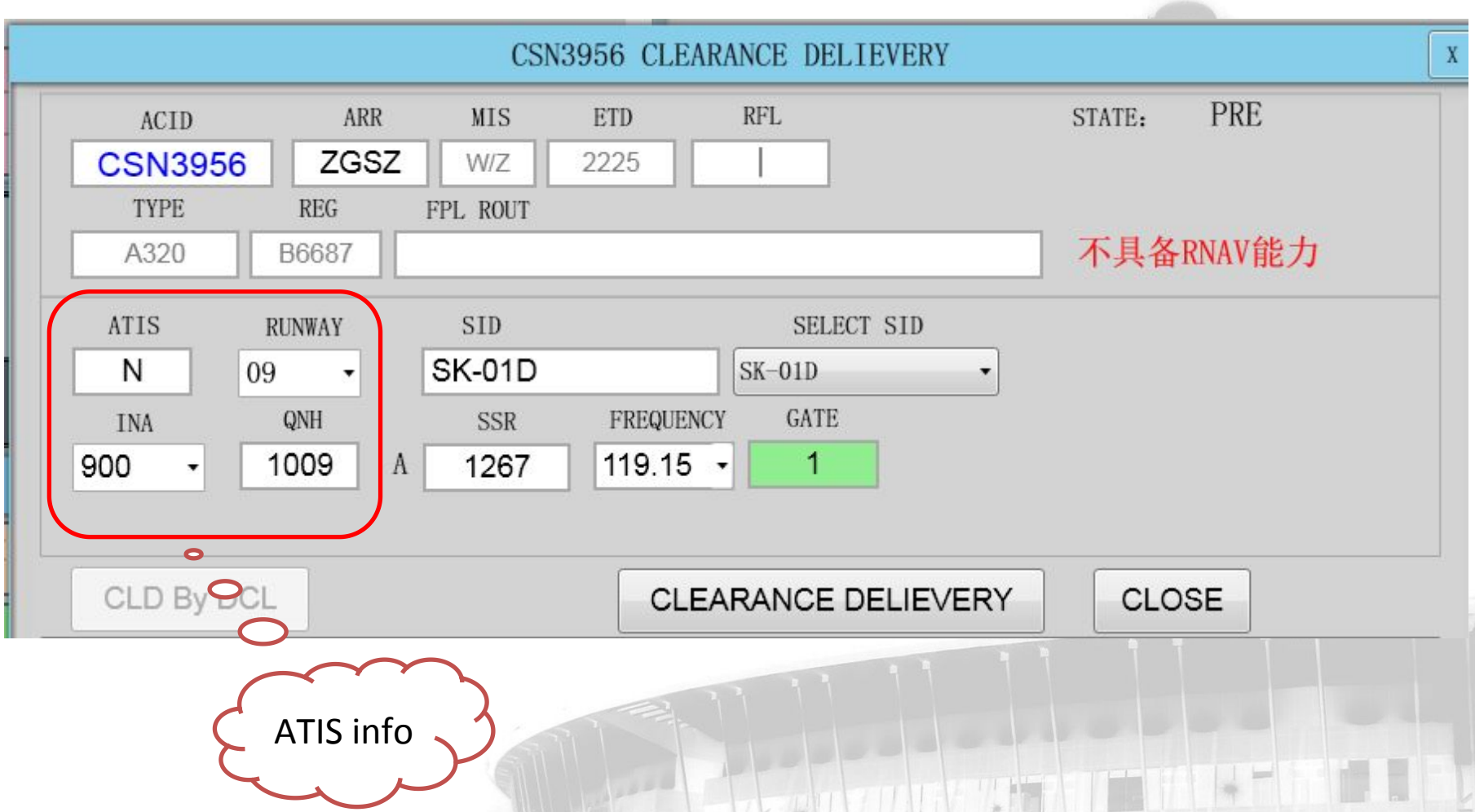


Data Integration & Exchange



After TOMS.
All systems are sending & receiving data from TOMS.

D-ATIS


CSN3956 CLEARANCE DELIEVERY
X
ACID
ARR
MIS
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STATE:
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1
CLD By DCL
CLEARANCE DELIEVERY
CLOSE
ATIS info

DCL

Pilot

DCL requests and results

PRE

REQ

CLD

RDY

HLD

DCL

Delivery

PUS

STR

TAX

Ground

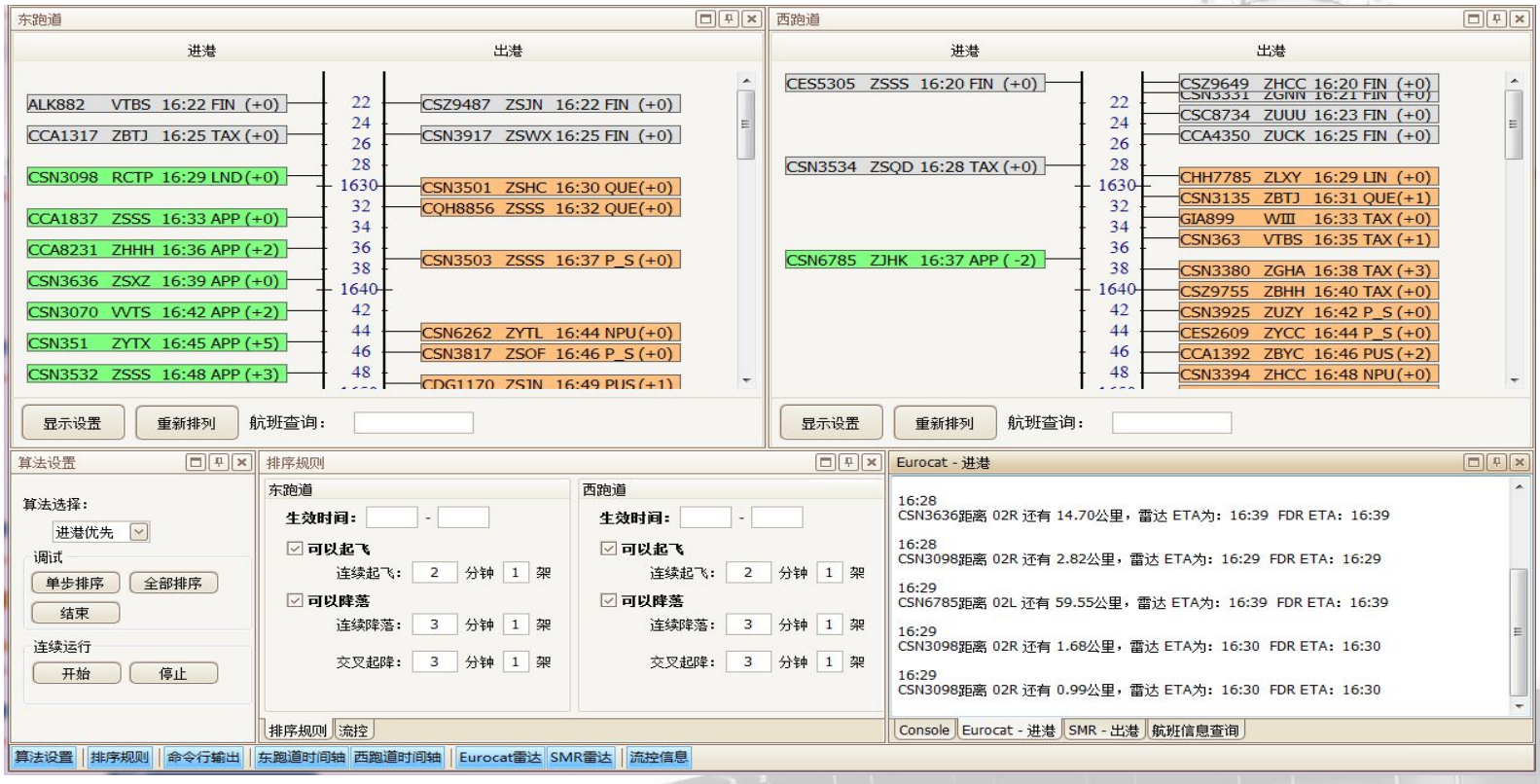
QUE

LIN

TAK

Tower

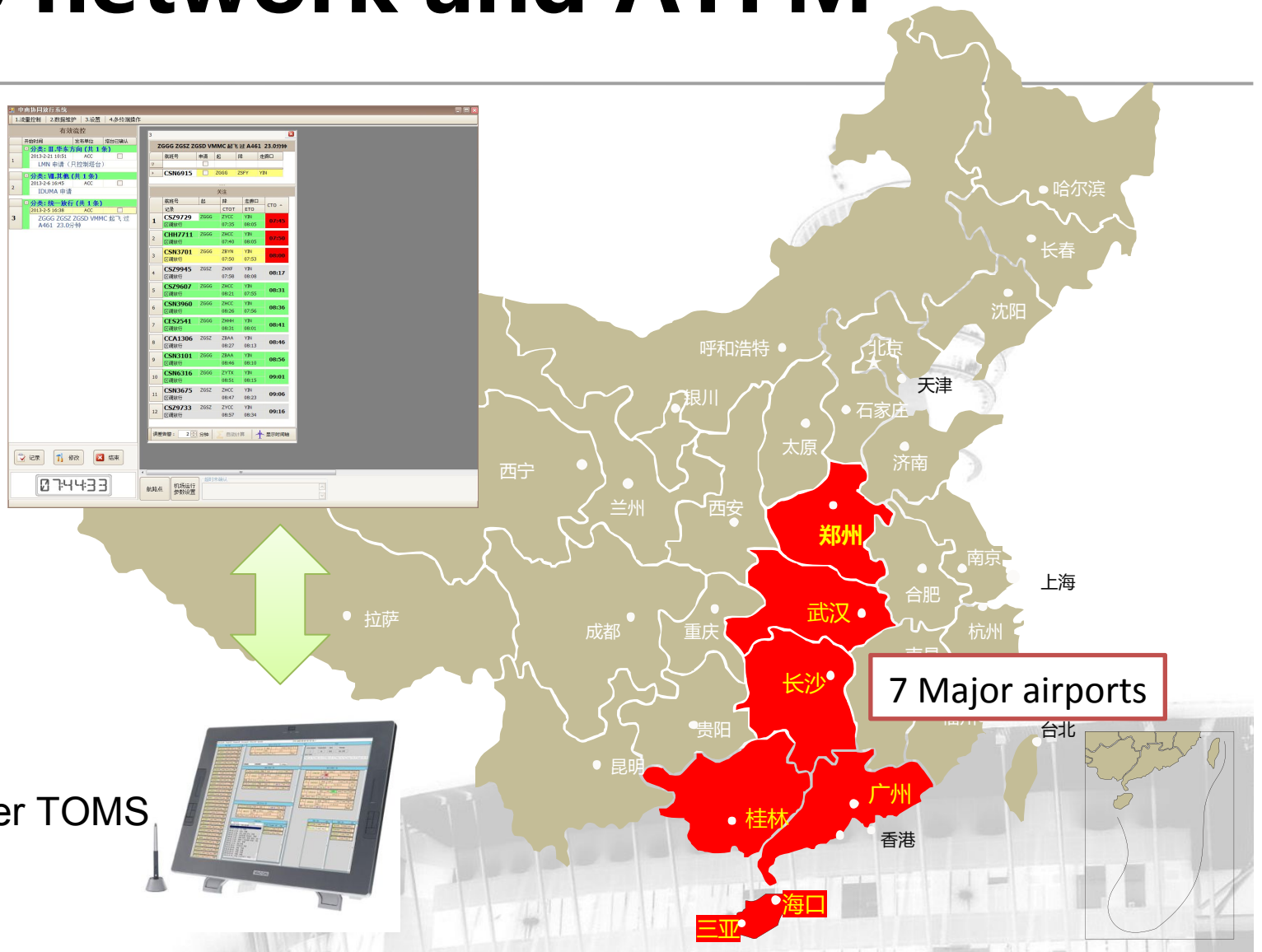
Departure Management



Departure management subsystem generates sequence & shows the result in electronic flight strip

TOMS network and ATFM

Regional ATFM network



Tower TOMS

Thanks !