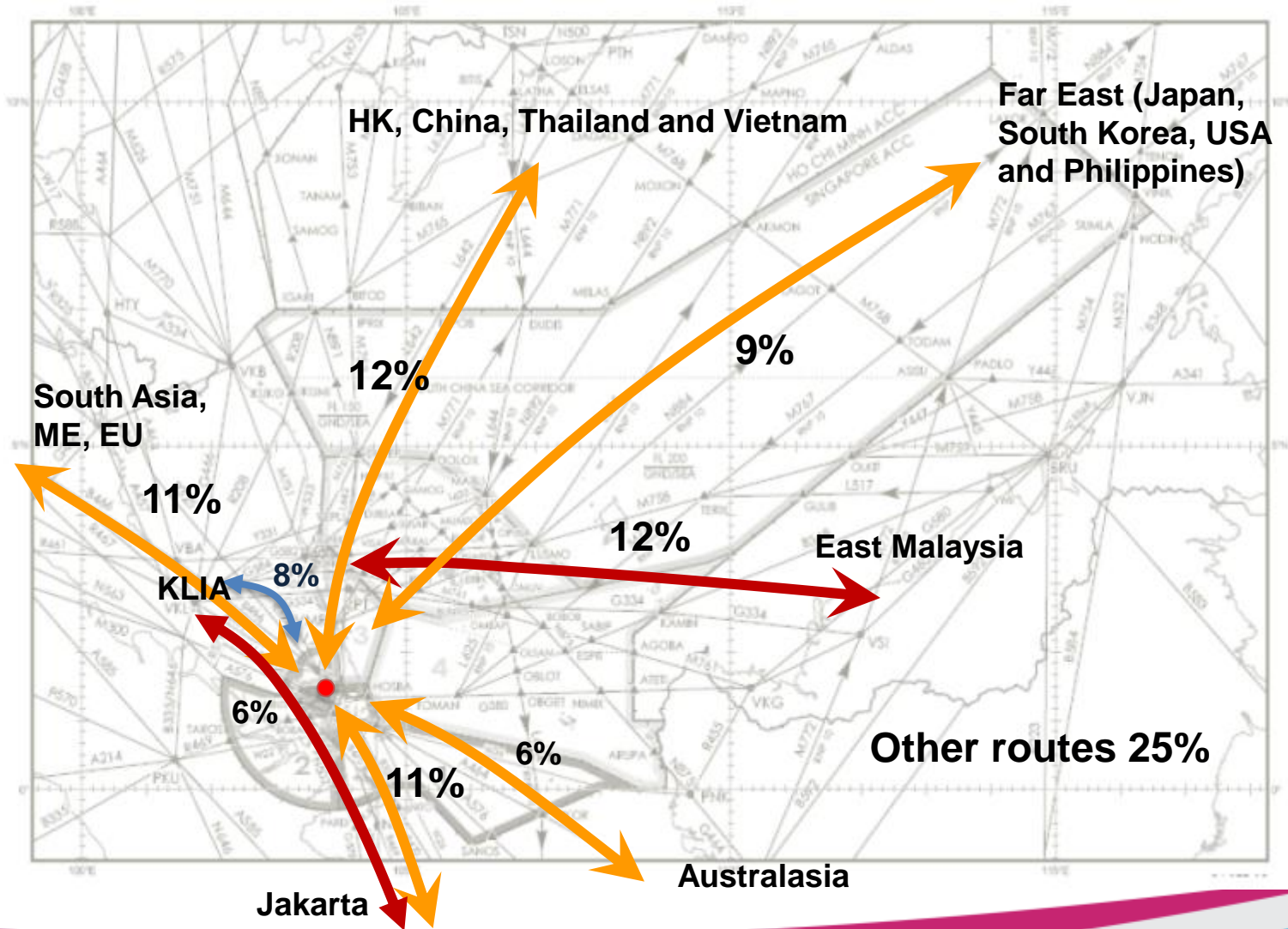


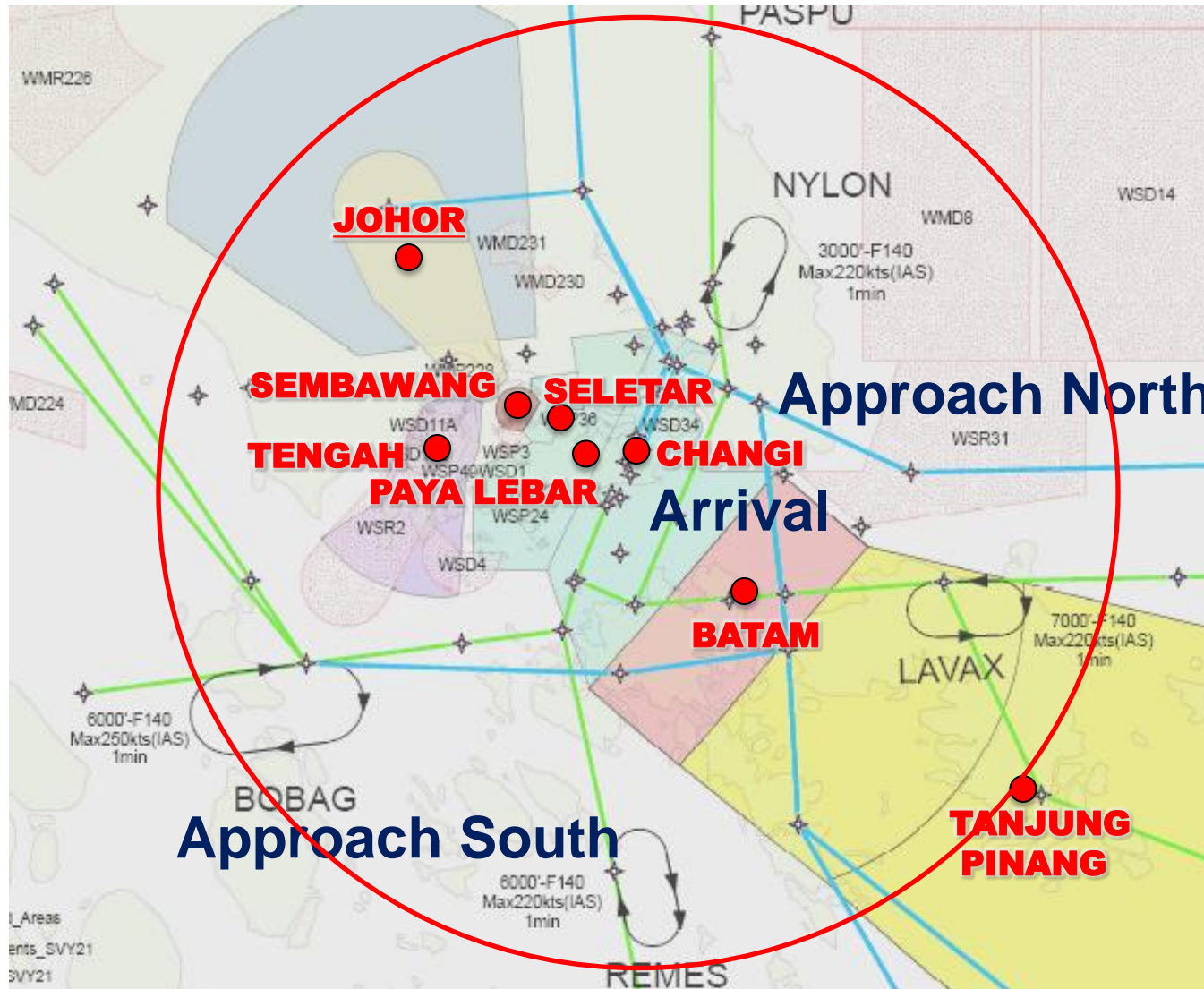
An introduction to Singapore ATC

5 Mar 2015

Air Traffic Flows



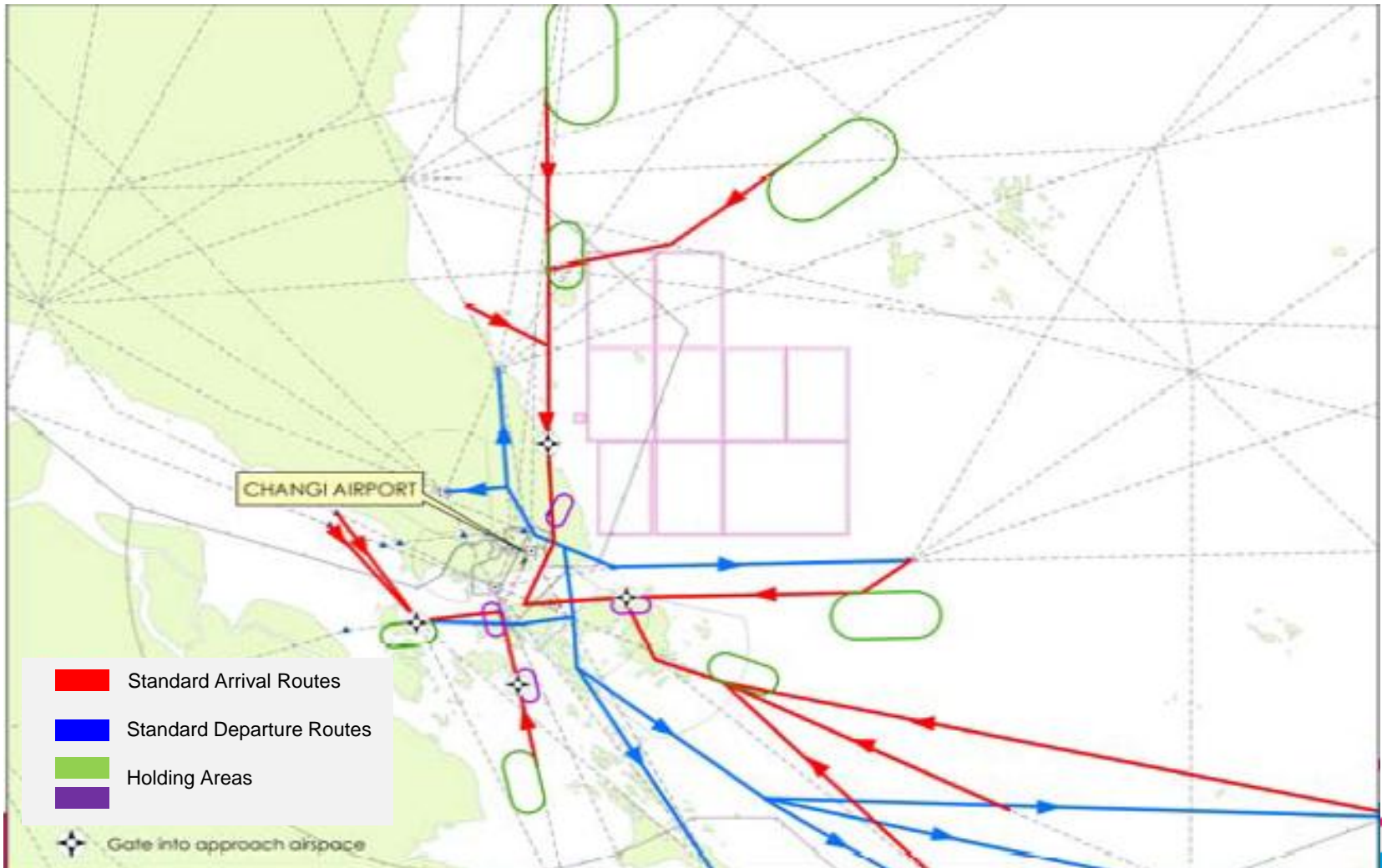
Approach Control Sectors



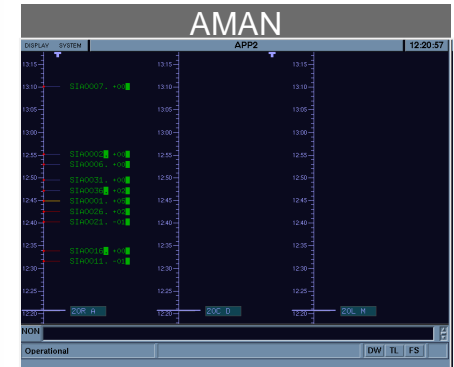
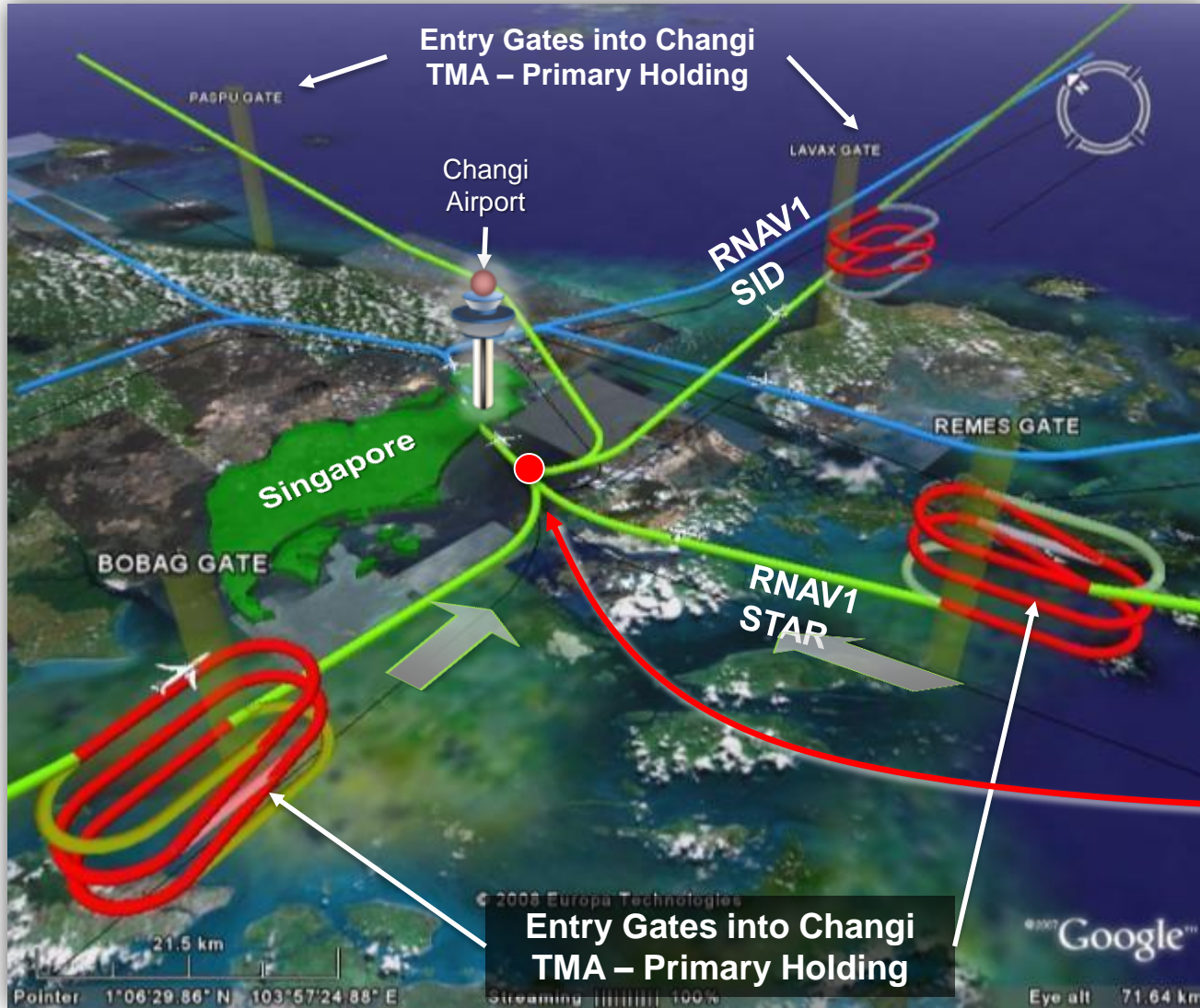
Departure

RNAV SIDs and STARs

(Area Navigation – Standard Instrument Departures and Standard Arrivals)
Segregated routes in and out of Changi that enhances traffic flows



Changi Flow Management

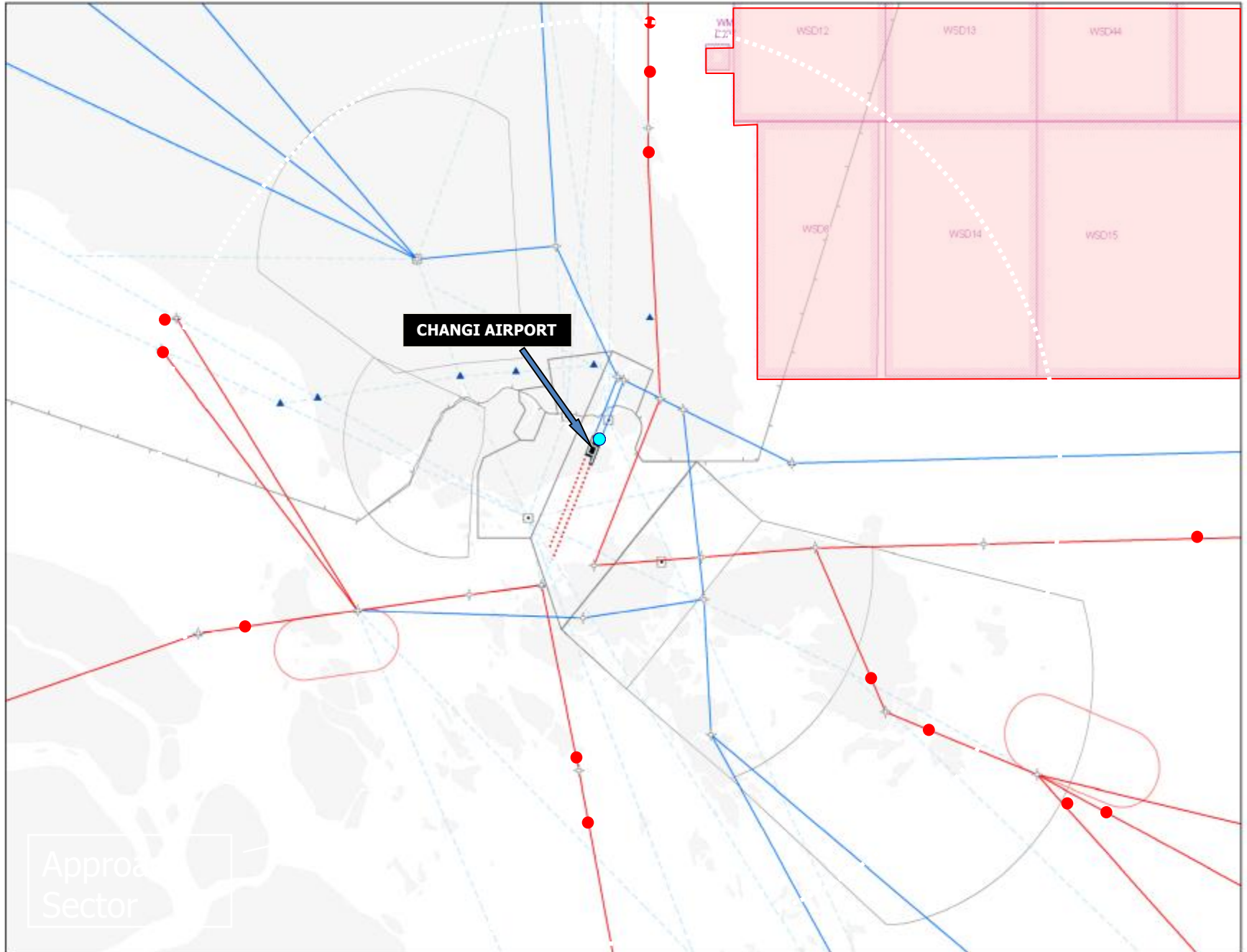


AMAN calculates spacing requirements between arrivals, manages sequence and advises ATC on Entry Gate crossing times for synchronized approaches

SIDs 

STARs 

Simulation of Air Traffic Flow with Changi Flow Management



LORADS III Features

- Advanced ATC automation features
 - Silent coordination for both internal and inter-centre tasks (e.g. AIDC with HCM ACC)
 - Tasks are performed on objects of interest e.g. labels, maps
 - Better management of flight information
- Enhanced decision-making tools
 - Integrated Arrival Manager
- Several layers of safety nets
 - Flight plan conflict probe
 - Short term conflict alert
 - Vertical and lateral adherence monitoring
 - New alerts such as Holding Adherence Monitoring

LORADS III Redundancy

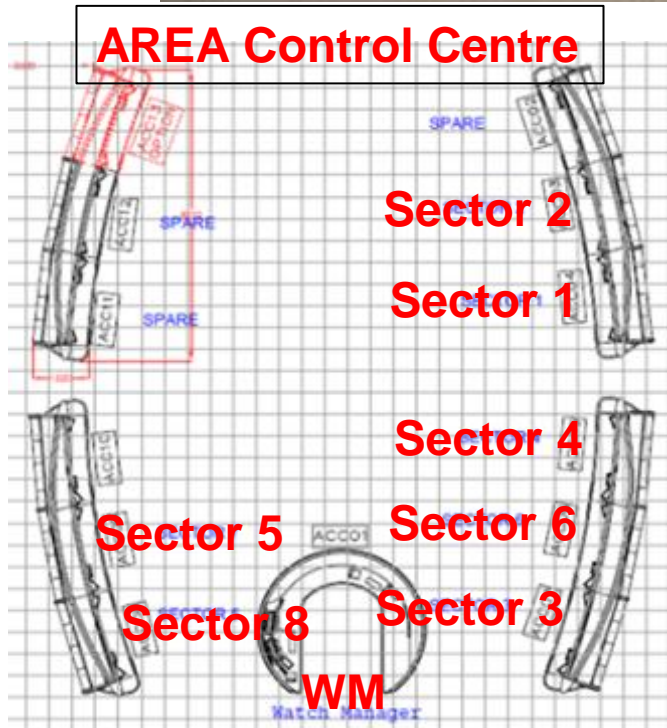
- Many levels of redundancy to ensure uninterrupted ATC services
- Built-in redundancies, multiple networks, duplicated servers
- Bypass processing for key servers e.g. FDP, SNAP
- Immediate Back-up (IBU) on hot standby
 - Provides controllers with immediate Air Picture at press of a button should the main system fail
 - 2 modes: HMI-IBU (standalone) or SYS-IBU (system wide upgrade with external links)
- Other Back-up modes
- Separate power sources, (including uninterruptable power supply (UPS) and generators)

SATCC

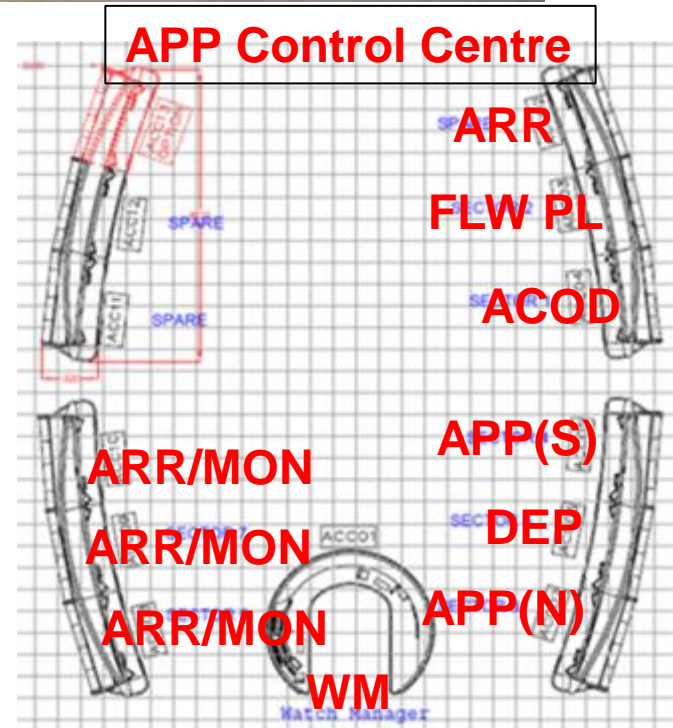
Area and Approach Control Centres



AREA Control Centre

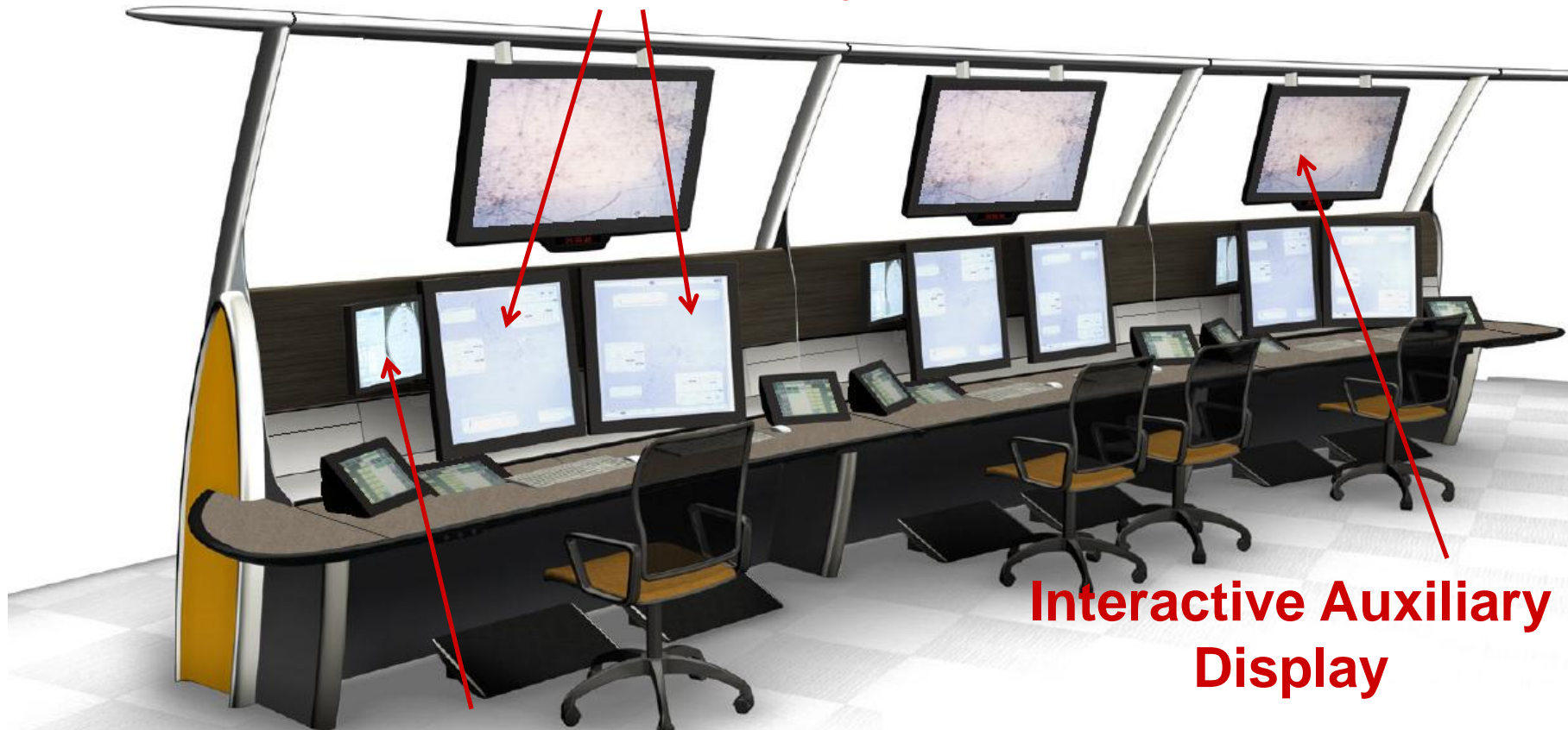


APP Control Centre



Enhanced ATC Workstations

Air Situation Display



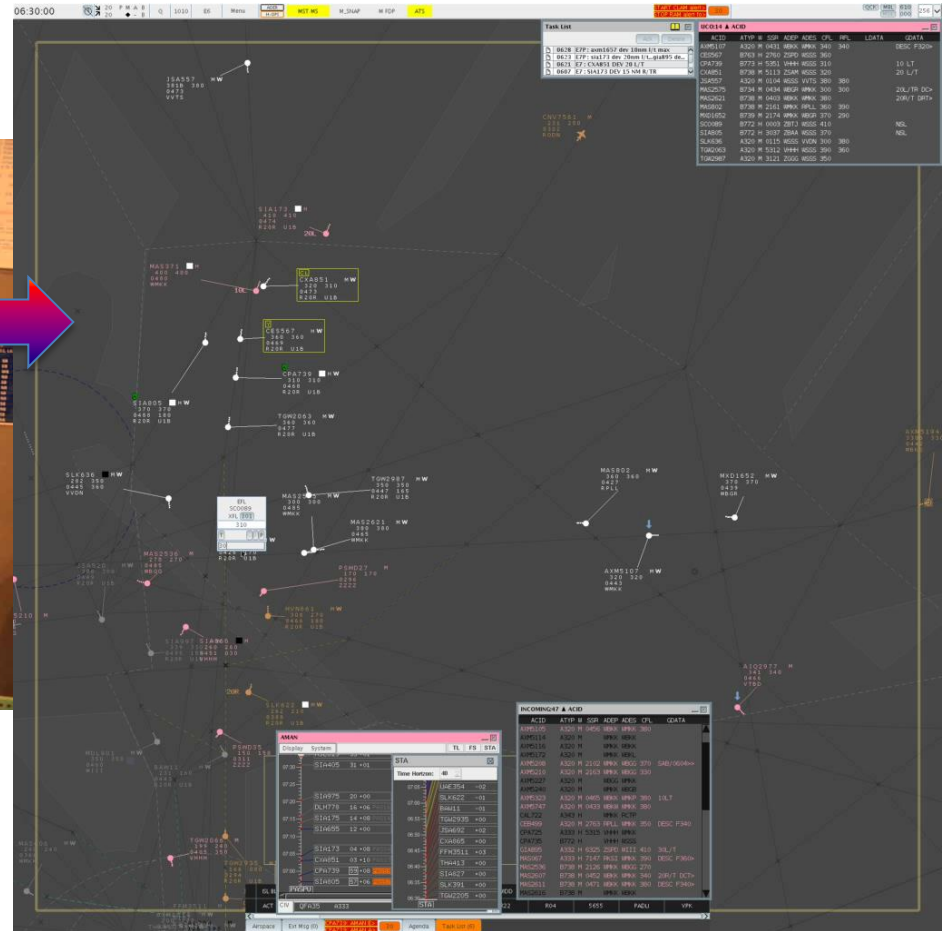
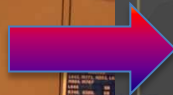
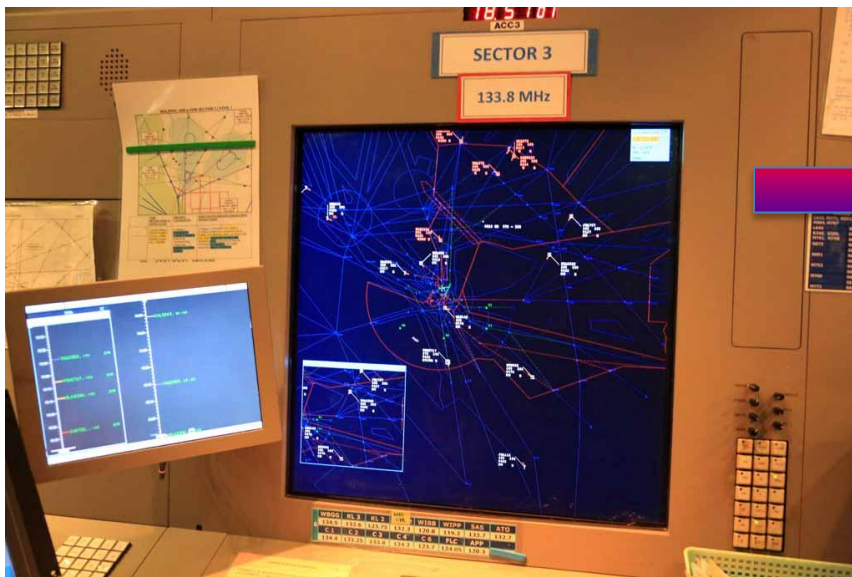
**Meteorological and
Navigational Aids
Display**

**Interactive Auxiliary
Display**

**Award winning ergonomic
designer consoles**

Advanced Java-based HM

OLD



Paperless environment

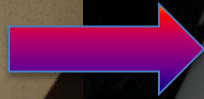
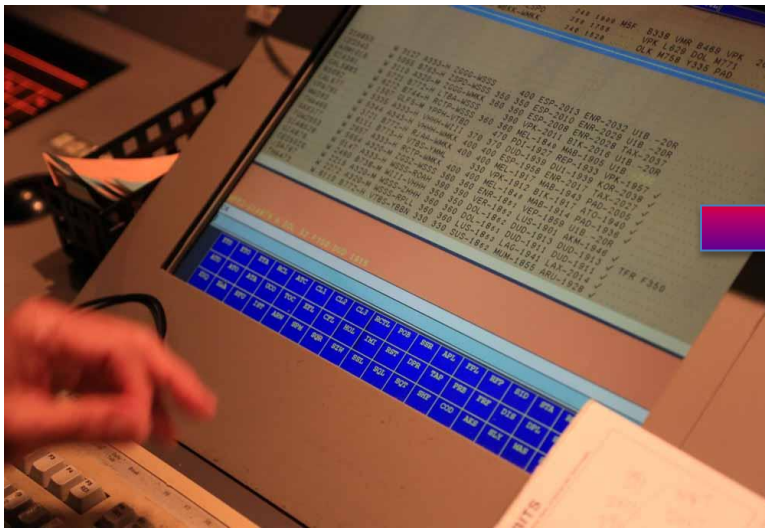
OLD

A screenshot of a modern flight operations software interface. The interface is divided into several panels, each displaying a grid of flight data. A large red arrow points from the 'OLD' image towards this software, indicating the transition to a paperless environment. The software interface includes a search bar at the top, a main data grid with columns for flight numbers, times, and statuses, and a sidebar on the right with additional information. The data is presented in a clear, structured format, allowing for easy navigation and analysis of flight operations.

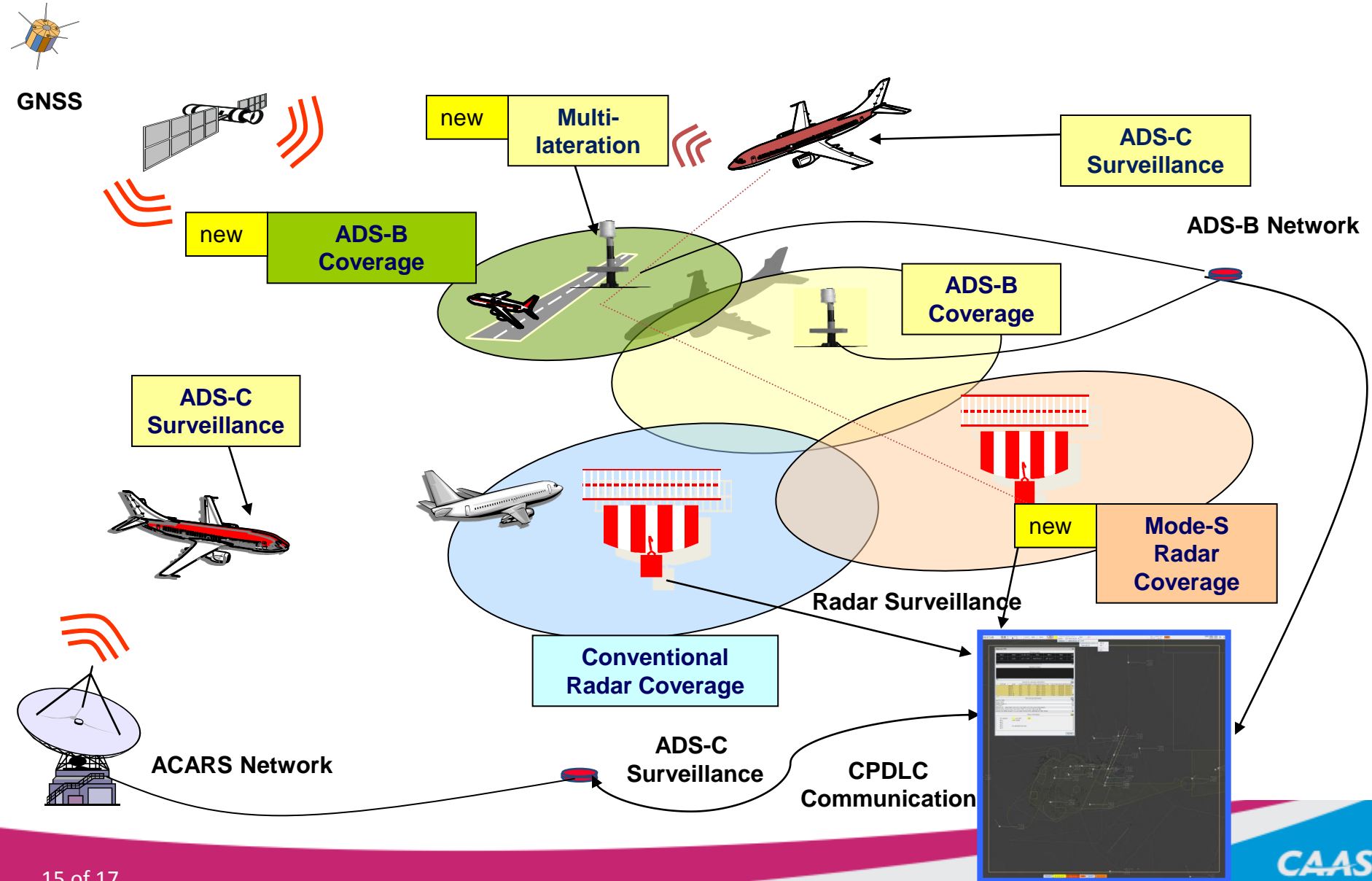
FLIGHT	STATUS	TIME	STATUS	FLIGHT	STATUS	TIME	STATUS
ARM =1347	230		B77R	RJ	→	007	
BOO =0152	EGLL	A664	BOBA			SSSS	E2
ARM =0417	AXM1811					M008	B
TOP =0435	340		A320	R	→		
BOO =0423	WNKK	A664	BOBA			SSSS	E2
ARM =0400	SLK321					0407	B
TOP =0358	230		A320	R	→		
BOO =0374	WNKK	A664	BOBA			SSSS	E2
ARM =0347	AXM1360					M008	B
TOP =0367	350		A320	R	→		
BOO =0340	WNKK	BOBA	ANT			M008	E2
ARM =0341	MDL701					0462	B
TOP =0335	2106	350		A320	R	→	
BOO =0329	WNKK	W126	W63			W111	E2
ARM =0340	SLK353					0460	B
TOP =0338	390		A320	RJ	→		
BOO =0401	WNKK	A664	BOBA			SSSS	E2
ARM =0308	WNKK	BOBA	ANT			W111	E2
TOP =0300	2142	150		A772	R	→	170
BOO =0329	WNKK	A664	BOBA			SSSS	E2
ARM =0254	VLU282					0460	B
TOP =0252	370		A320	R	→		
BOO =0315	WNKK	A664	BOBA			SSSS	E2
ARM =0249	SLK345					0451	B
TOP =0247	390		A320	RJ	→	037	020
BOO =0312	WNKK	A664	BOBA			SSSS	A1 390
ARM =0237	MAS125					0470	B
TOP =0236	2151	370		A333	RJ	→	370
BOO =0242	WNKK	W630	BOBA			YPRR	
ARM =0233	MPH095					0490	B
TOP =0231	370		B744	RJ	→	002	
BOO =0309	ONSJ	A664	BOBA			SSSS	E2
ARM =0225	MAS611					0460	B
TOP =0223	2143	330		B738	R	→	
BOO =0244	WNKK	A664	BOBA			SSSS	R1
ARM =0146	AXM1702					M008	B
TOP =0144	2146	350		A320	R	→	077
BOO =0218	WNKK	A664	BOBA			SSSS	

Improved workflow with new HMI

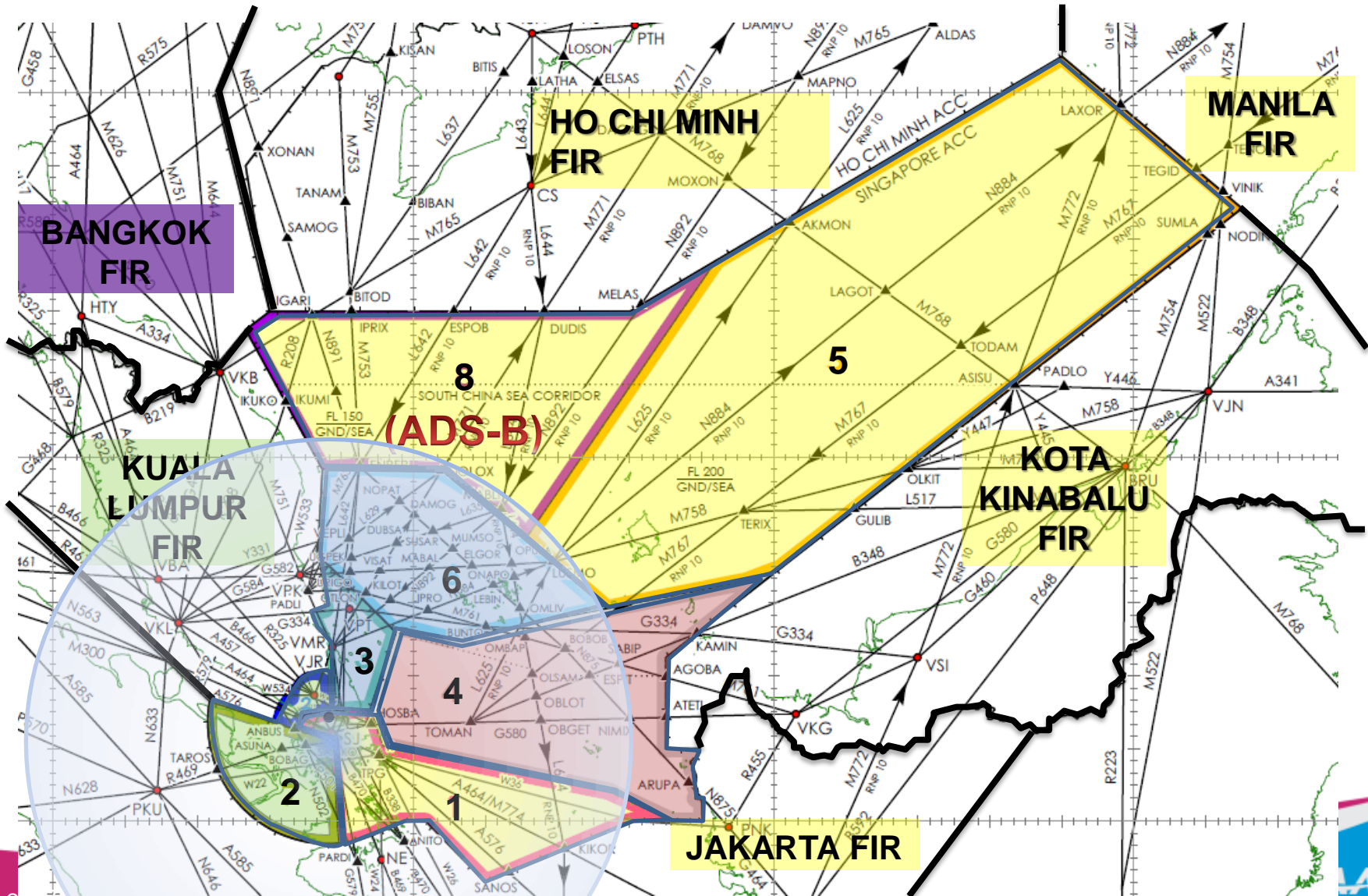
OLD



Communications and Surveillance

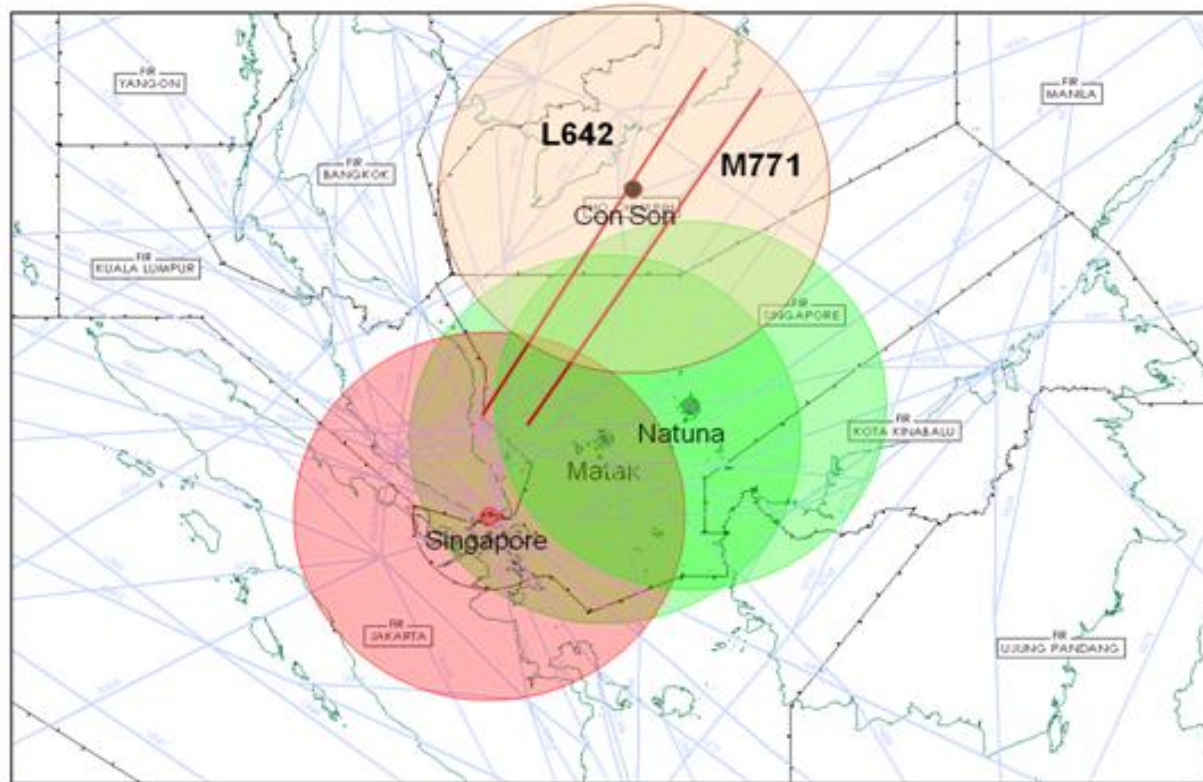


Area Control Sectors



Phase 1 of South China Sea ADS-B Collaboration Project

- Singapore's collaboration with Indonesia and Viet Nam - has enhanced ATC service on routes L642 and M771



Thank you