

**DRIVING PLANNING PROCESSES FOR PRECISION WEAPONS
WITH EMBEDDED WEATHER DECISION AIDS**

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OBJECTIVE:

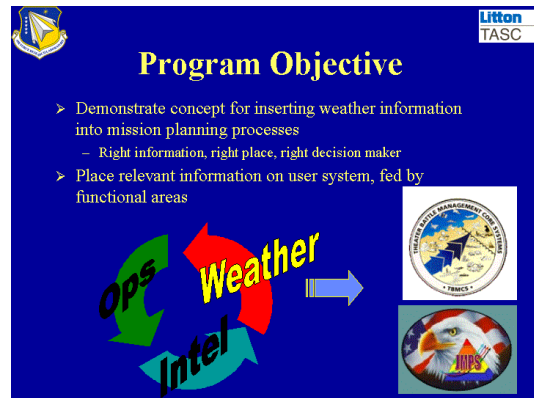
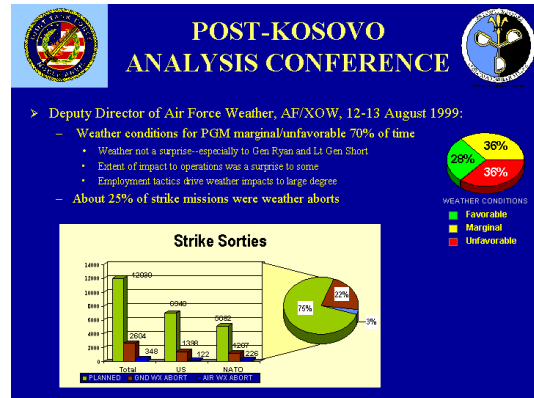
Historically, the incorporation of focused weather information into the Air Force mission and force level planning process has been difficult and haphazard at best. In the modern air battle campaign, hundreds or thousands of sorties must be planned and flown over a very short period of time. Automation is increasingly required to plan, execute, and re-plan missions quickly. A current Air Force Research Laboratory effort demonstrates how the operational community can integrate weather and Weather Impact Decision Aids (WIDAs) into their existing and planned automated mission planning

architectures, and use precision guided weapon systems more effectively against enemy targets. The Joint Environment Exploitation Segment (JEES) will embed weather and WIDAs within the Air Tasking Order (ATO) generation process, enabling the planner to use weather impact information in selecting the optimal time/ target/ precision-weapon combination. Future plans for JEES include use across the broad spectrum of mission planning and execution application. In addition to JEES demonstrating the integration of WIDAs into the ATO generation process, the prototype Weather for Automated Mission Planning Software (WAMPS) demonstration illustrates the

addition of similar decision support in the mission execution level tactics planning that takes place at the pilot level within the Portable Flight Planning System (PFPS) and Joint Mission Planning System (JMPS). These efforts will demonstrate to the planning community and warfighting policy-makers how weather, and specifically Weather Impact Decision Aids (WIDAs), can benefit the planning through execution process.

These processes will be illustrated through the briefing presented at the conference, and through interactive software demonstrations.

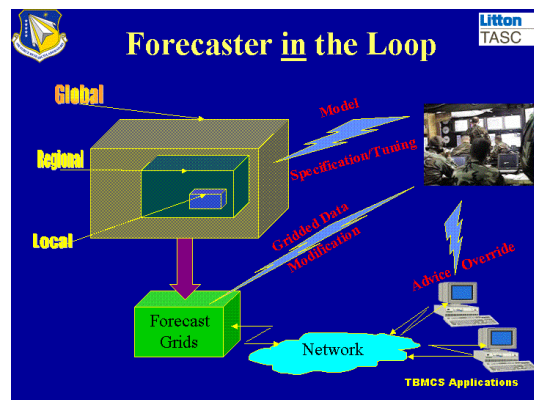
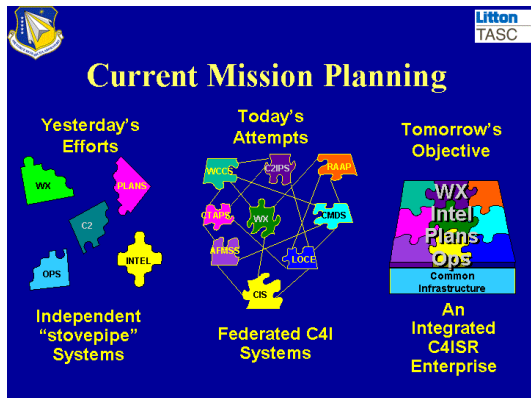
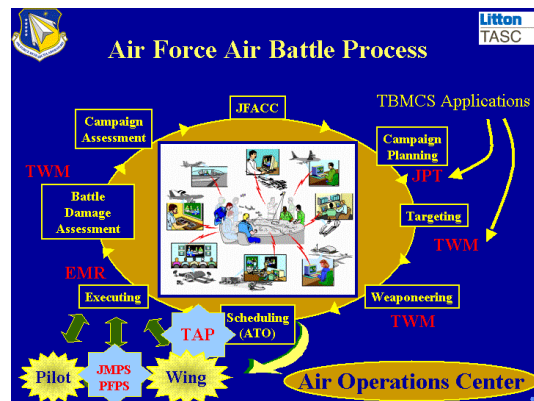
BACIMO PRESENTATION:



Driving Planning Processes for Precision Weapons with Embedded Weather Decision Aids

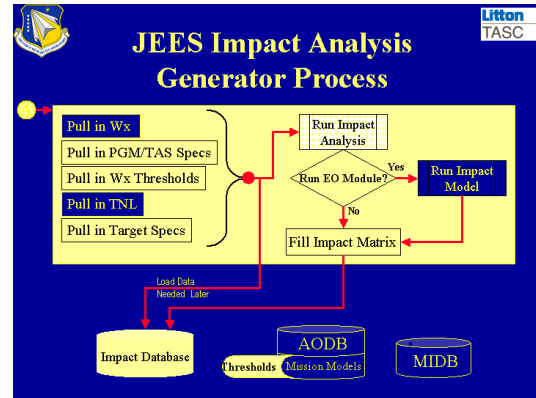
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WAMPS Program Overview

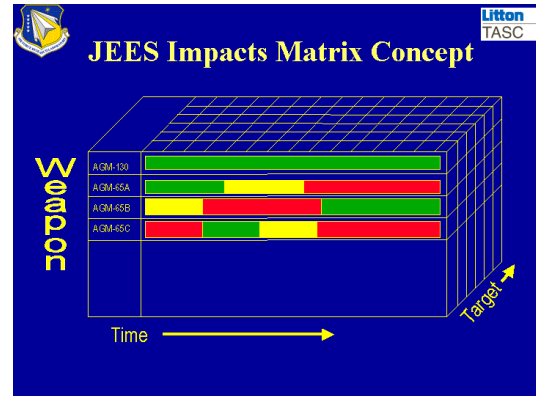
- > 1998-1999: TBMCS Demo
 - Focused on Theater Air Planner (TAP)
 - Grew into current JEES program with AFRL
- > 2000:
 - JEES Program builds operational code into TAP
 - PFPS/JMPS Visual Basic Demo
- > 2001:
 - Operationalize and transition JEES
 - JMPS/PFPS demo becomes operational code



JEES Objectives

- > Demonstrate Ability to Consolidate Battlespace Infosphere Data (Intel, Ops, and Weather) Into Comprehensive, Relevant, Decision-support Tools
- > Incorporate These Context-sensitive Decision-support Tools (CSDST) Within GCCS/TBMCS/JMPS Decision-making Applications
- > Provide GCCS/TBMCS/JMPS Low-Risk Means of Incorporating New Capabilities

A Cog Linking the Battlespace Infosphere to Decision Making

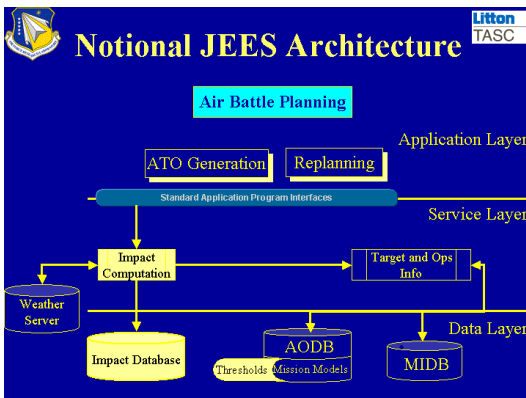


JEES Program Approach

- > Start with Theater Air Planner (TAP) component of Theater Battle Management Core Systems (TBMCS)
- > Access MIDB (target) and AODB/TAP (weapons and sensors) databases
- > Access 4-D METOC data "cube"
- > Integrate TAWS models and constraint-based impacts rules
- > Build Impacts database
- > Integrate Impacts into TAP during real-time planning
- > Generate "wx-enabled" Air Tasking Order (ATO)

JEES Data Needed

- > **Target**
 - App: Location, Type
 - MIDB: Make-up, Shape/Orientation, Background Make-up
- > **Topography**
- > **Weather**
 - At Target:
 - Previous 24 Hour Precipitation
 - Previous 12 Hour Temperature
 - Clouds
 - Visibility
 - Winds
 - Moisture Content
 - Present Weather
 - Aerosol Type & Concentration
 - More....
- > **Ops Data**
 - App: Time over Target, PGM
 - MIDB: Types in SCL, Model characteristics
 - AODB: ROE Altitudes, Engagement Thresholds (JFACC Defined)



JEES METOC Database

- > Uniformly Gridded Data Fields (Notional GRIB)
- > 4-D (Lat, Lon, Alt, time)
- > Atmosphere, Ocean, Space (SEAMLESS Natural Battlespace)
- > Number of Atmosphere Elements
- > Defined by DISA Data Dictionary
- > Handle Large Number of Queries
- > Distributed (One theater, ONE Joint METOC DB)

Source: TBD (Notional JMFU/OWS)
Server: TBD (Notional TEDS/AFWA)
Segment: JEES

JEES Decision Aids Illustrated For Theater Air Planner (TAP)

The screenshot displays the Theater Air Planner (TAP) interface. It features a top menu bar with options like 'File', 'Edit', 'Planning', 'Database', 'Engagement', 'Command', 'Targets', and 'Help'. Below the menu is a detailed mission planning form with fields for 'Mission Name', 'Launch Base', 'Route Base', 'Target', 'Type A/C', 'Weapon', 'Altitude', 'Time', 'Priority', 'Status', and 'Remarks'. A central section shows a 'Weather Effects' graph with a color-coded scale from green (low) to red (high). The bottom part of the screen shows a list of mission targets and their associated resources.

JMPS/PFPS Decision Aids Illustrated Using Falcon View

The screenshot shows the Falcon View interface, which includes a 3D terrain map on the left and a circular decision aid overlay on the right. The overlay consists of concentric circles in green, yellow, and red, representing different levels of weather or threat impact. The interface also includes a toolbar with various navigation and tool icons.

JMPS/PFPS Program Approach

- Use PFPS 3.01 as notional JMPS
 - JMPS 1.0 would have functionality plus "look and feel" of PFPS
 - Build active Visual Basic demo to illustrate the various functions
 - Work actively with pilots and mission planners to illustrate most important functionality
 - Work with weather community on CONOPS for building/accessing Joint METOC Database

The Result

The flowchart illustrates the process from data to mission execution. It starts with 'Right Data' (represented by a cylinder icon) and 'Right Place' (represented by a map icon). These lead to 'Right Decision' (represented by a computer monitor icon), which is linked to 'Course of Action Development'. This process then leads to 'Mission Planning' (represented by a person at a computer) and finally 'Mission Execution' (represented by an aircraft icon).

JMPS/PFPS Notional Architecture

The diagram shows the notional architecture. It features a 'METOC Server Database' on the left, which provides 'Sensible Wx Parameters' to 'TAW/SINOWS Models'. These models feed into 'PFPS/JMPS Processes', which are also influenced by 'ATO From TAP'. The processes generate 'Weather Effects Special Output Products'.

CONCLUSION:

The JEES and PFPS/JMPS prototype programs will demonstrate how combining precise environment information with existing intelligence and operations data will aid Joint service combat mission planners. Planners will be able to reduce ground weather aborts and have greater success in employing precision guided munitions.

JMPS/PFPS Components Targeted

The image shows three screenshots of software components. The top screenshot is 'COMBAT Flight Planning Software', displaying a table with columns for 'Type', 'Latitude', 'Altitude', 'Time', 'Temp', 'Wind', 'Dir', 'Dist', 'Fuel', 'Status', and 'Remarks'. The middle screenshot is 'COMBAT Weapons Delivery Software', showing a 'Weapon Data' table with columns for 'Name', 'Type', 'Weight', 'Tgt', 'Alt', and 'Status'. The bottom screenshot is 'COMBAT Airdrop Planning Software', showing a 'Weapon Data' table with columns for 'Name', 'Type', 'Weight', 'Tgt', 'Alt', and 'Status', along with a visual representation of an aircraft and airdrop targets.