Surveillance solutions for CAR/SAM area

INTELCAN TECHNOSYSTEMS

PROVIDING SOLUTIONS THAT TAKE FLIGHT

Panama City. September 22nd, 2015

Intelcan Profile

Providing Solutions That Take Flight

Intelcan is an innovative Canadian corporation with a proven 40-year track record in design, manufacturing, and deployment of Communications, Navigation, Surveillance (CNS), Air Traffic Management (ATM), and airport infrastructure

Intelcan Offering

CNS/ATM Products

- ATM |
- ADS-B |PSR | MSSR | PAR
- AMHS | D-ATIS | RCMS
- ILS | DME

Integrated Aeronautical Solutions

- Turnkey Aeronautical Solutions
- Integration with 3rd party systems (new & existing)

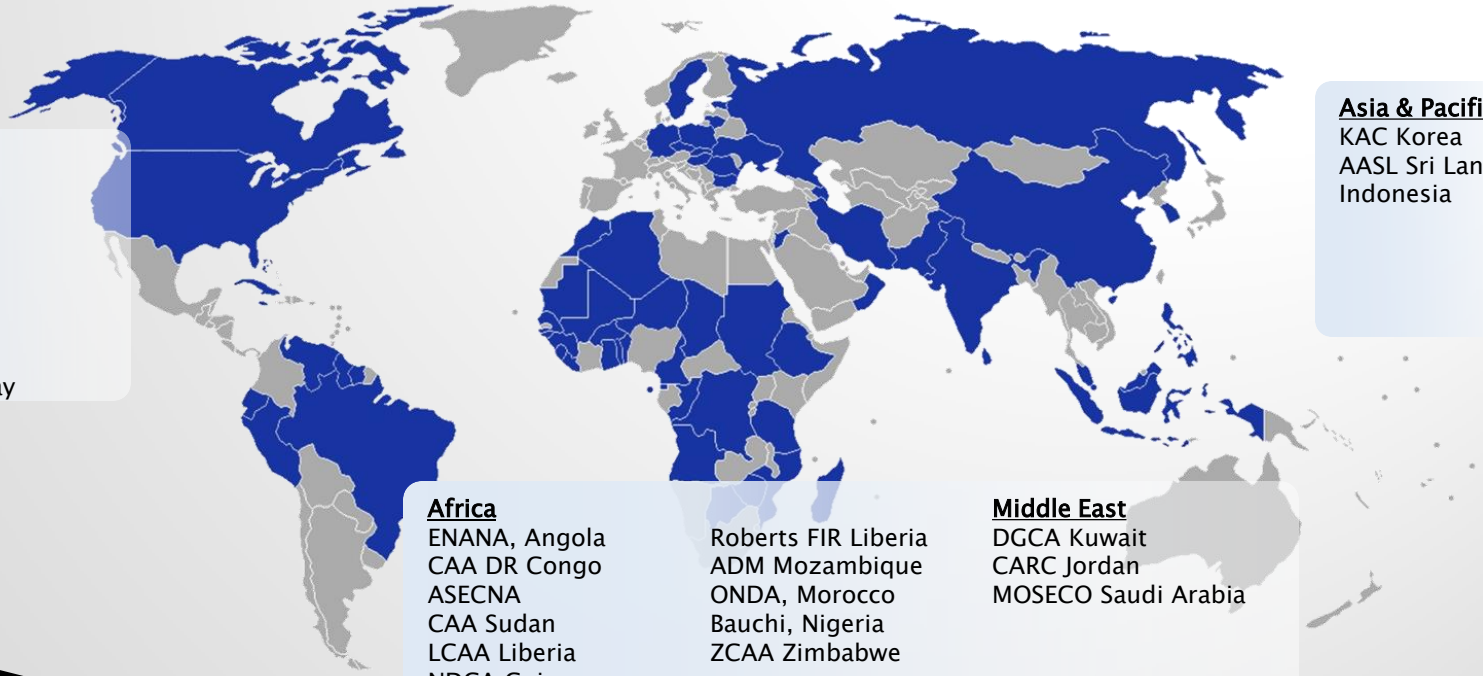
Customized solutions

- Closer to customers
- Innovative, flexible and nimble solutions

Recent Experience

- Intelcan has successfully delivered CNS/ATM & airport solutions to countries around the world in all the regions of ICAO.
- This diversity of experience ensures that Intelcan offers solutions that meet international and regional standards.
- Adapted to different environments and project size

Europe
LNAF, Latvia
PANSA Poland
PAF Poland
RAF Romania
MoD Bulgaria
GECI Spain



Americas
NAV CANADA
EXCELIS USA
JCAA Jamaica
CAI Cuba
HIA Cuba
QIA Ecuador
GCAA Guyana
DINAC, Paraguay

Asia & Pacific
KAC Korea
AASL Sri Lanka
Indonesia

Africa
ENANA, Angola
CAA DR Congo
ASECNA
CAA Sudan
LCAA Liberia
NDCA Guinea
CAA Equatorial Guinea
Roberts FIR Liberia
ADM Mozambique
ONDA, Morocco
Bauchi, Nigeria
ZCAA Zimbabwe

Middle East
DGCA Kuwait
CARC Jordan
MOSECO Saudi Arabia

The Guyana experience

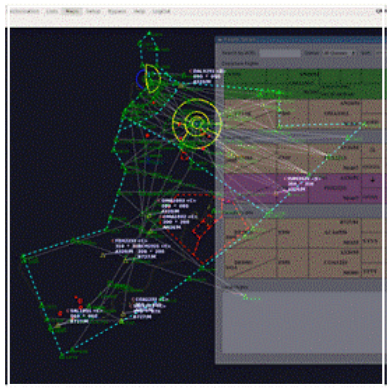
Modernization of the CNS/ATM systems in the republic of Guyana

PROYECT PARAMETERS

- Need for improved awareness
  - Atm system
  - Surveillance means
- Maximize the use of existing infrastructure
  - Airport facilities
  - Airport already crowded with antennas towers
  - Communication means
- Coverage
  - At RWY touch points
  - En- route
- Reliability, availability and maintenance

The Guyana experience

Proposed solution



SkyControl ATM SDPS

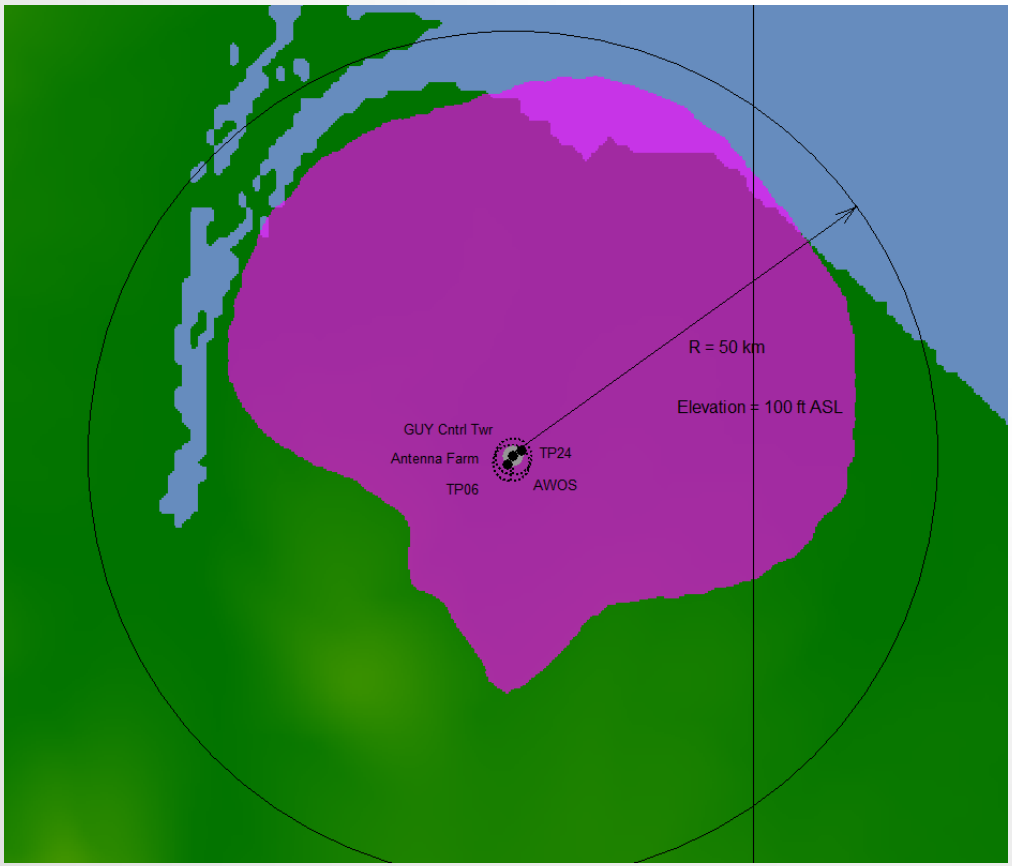
- Flexible solution
- Adapted to specific customer need and procedures
- Cost efficient
- Modular for future evolution of needs

SkyControl ADS-B station

- Cost effective
- Adequate coverage from RWY touch point to en-route
- Easy to install and maintain
- Use of existing infrastructure (VHF antenna TWR and equipment room)
- More than 90% aircrafts equipped

The Guyana experience

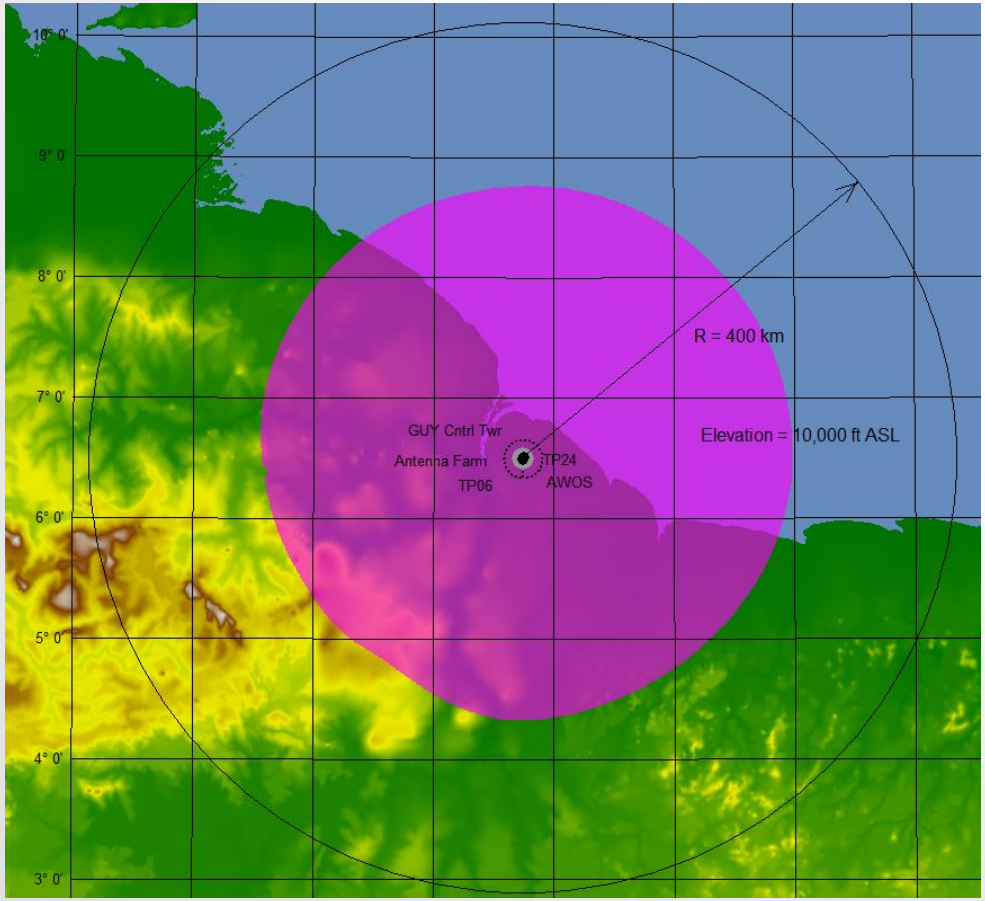
Coverage analysis



LOS COVERAGE AT FL 001

The Guyana experience

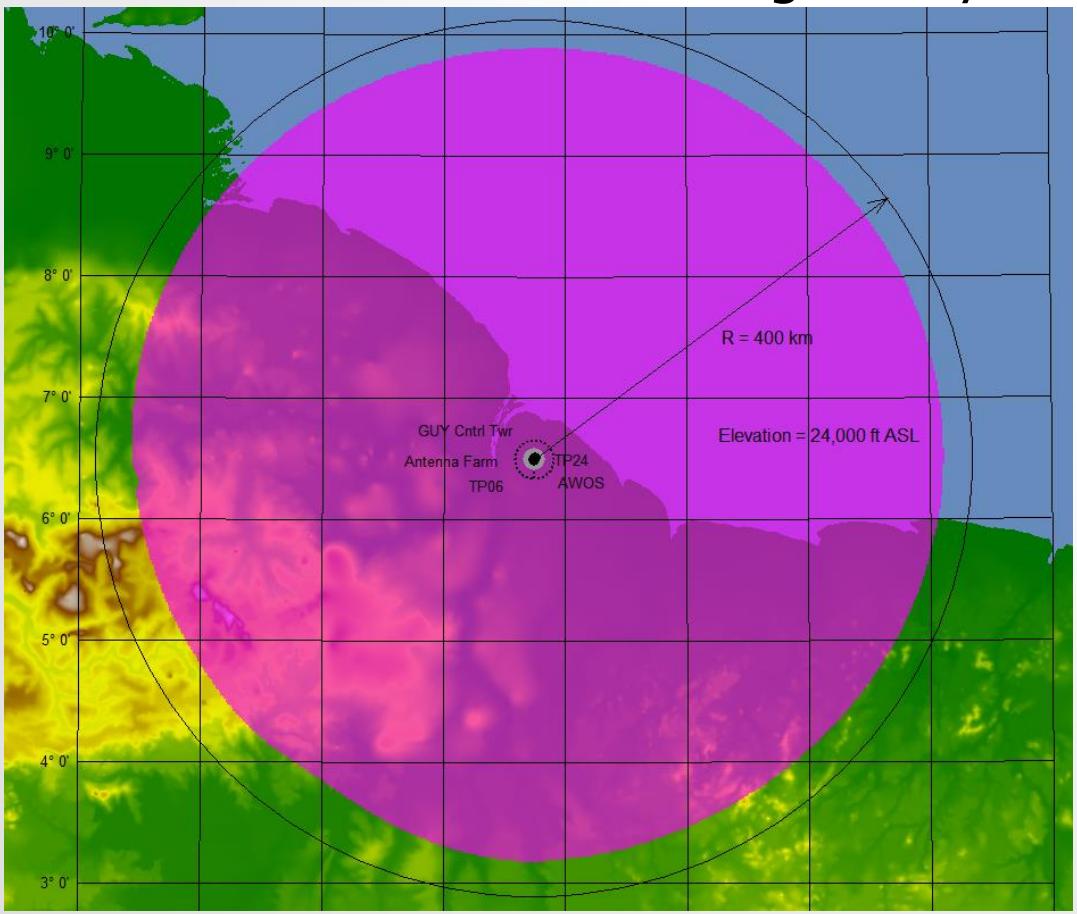
Coverage analysis



LOS COVERAGE AT FL 100

The Guyana experience

Coverage analysis



LOS COVERAGE AT FL 240

The Guyana experience

Modernization of the CNS/ATM systems in the republic of Guyana

PROYECT RESULTS

- Objective coverage obtained
- Maximum reuse of existing facilities and systems.
- Modular System prepared for easy expansion for future needs and extended coverage
- Reliable solution, no failure detected in 1 year. No interruption of service
- More than 90% of aircrafts equipped with ADS-B at FL 245 based on real trafic observation
- Lower cost and maintenance cost vs other technologies

ADS-B Technology

PROS

- **Cost**: ADS-B is a very cost effective alternative in many ATM applications. Total cost of ownership < 35-50% of any other surveillance solutions .

- **Performance**: low latency (< 2s), high update rate (1s), high accuracy (based on GNSS), not affected by range, high capacity (> 500 targets), surface & air surveillance.

- **Flexibility**: small form factor solution, significantly less affected by terrain or weather; solid-state; lightweight, low-maintenance, low power, with the ability to leverage multiple power sources,

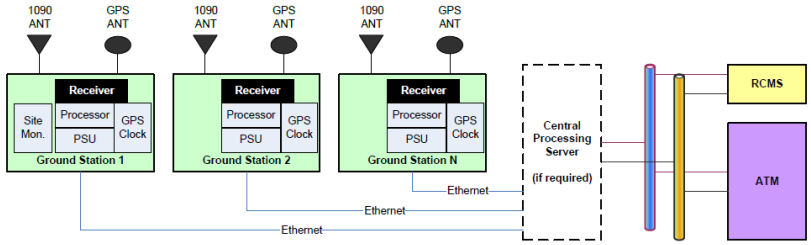
CONS

- **Interoperability**: Required that all aircraft are equipped. **But**, as our Guyana analysis shows, we get 90% of targets in their FIR.

- **Security/Safety**:
  - Relies on GNSS: **But**, GNSS modernization/deployment is reducing the risk.
  - Relies on airborne equipment: **But**, just like it SSR technology.

Intelcan ADS-B solution

SKYSURV is comprised of the following:



- **Ground Station**: one or more receiving Ground Stations installed at specified sites (locations), and including a site monitor.
- **Central Data Processing**: ADS-B central data processing equipment – *optional*.
- **Control And Monitor System**: remote/local Control and Monitor System for remote management of the whole system from the control center;
- **Target Display**: offers Radar-like display and viewing of live or recorded ADS-B targets. It is intended for diagnostic and testing of the ADS-B reception and processing performance – *optional*.
- **Record and Playback**: collects ASTERIX and/or Raw messages sent by the ground station and playback the recorded data – *optional*.

The Ground Station

Ground Station is composed of:

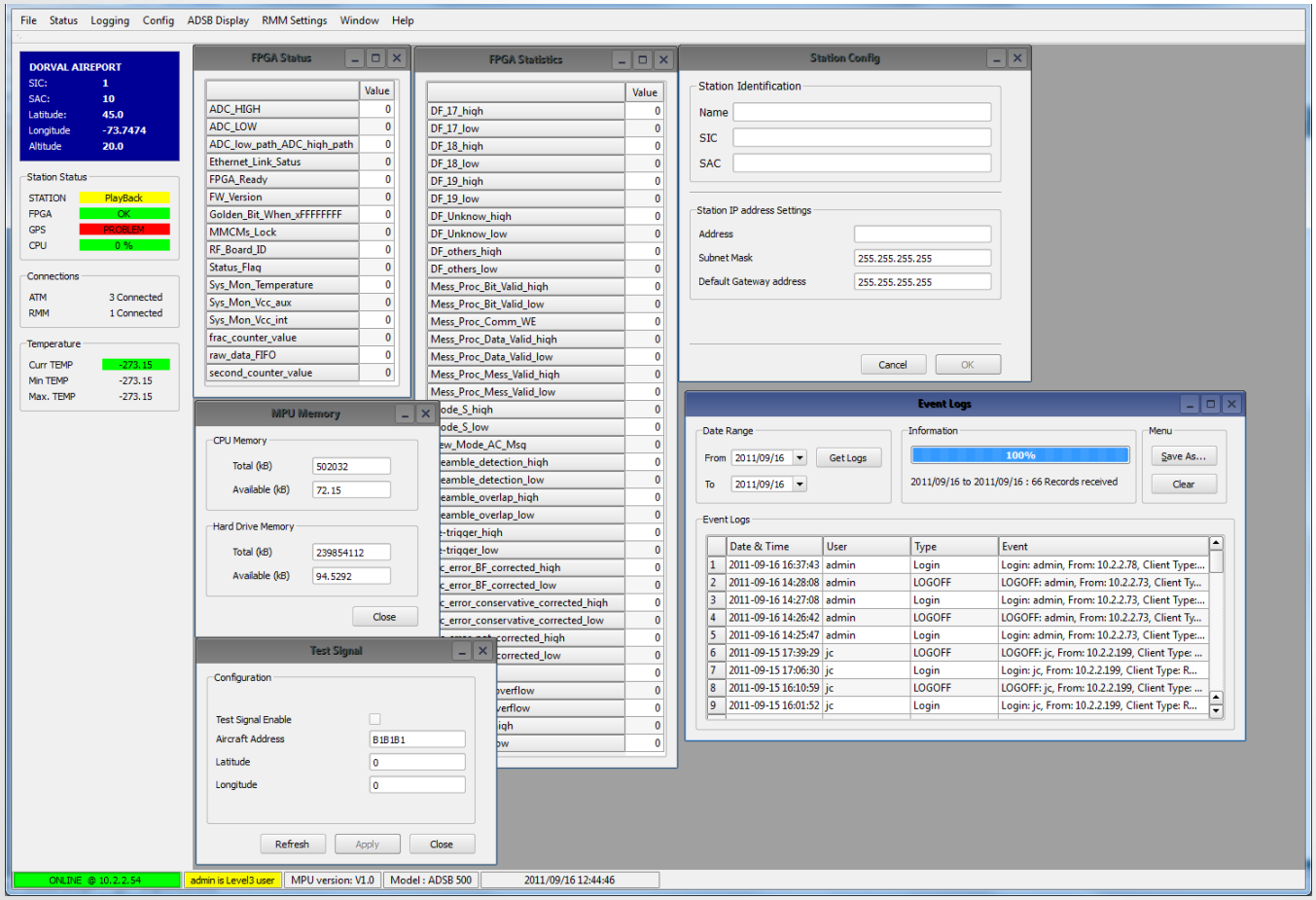
- RXU – Receiver Unit (up to 6)
- SMU – Site Monitor Unit (0 or 1)
- PSU – Power Supply Unit (1 or 2)
- MPU – Main Processing Unit (1 or 2)

*All units are Line Replaceable Units (**LRU**), Support full **hot swap**, and can be unplugged/replugged or replaced easily without interruption of service on a redundant model. They are designed to avoid damage if plugged into a wrong slot.*

SkySurv ADS-B is conceived with a cross redundancy design for improved availability and robustness.

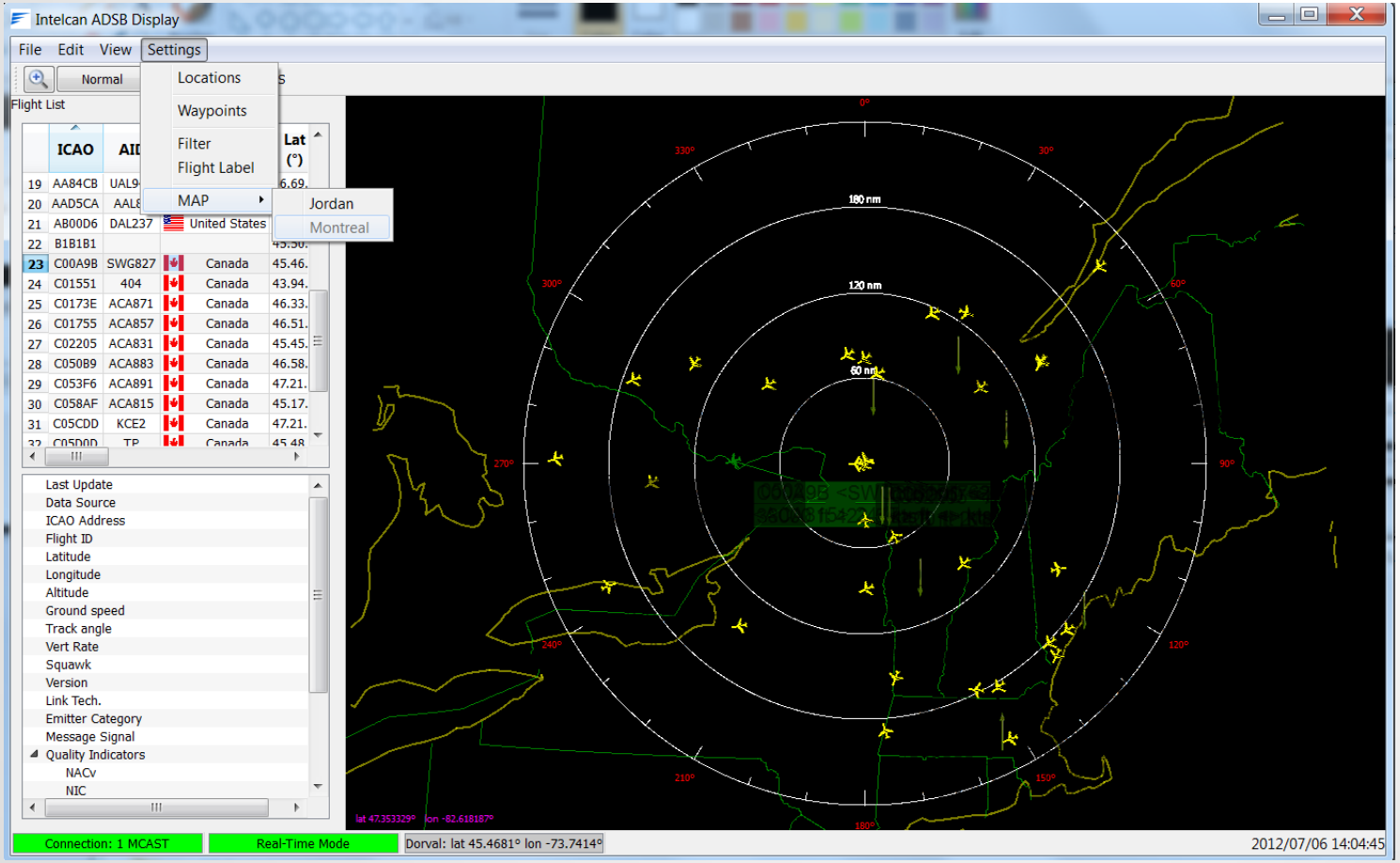
System Description

RCMS



System Description

Target Display



ATM Solution

Today's ATM challenges are:

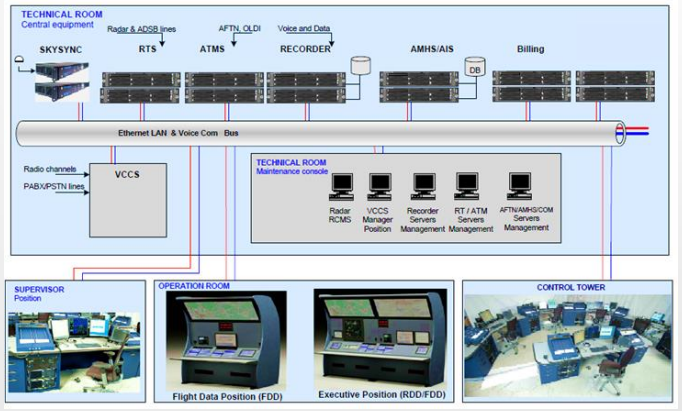
- Multiple sensors (ADS-B, Radar, Flight Plan, MLAT, …)
- Compliance to changing standards
- Customized user interfaces
- Scalability
- Cost Reduction
- System Security

Overview

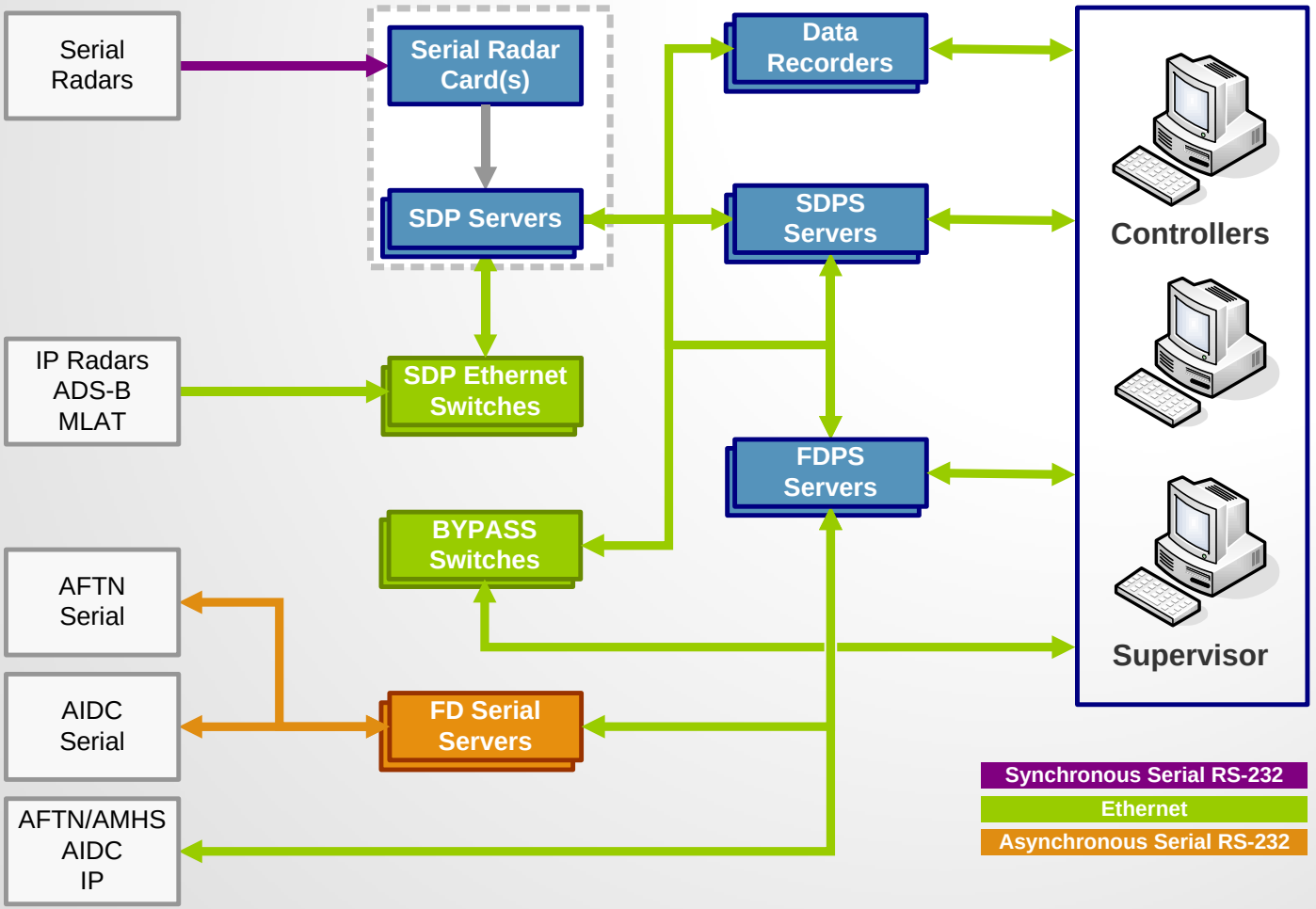
- SKYCONTROL ATM has a solid track record with deployments on all 5 continents.
- It complies with ICAO, Eurocontrol and NATO requirements.
- Selected by ITT (later Exelis, and now Harris) to complete their Surveillance Offering in the US and international Market (Canada's MoD, Sweden's DoD,..)

Intelcan ATM Solution: SKYCONTROL

- Based on COTS Hardware with an open architecture running on Linux.
- Highly Scalable:
  - Support of multiple surveillance sensors: PSR, MSSR Mode S, ADS-B and Multilateration
  - Offers customization through user definable variable system parameters (VSP)
  - Virtually unlimited CWP expansion (Tested with up to 128 positions)



ATM System Components



SKYCONTROL ATM

Integrated Solution

- Radar Tracking
- Flight Plan Processing
- Radar – Flight Plan Correlation
- Electronic Flight Strips
- Approach Path Monitoring
- MET & NOTAM Processing
- System Monitoring
- ATC Forecast (ATFM)
- Billing Support

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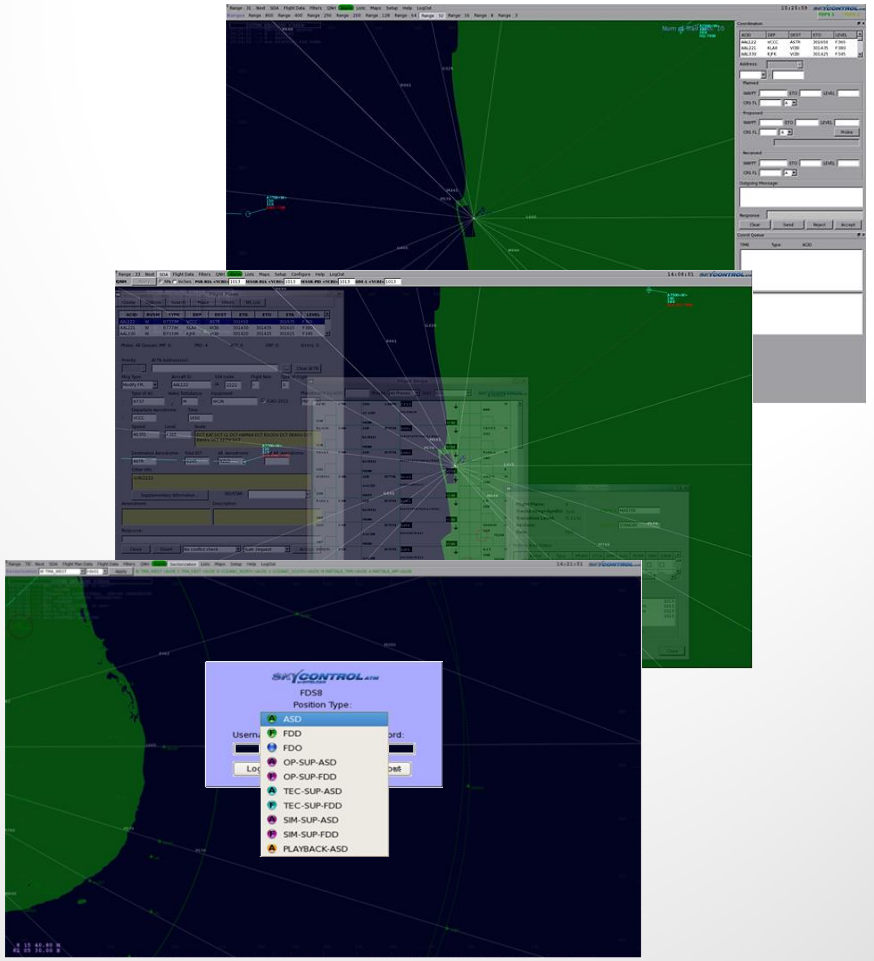
Customized Solution

- System Customized to meet client requirements providing specific design for:
  - Customized Server Distribution
  - Workstation Graphical User Interface layout
  - Multiple Electronic Flight Strip formats
  - Customized Simulator solutions
  - Billing Data for Invoicing

Customized GUI Layout

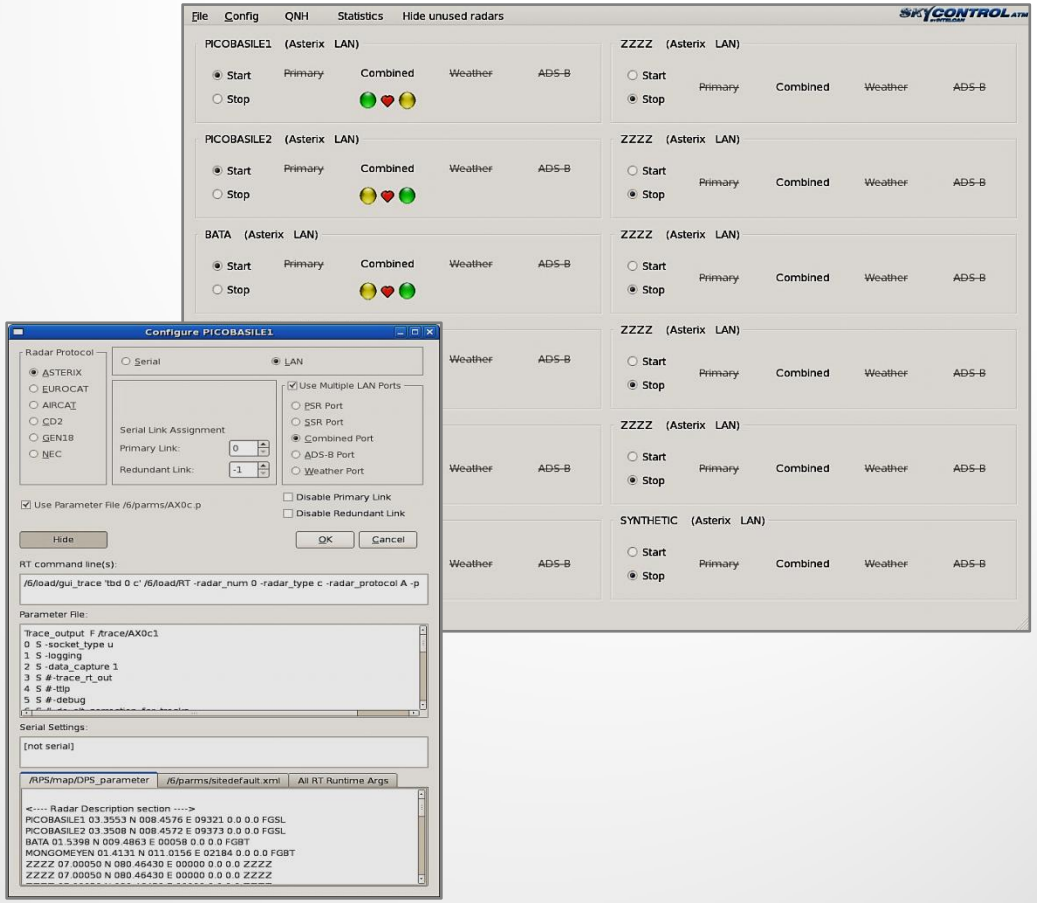
- Customized GUI to meet the specific end-user layout
- Providing ATC system features at each Controller Workstation based on the flexible role definition
- CWP application based on the latest look-and-feel technologies, including:
  - Transparent windows
  - Multiple color choices for virtually all map elements
  - Customer defined map symbols and target symbols



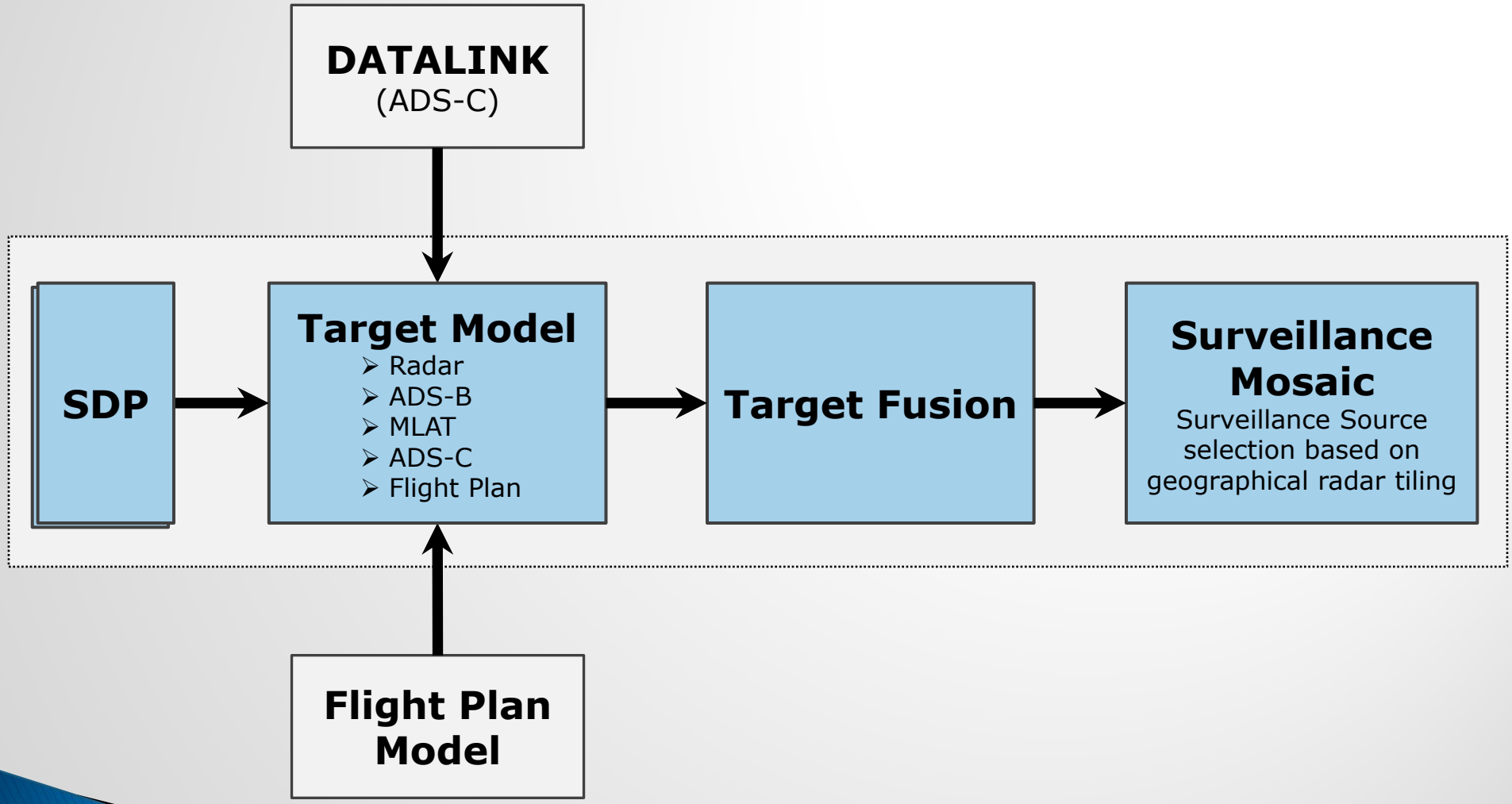
SDPS

Multi-Sensor Tracking

- Multi-Sensor Tracking
- Sensor Data Input
  - ✓ ASTERIX
  - ✓ EUROCAT
  - ✓ AIRCAT
  - ✓ GEN18
  - ✓ CD2
  - ✓ EVZ
  - ✓ NEC
- Sensor Bypass Output



Multi-Sensor Fusion



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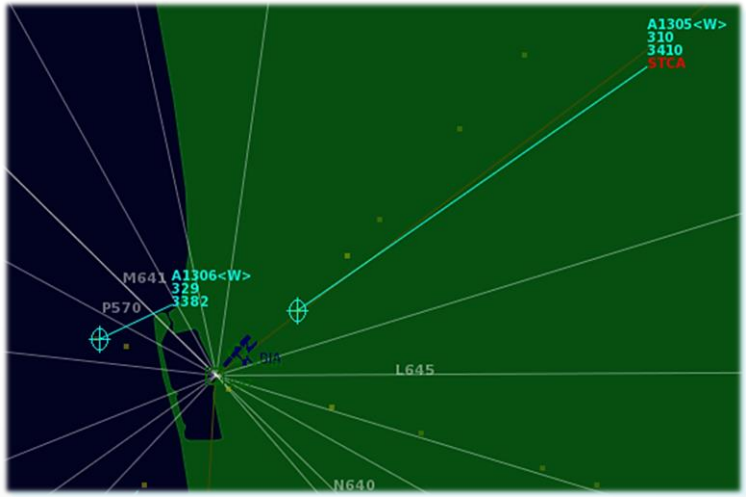
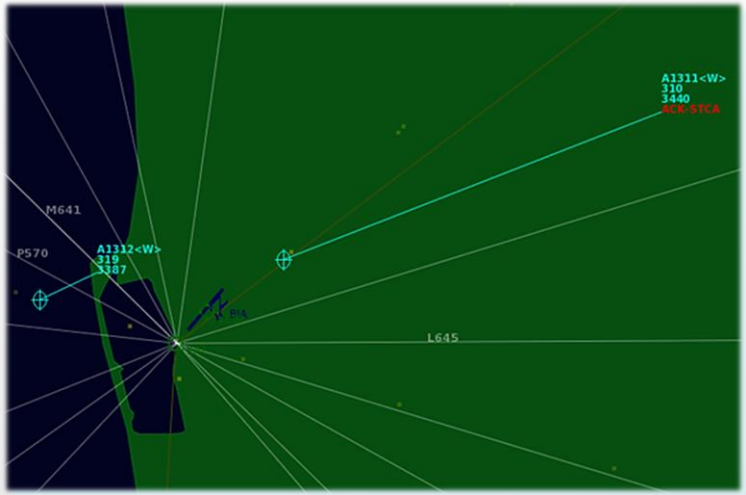
Safety Nets

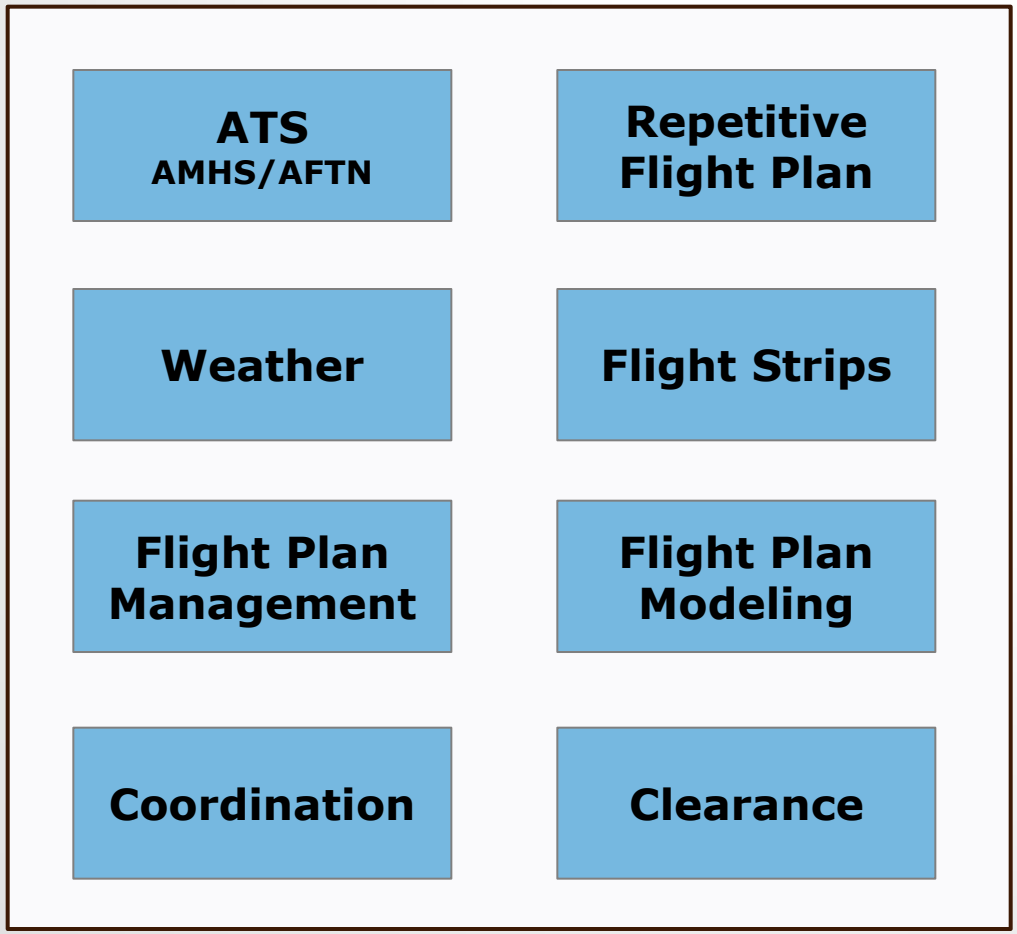
- Short-term conflict alert (STCA):
  - Proximity Conflict Detector (PROCON)
  - Linear Conflict Projector (LINCON)
- Reduced Vertical Separation Minimum (RVSM)
- Minimum Safe Altitude Warning (MSAW)
- Danger Area Infringement Warning (DAIW)





SKYCONTROL ATM

Flight Data Processing System (FDPS)



Safety Nets

- Medium Term Conflict Detection (MTCD)
- Cleared Level Adherence Monitor (CLAM)
- Route Adherence Monitor (RAM)
- Approach Path Monitor (APM)

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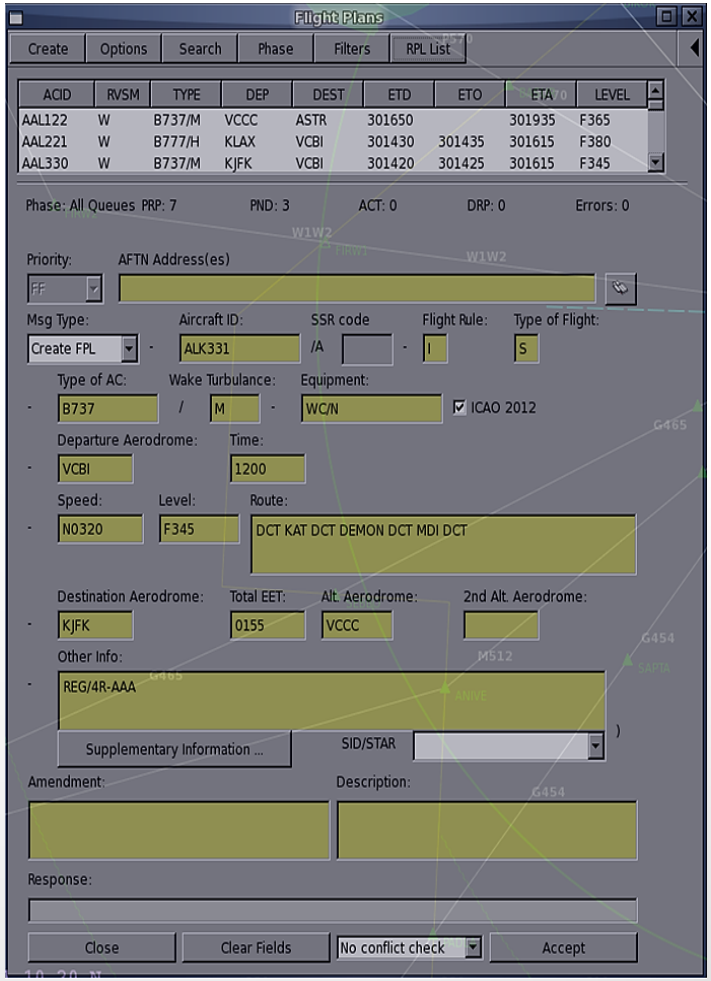
System Features

- 2012 Flight Plan format support
- Flight Plan Route Analysis
- Flight Trajectory Modeling based on:
  - Route
  - Aircraft Performance Model
  - Wind Model
- Dynamic Flight Model Updating based on:
  - Surveillance Position reports
  - Current Meteorological Data
  - Clearance & Coordination
- Flight Plan Track Generation

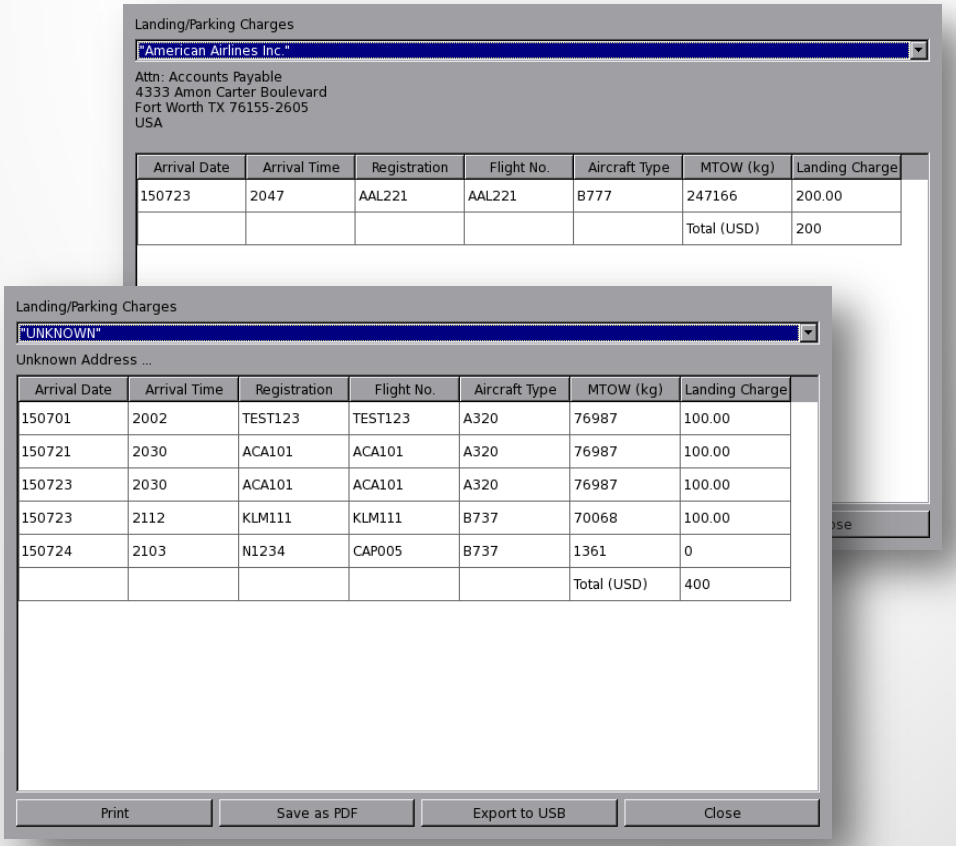


SKYCONTROL ATM

FDPS

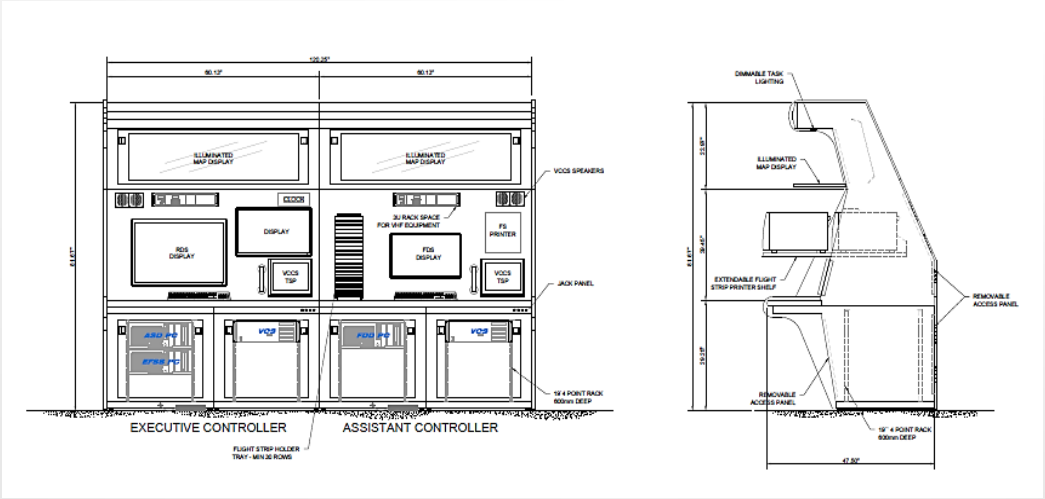
Features

- Flight Plan Database Management
- RPL Management
- Automatic SSR Code Allocation
- Flight Data Recording
- Logs and Statistics Generation
- Billing Support



Controller Work Station (CWP)

- ASD
- FDD
- TEC-SUP
- OP-SUP
- FDO
- PLAYBACK



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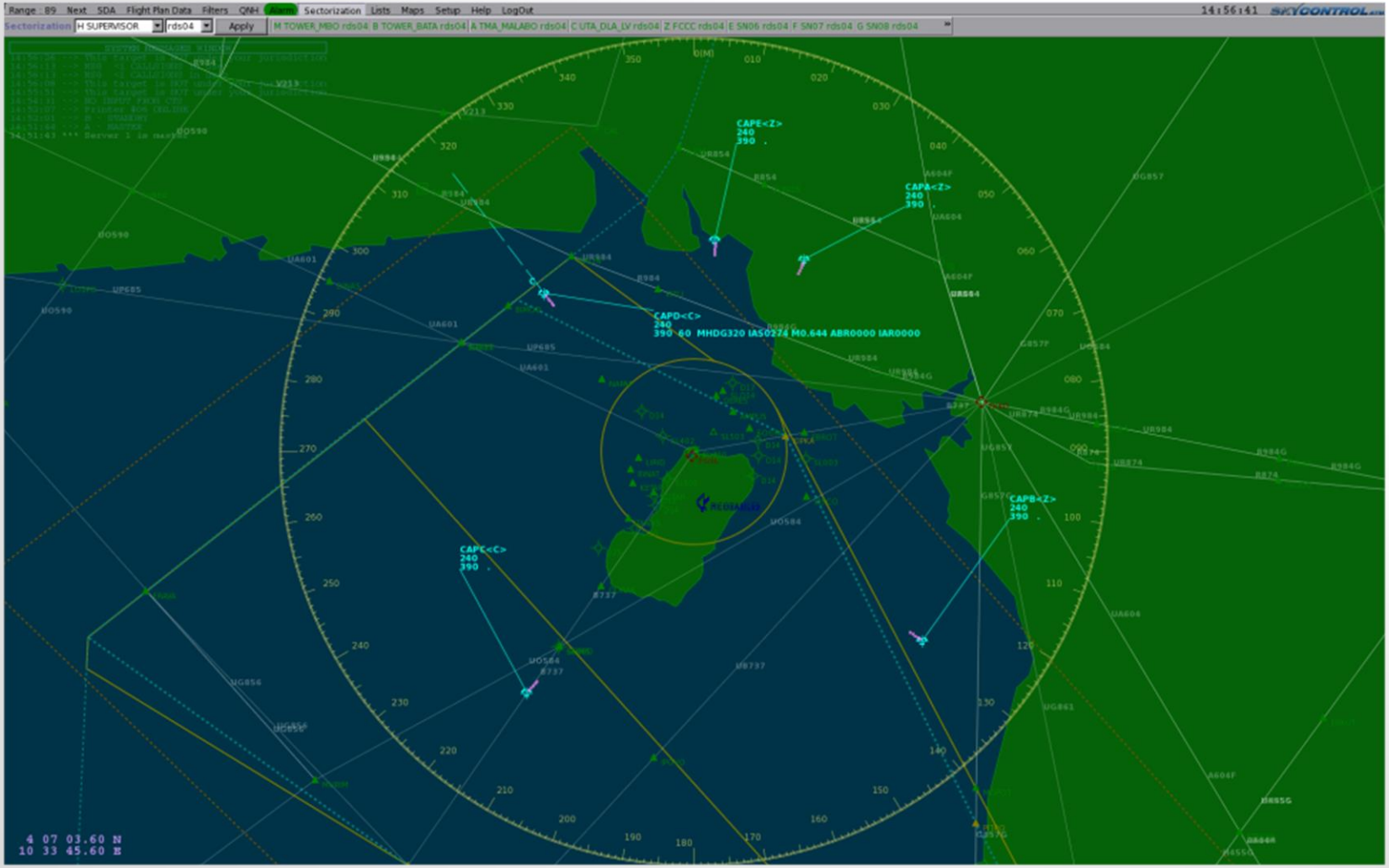
Graphical User Interface



SKYCONTROL ATM

Flight Strip Examples

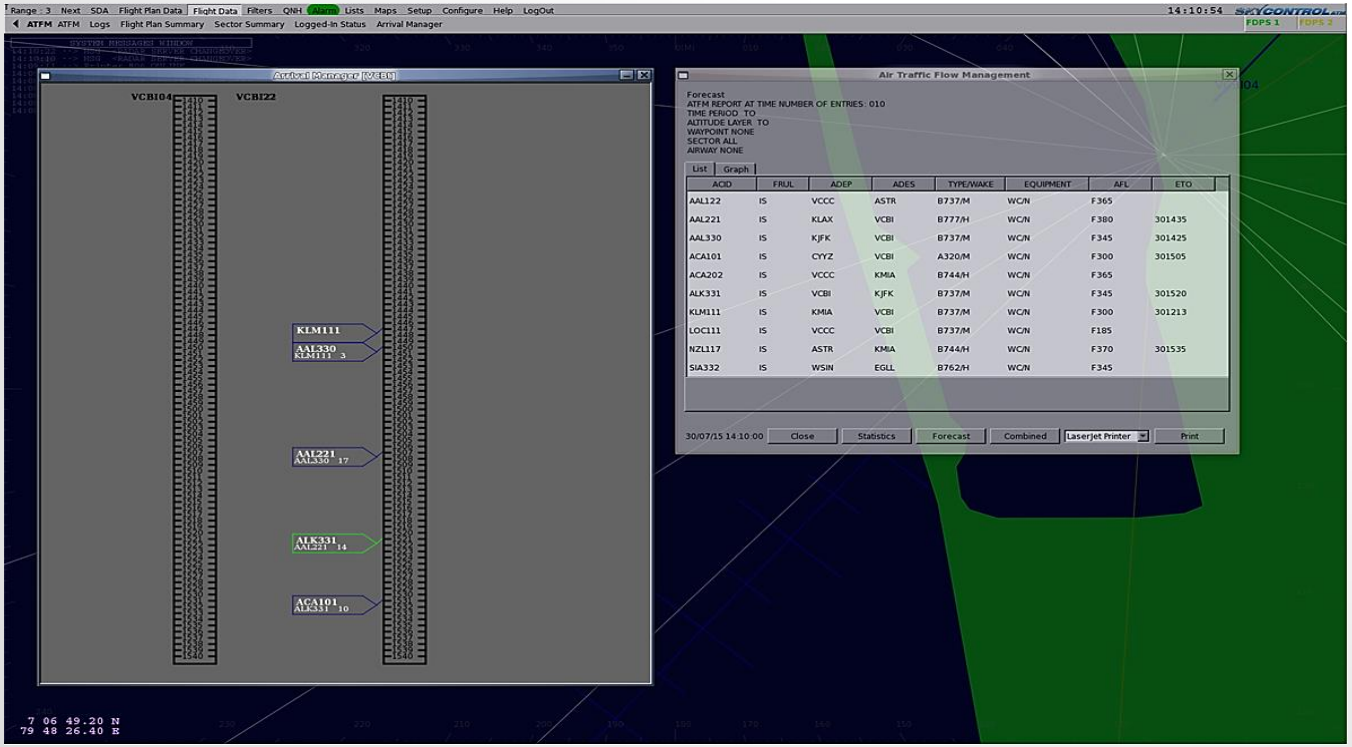
Guyana

Korea

SQ900 A320/M KPKA	1477 RJPN RCHN	F250	TOPAX 1551 NAMDO PSN TOPAX SSR/1477 EET/RKRR0002			
CX440 A320/M KPKA	1377 RCHN RJPN	F250	BULGA 1600 TOPAX PSN BULGA SSR/1377 EET/RKRR0002			
CX440 A320/M KPKA	1377 RCHN RJPN	F250	BULGA 1600 TOPAX PSN BULGA SSR/1377 EET/RKRR0002			
AC100 A320/M KPKA	1577 RKPK 2017	F250 ↓	RJPN RKPK PSN NARAE INVOK SSR/1577 EET/RKRR0002			
AC100 A320/M KPKA	1577 RKPK 2017	F250 ↓	RJPN RKPK PSN NARAE INVOK SSR/1577 EET/RKRR0002			
CX440 A320/M KPKA	1377 RCHN RJPN	F250	BULGA 2045 TOPAX PSN BULGA SSR/1377 EET/RKRR0002			
CX440 A320/M KPKA	1377 RCHN RJPN	F250	BULGA 2045 TOPAX PSN BULGA SSR/1377 EET/RKRR0002			
SES770 C208/L KPKA	2431 GGGG RKPK	F120 ↓	RKPK 1657 APELA PSN KALOD RKPK SSR/2431 EET/RKRR0001			

Air Traffic Flow Management

- Air Traffic Flow Management Forecast (ATFM)
- Arrival Manager

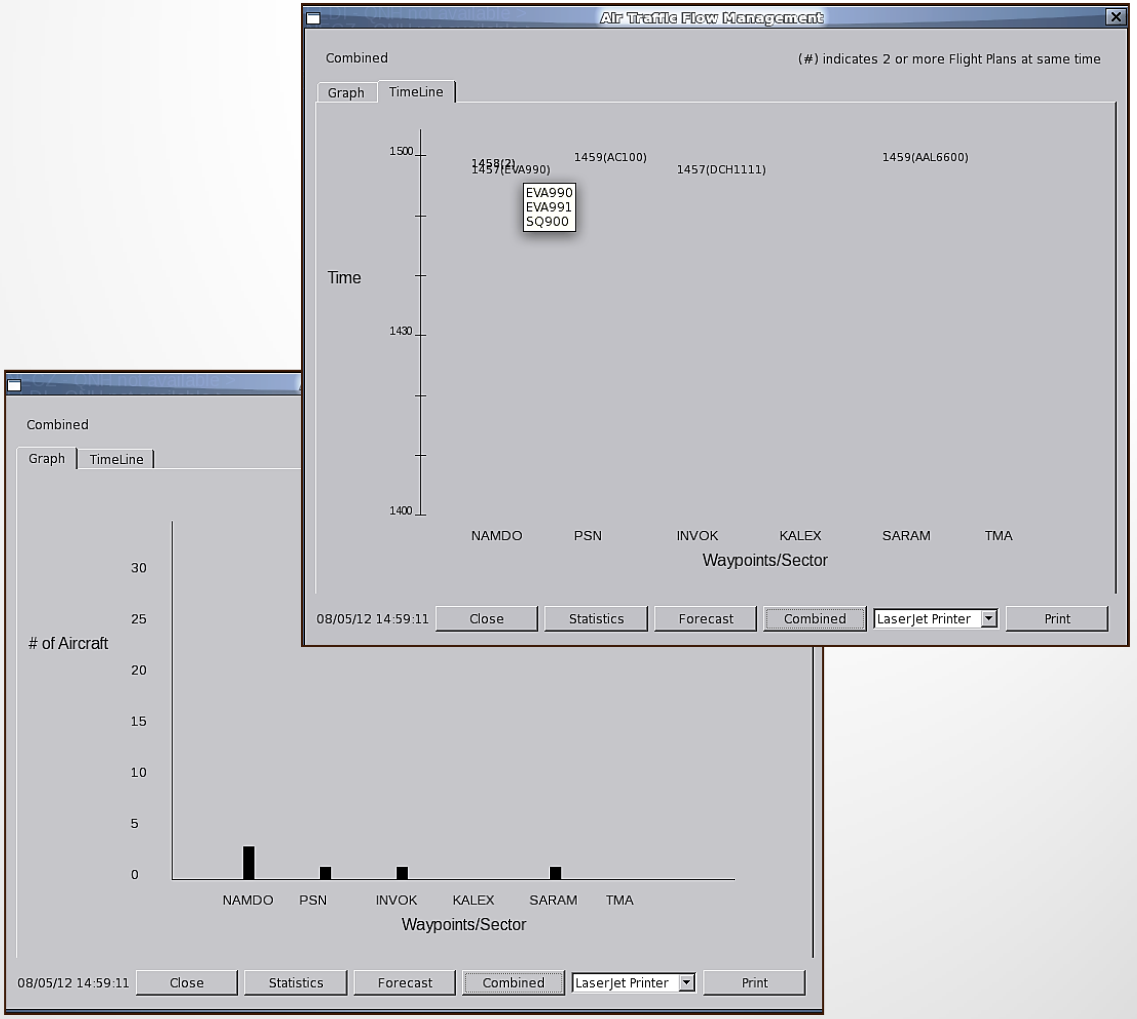


Air Traffic Flow Management

- Air Traffic Flow Management (ATFM) is the management of air traffic to avoid exceeding airport or air traffic control capacity in handling traffic, and to ensure that available capacity is used efficiently.
- The ATFM forecast window contains a list of flight plans for a selected time period.
- Flight plans filter criteria include:
  - time period
  - altitude range
  - waypoint
  - airway
  - sector

ATFM Combined Forecast

- The combined ATFM forecast graph is a bar graph showing the number of aircraft for a selected time period and multiple waypoints.
- Filter criteria include time period, altitude range, waypoints, and sector.
- Each bar represents a waypoint.



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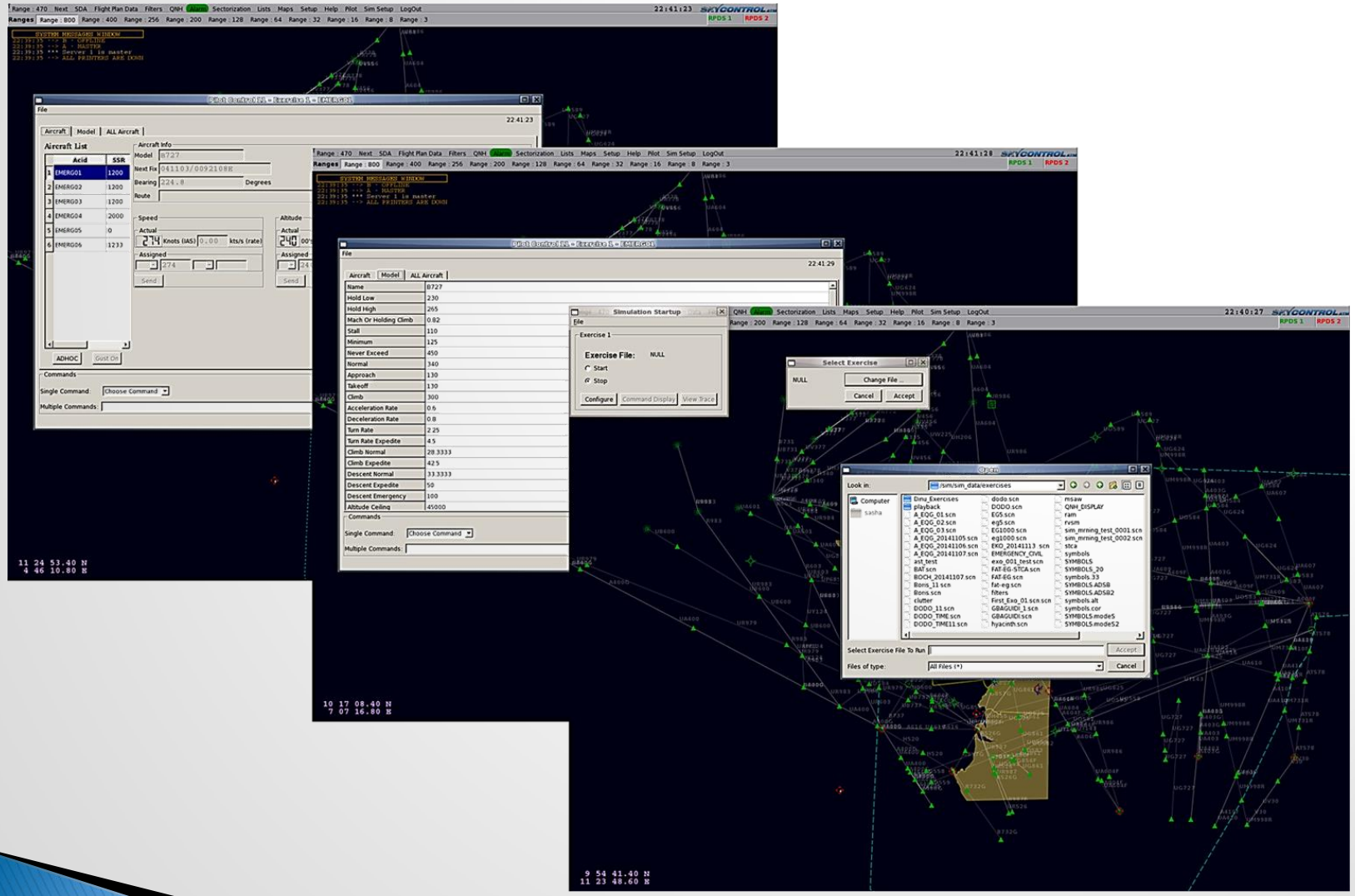
ATM Simulator Exercise Control



Thank You!

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