Thailand ATM System :

Architecture and Acceptance Process

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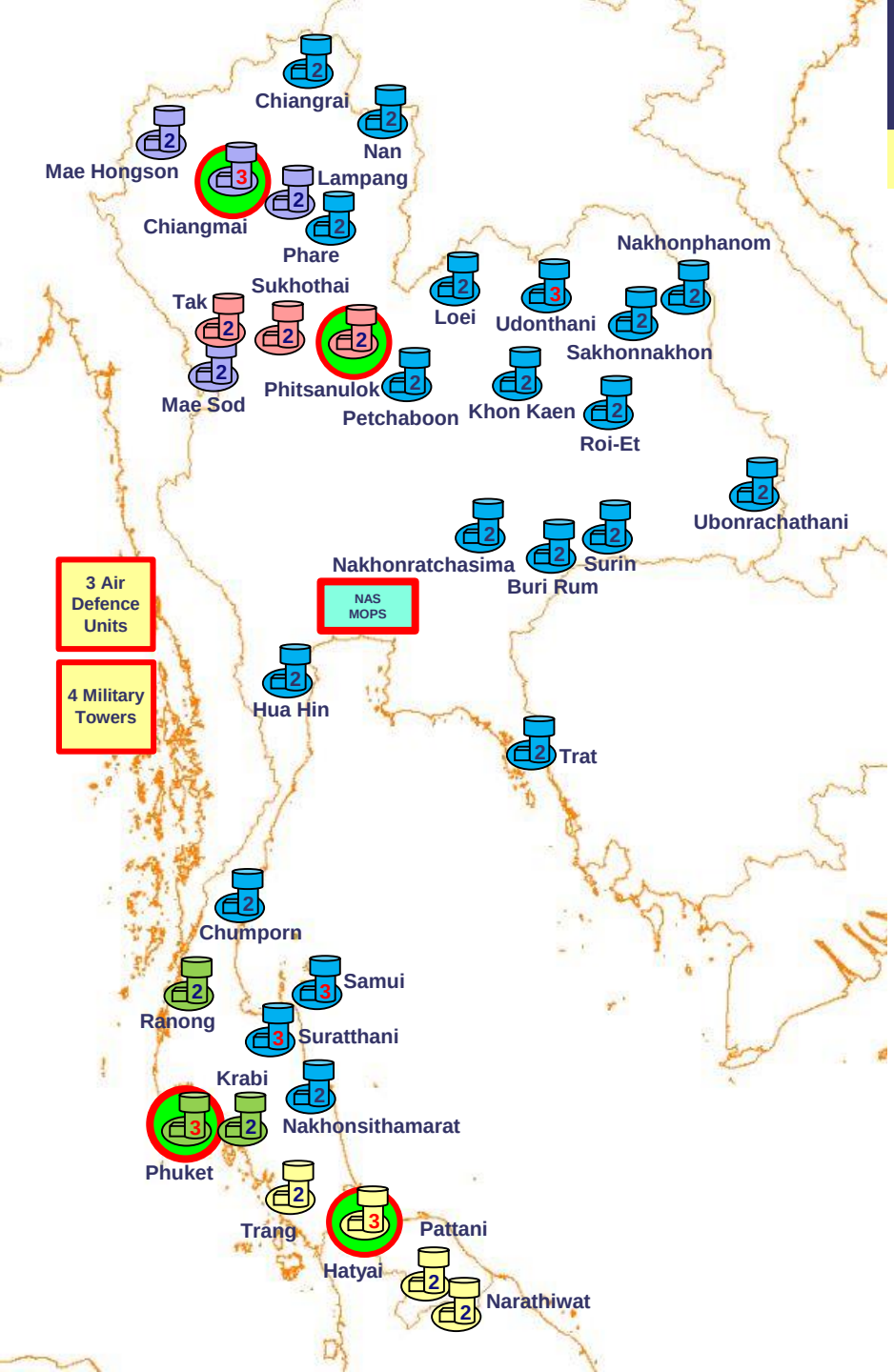
Thailand Modernization CNS ATM System : TMCS

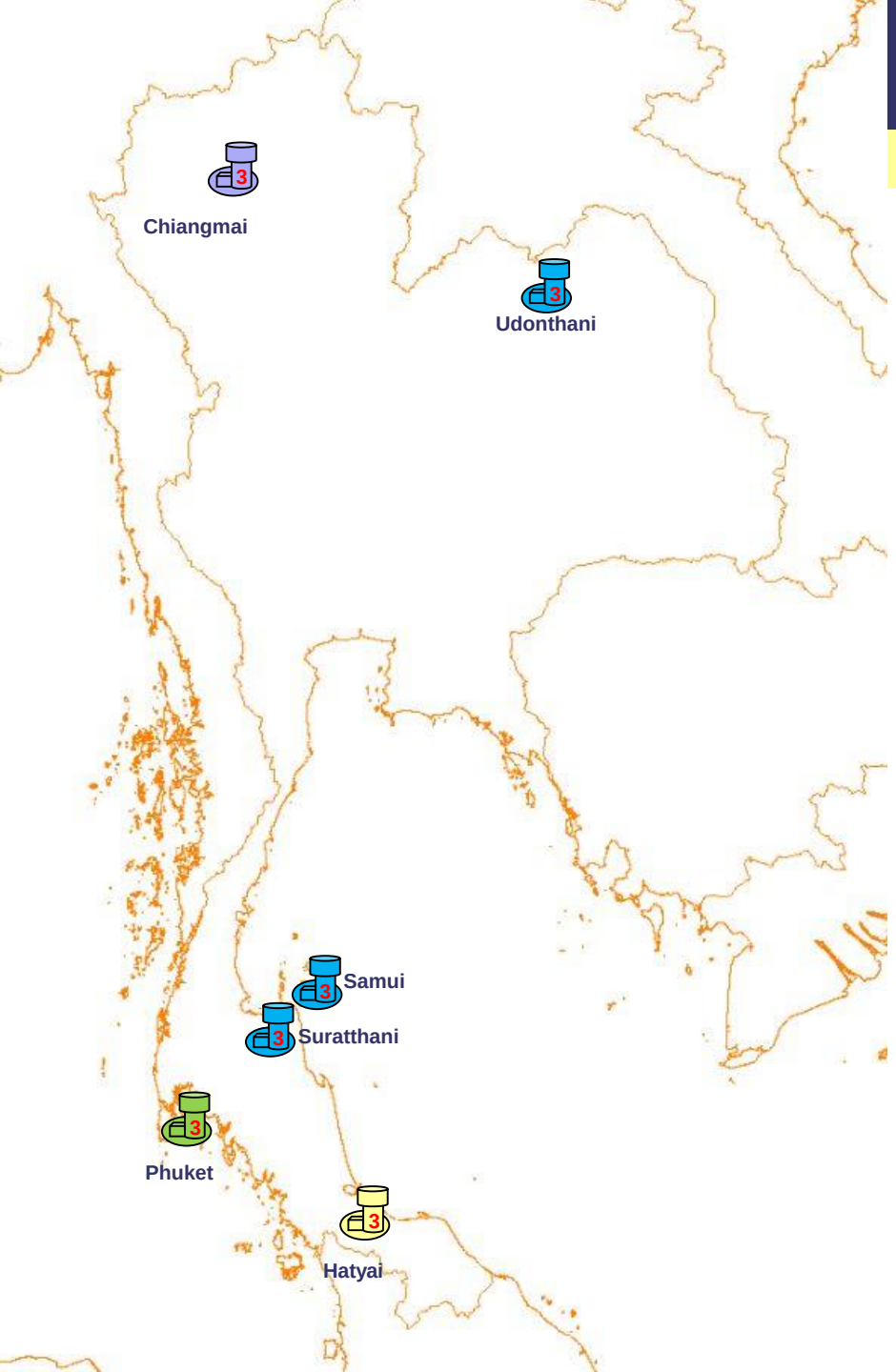
Air Traffic Management system (ATMS)

- **Main Operational System (MOPS)**
- **Tower System**
- **Simulator System.**



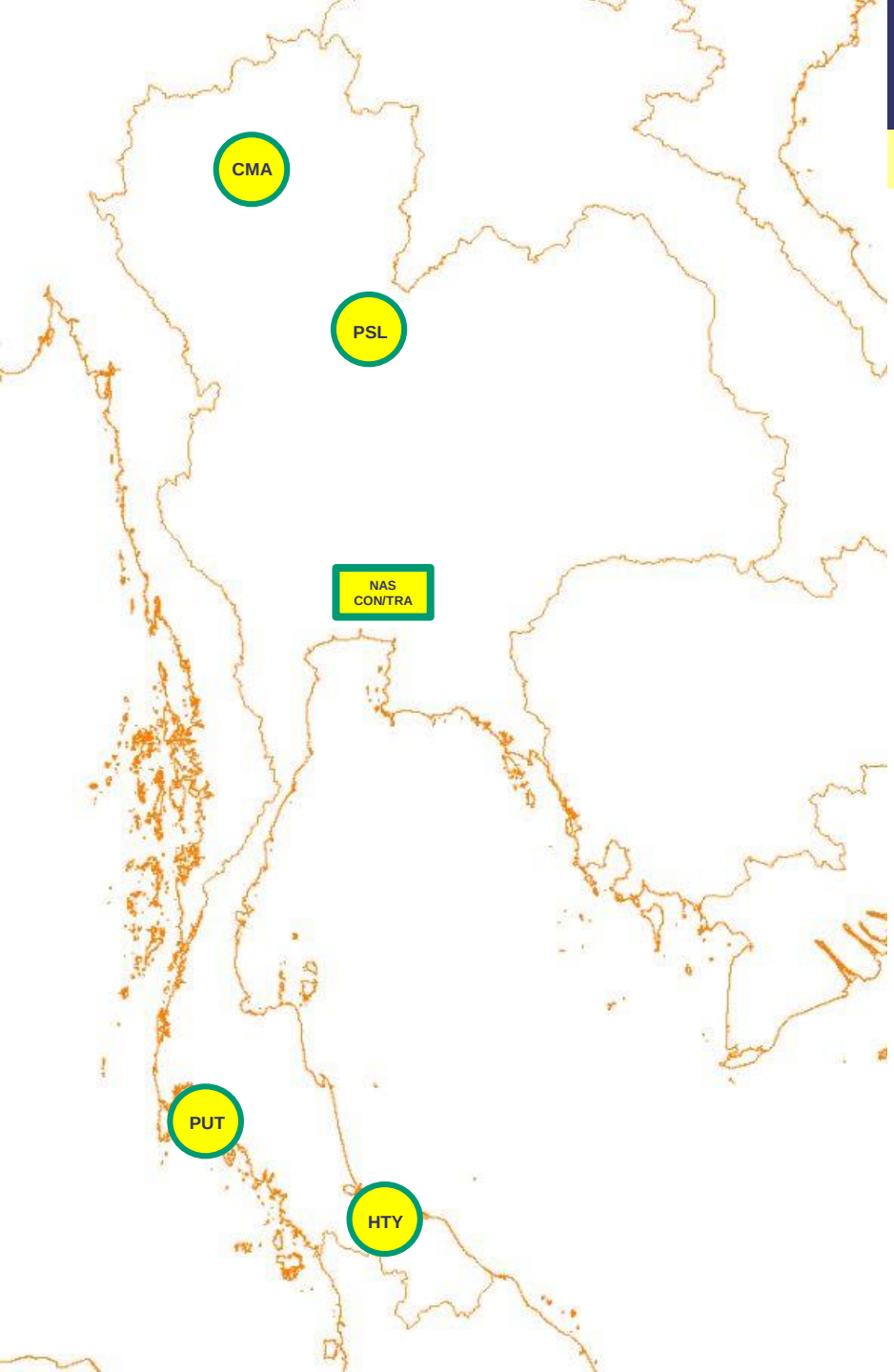
Main Operational System (MOPS)

- **Bangkok Area Control Centre (BACC) and Bangkok Approach Control Centre (BAPC)**
- **Approach Control Centre (APC)**
- **Aerodrome Control Tower**
  - 7 Towers Level-I ;
  - 28 Towers Level-II ; and
  - 6 Towers Level-III .



Tower System

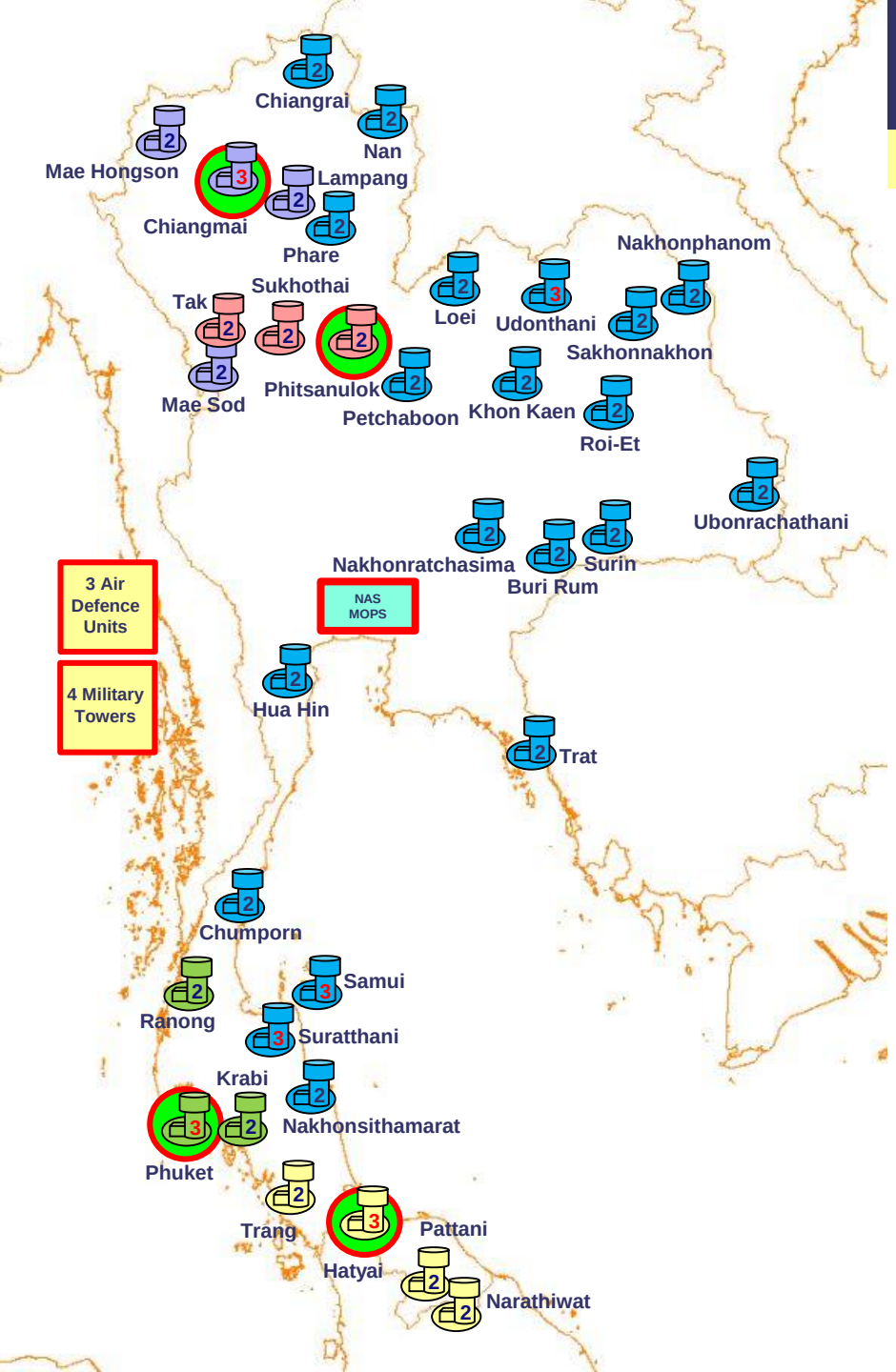
- **Aerodrome Control Tower Level-III**
  - Chaingmai ;
  - Phuket ;
  - Hatyai ;
  - Udonthani ;
  - Suratthani ; and
  - Samui .



Simulator

- **Bangkok Area Control Centre (BACC) and Bangkok Approach Control Centre (BAPC)**
- **Approach Control Centre (APC)**
  - Chaingmai ;
  - Phitsanulok ;
  - Phuket ; and
  - Hatyai.

ATM Architecture



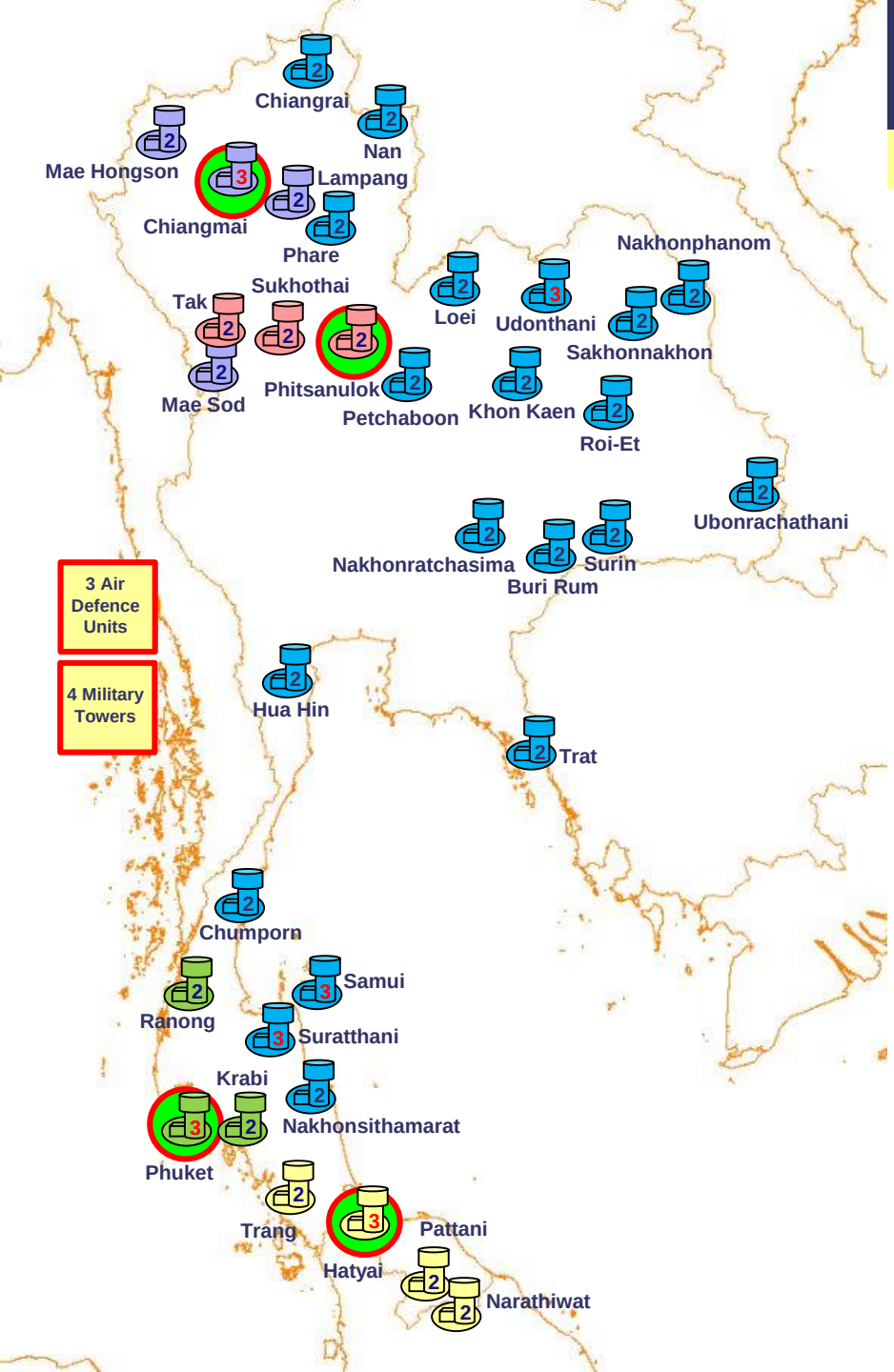
The system is divided into a number of system elements, consisting of software applications and hardware resources.

These system elements collectively are referred to as “partitions”.

The ATM architecture is divided into the following partitions :

- ✓ **Area / Approach Control Centre (BACC/BAPC) partition ;**
- ✓ **Approach Control Centre Partition (APC) ; and**
- ✓ **Remote Tower Control Partition.**

BACC/BAPC Partition



The BACC/BAPC provides centralised data processing for all partitions of BKK FIR.

Data is exchanged with remote partitions via AEROTHAI IP Cloud through dual independent and redundant IP interfaces at all platforms, except Towers Level-I and ADF positions.

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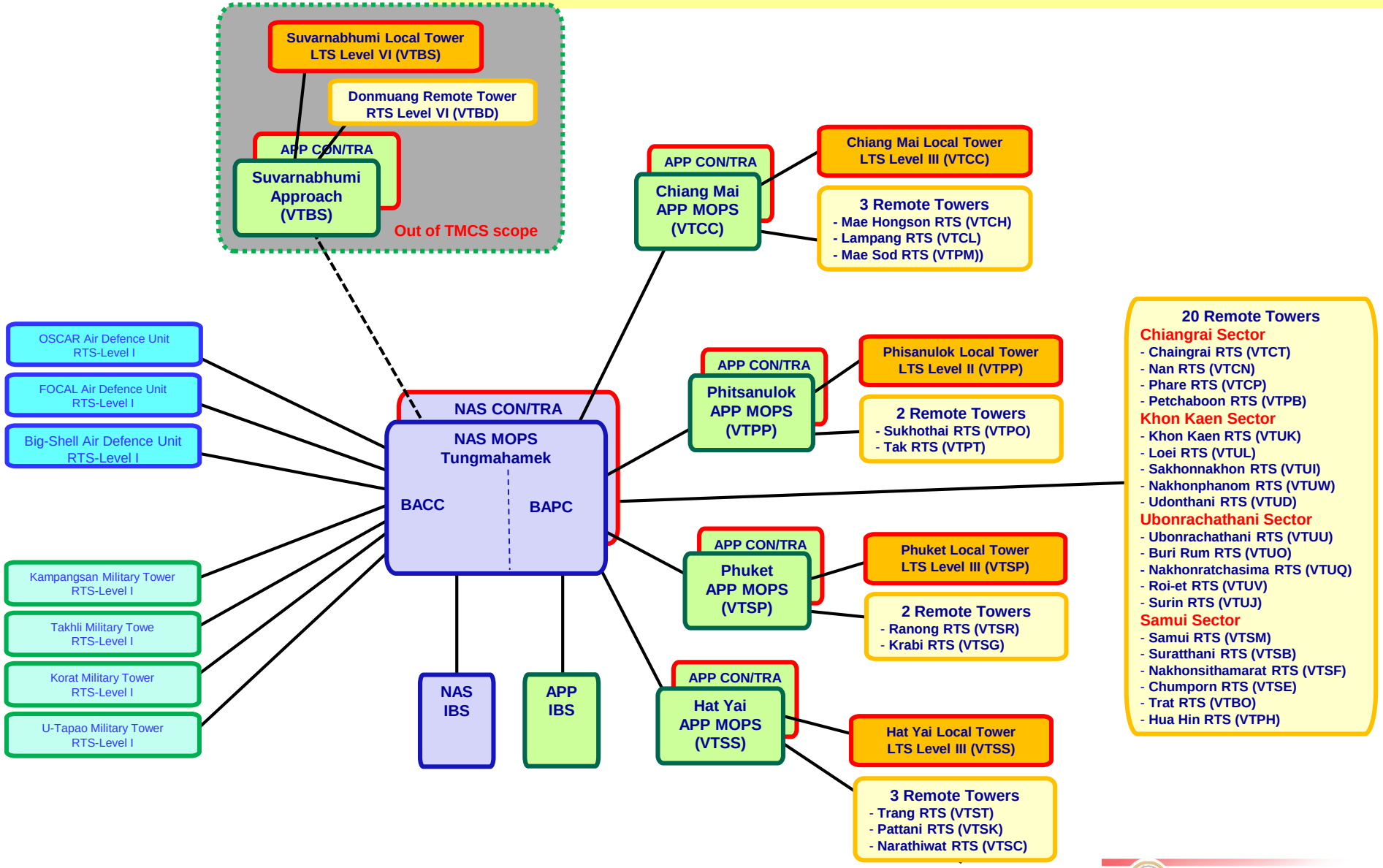
TMCS Component



Level of Contingency & Backup

MOPS, CON/TRA and IBS are built and interconnected to provide 5 levels of contingency and backup as follows:

- **Level-I to Level-III redundancy is provided within the MOPS and IBS.**
- **Level-II to Level-III redundancy is provided within the CON/TRA (Contingency mode).**
  - **Level-I : All servers and internal network in the system is duplicated and operate simultaneously.**
  - **Level-II : Fall-back Surveillance Data Processing (FSDP) servers run in parallel with Duplicated Main Surveillance Data Processing (MSDP) servers and seamlessly take over the operations on failure of MSDP.**
  - **Level-III : Surveillance Direct Access (SDA) Processing servers provides continuation of surveillance tracking data to the operator in the event of a failure of the both MSDP and FSDP.**

ATMS Contingency & Backup

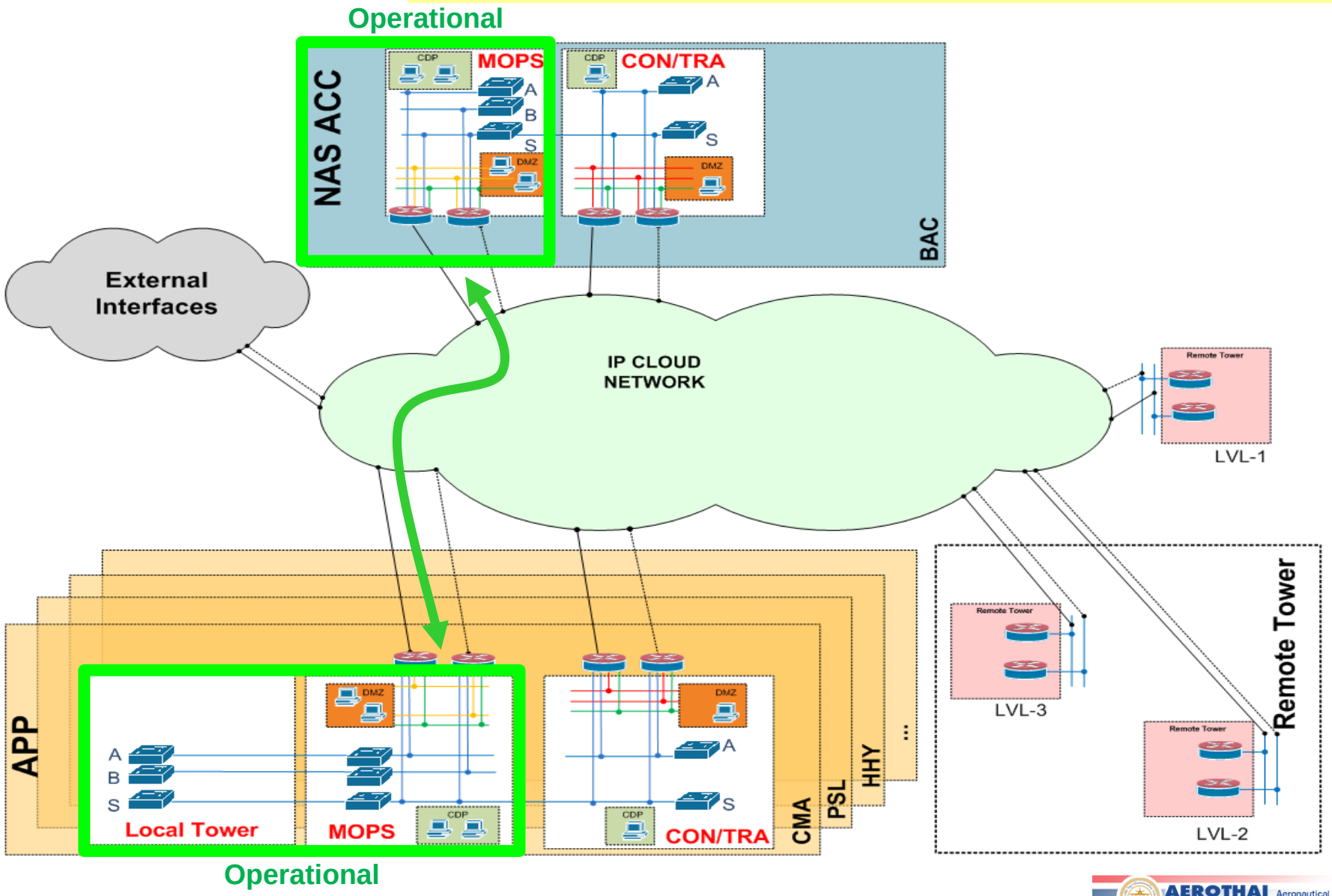
- **Level-IV redundancy is provided through CON/TRA.**
  - **The CON/TRA system runs in Contingency Mode (CON mode) and takes over the operations of MOPS in event of MOPS failure or unavailability.**
- **Level-V redundancy is provided through IBS.**
  - **The NAS IBS takes over the operations of NAS MOPS in the event of disaster at NAS (BACC, BAPC).**
  - **The APP IBS takes over the operations of any one of the APCs in event of disaster at APC.**

ATMS Contingency & Backup

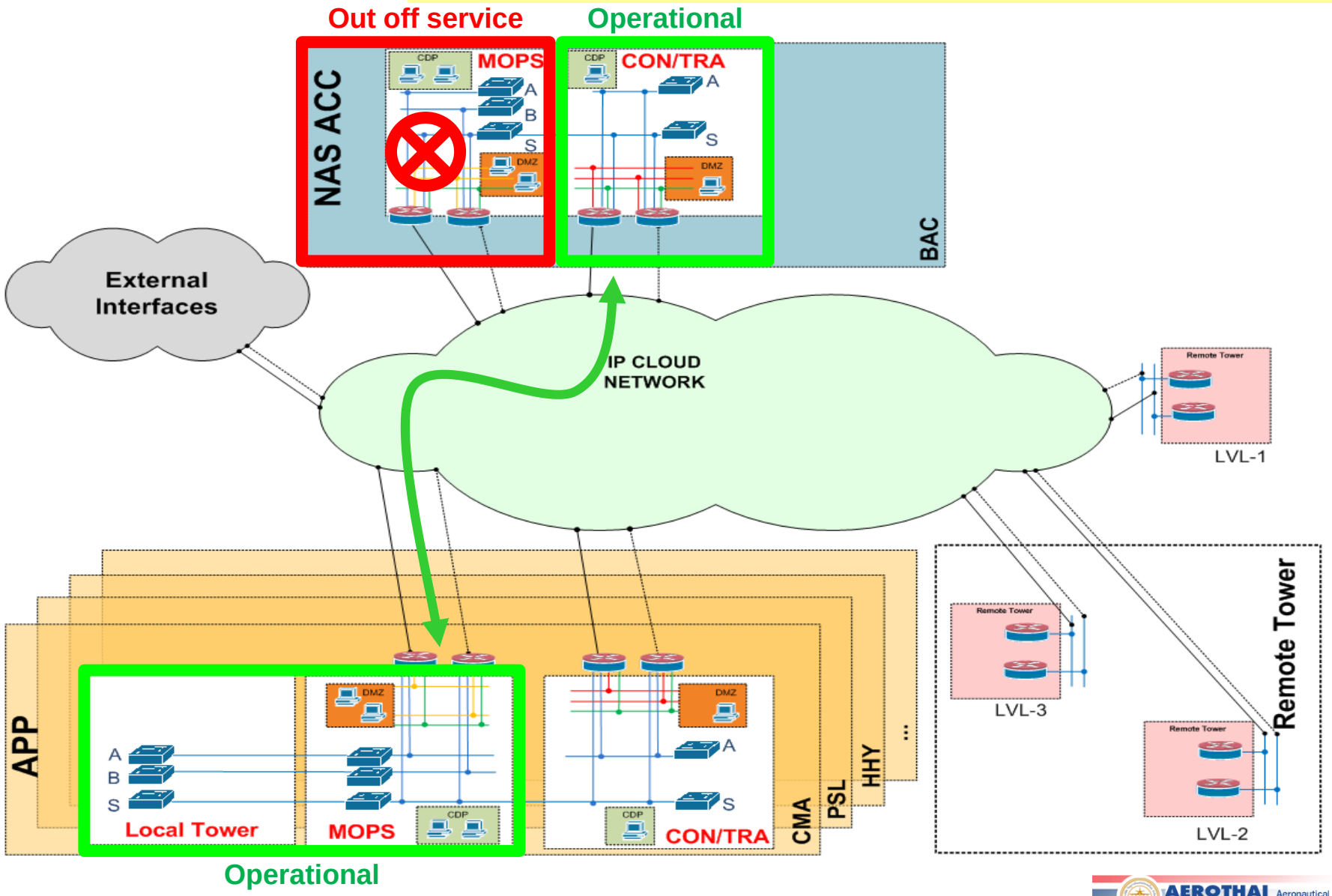
ATS Unit	Level I	Level II	Level III	Level IV	Level V
BACC/BAPC	✓	✓	✓	✓	✓
CMA APC	✓	✓	✓	✓	✓
PSL APC	✓	✓	✓	✓	✓
PUT APC	✓	✓	✓	✓	✓
HTY APC	✓	✓	✓	✓	✓

Level - I : Redundant Servers & Network
Level - II : Fallback (F-SDPS)
Level - III : Surveillance Direct Access
Level - IV : Contingency System (CON)
Level - V : Independent Backup System (IBS)

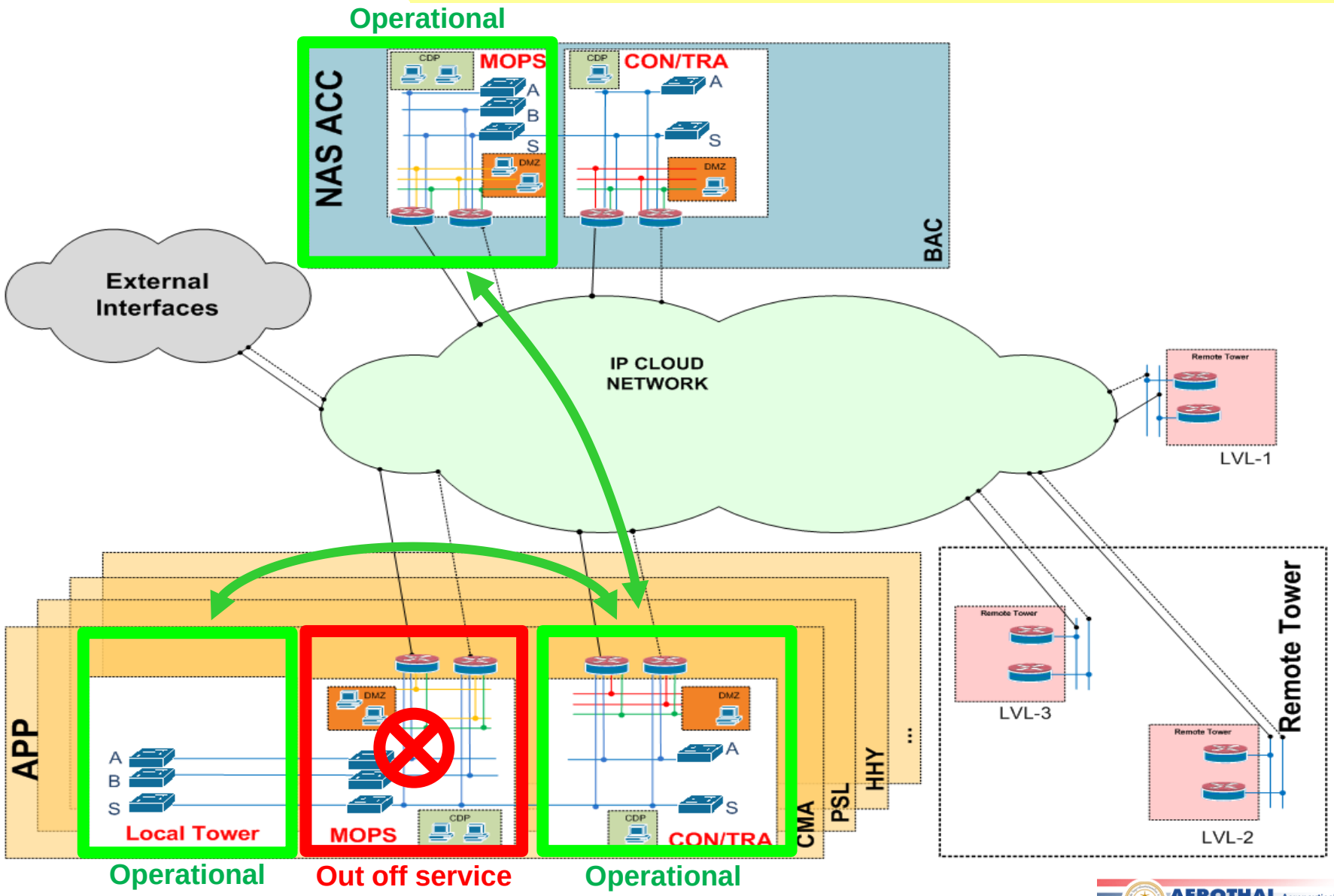
Contingency : Normal Mode



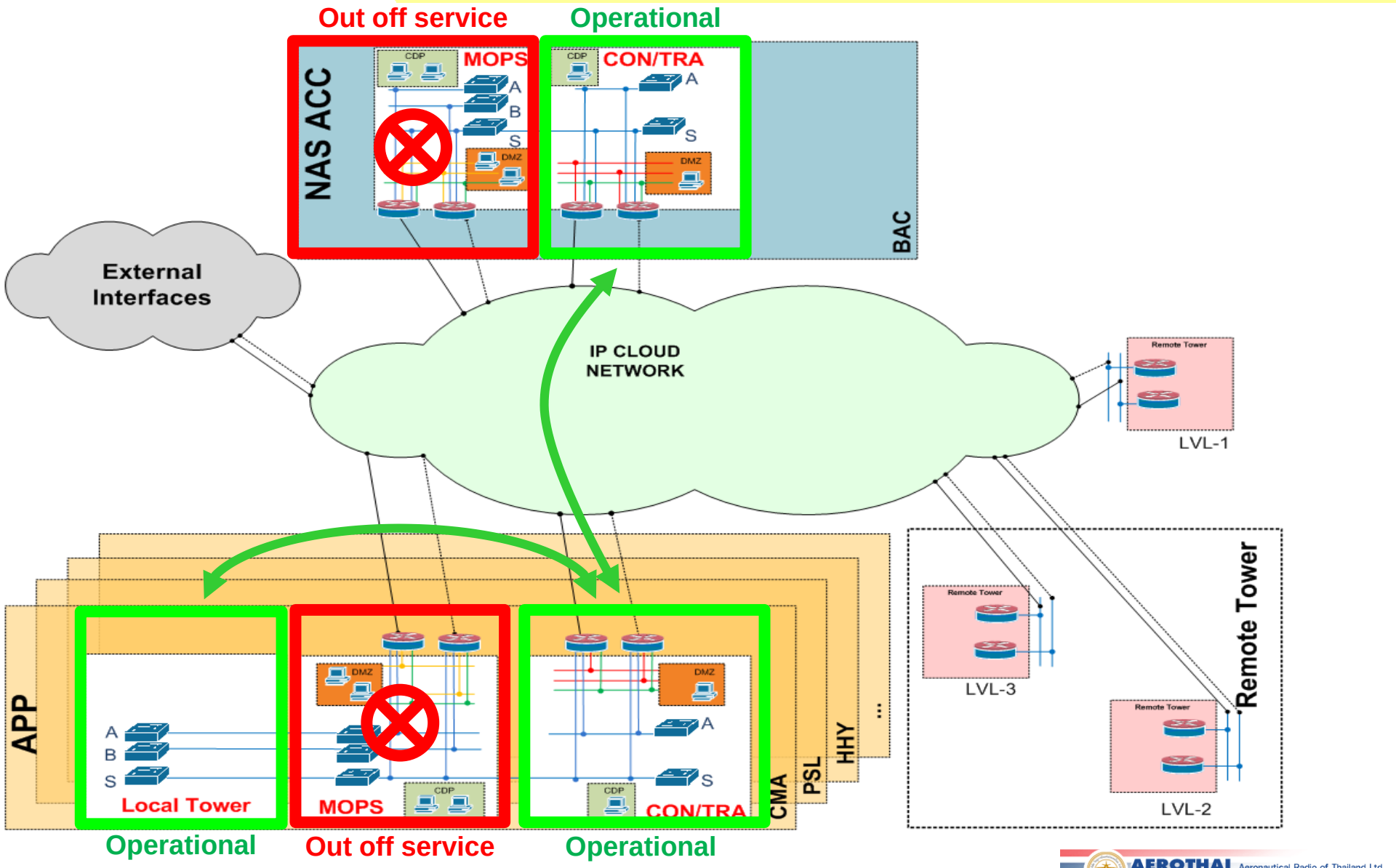
Contingency : NAS CON/TRA @ CON Mode



Contingency : APP CON/TRA @ CON Mode



Contingency : NAS CON/TRA and APP CON/TRA @ CON Mode



Acceptance Process

Infrastructor Test (IFT)

- To demonstrate that the installed equipment meets iits requirements.

Syetem Site Function Test (FUT)

- To demonstrate that the system is “fit to the purpose” through operation and functional test scenarios.

Acceptance Process

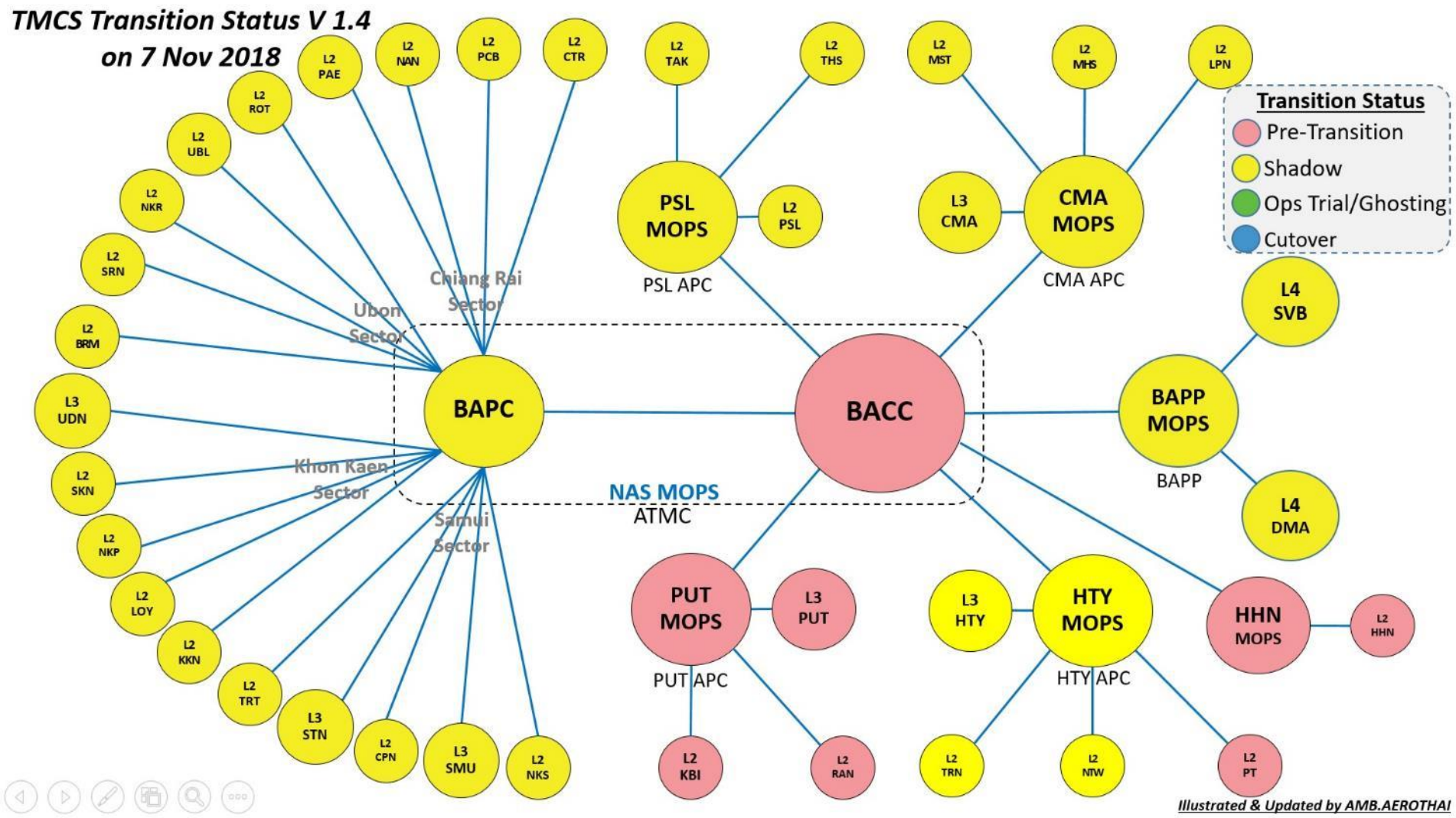
Integration Test (ITT)

- To demonstrate the proper interaction, exchanges of data and operation of the sub-system comprising the TMCs

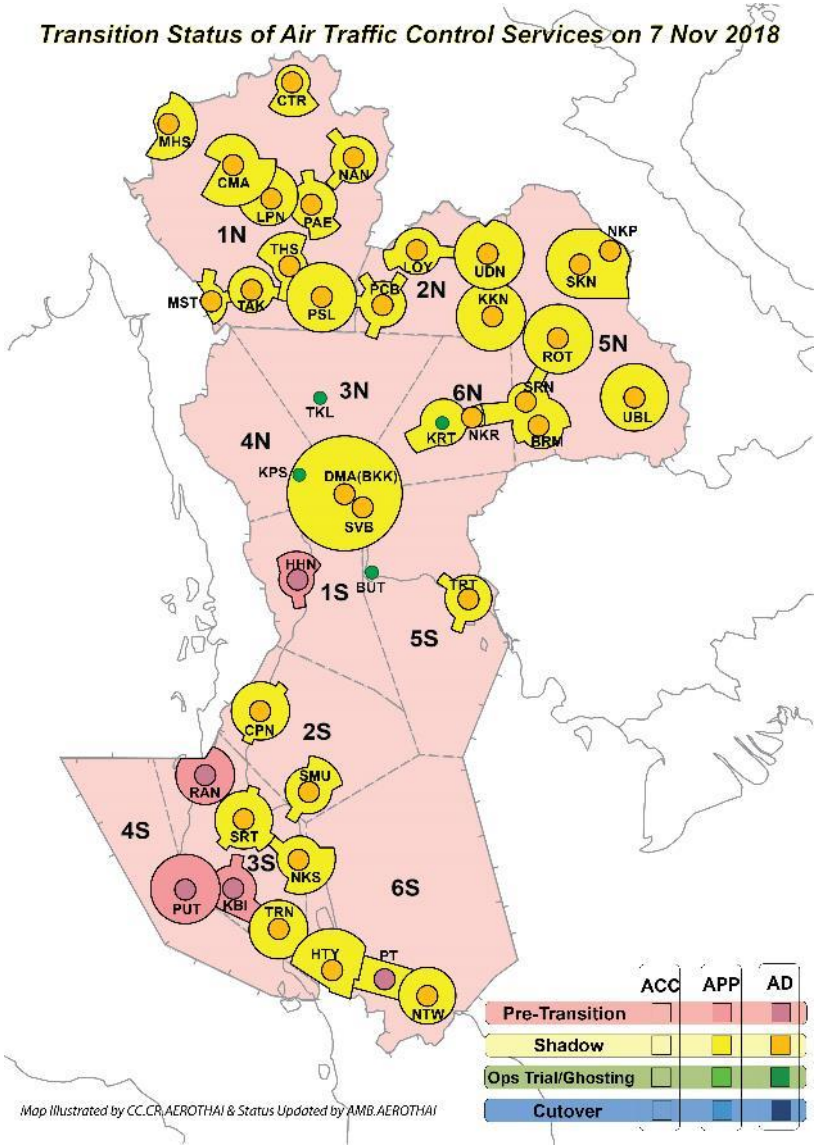
System Continuous Test (SCT)

- To demonstrate the proper interaction, smooth exchanges of data and operation of thr entire TMCS for a continuous period of 90 days.

TMCS Transition status on 7 Nov 2018



TMCS Transition status on 7 Nov 2018




Thank you