Introduction and Background

The Naval Synchronization Toolset (NST) is an Internet-based software tool that provides the Department of the Navy (DoN) with predictive analytic capabilities for the sourcing of aircraft to squadrons, squadrons to air wings, and air wings to aircraft carriers. NST will offer rapid visibility into the consequences of the scheduling decisions related to individual aircraft, squadrons, carrier air wings, and carriers. The predictive planning capabilities of NST will be used to resource F/A-18 aircraft to squadrons and air wings to support carrier strike groups (CSGs), with the intent of extending the lives of older, currently deployed aircraft.

Before NST was developed, there were no convenient means to develop and implement schedules based upon operational demands of squadrons or carrier air wings against schedules for required airframe maintenance and/or training. Planning and managing were done manually rather than with a convenient automated tool. NST will be the automated tool that allows operational planners to develop and visualize operational schedules and to synchronize them with airframe maintenance schedules and training schedules.

The goal of NST is to improve resource planning and management capabilities for assets through synchronization and efficient management of inventory. This tool closes the operations and maintenance loop. The primary focus of NST is predictive planning and management of aviation resources, for which the high-level demand requirements are the operational schedules for the DoN’s fleet of nuclear-powered aircraft carriers. NST supports two major objectives:

- Facilitate the efficient, synchronized development of authoritative operational, maintenance, and training schedules for the DoN’s operational units and their assets.
- Facilitate the development of alternative courses of action (COAs) to explore the impacts of potential changes to operational commitments, training patterns, and fiscal constraints.

The NST project is a collaborative effort involving the F/A-18 and E/A-18G Program Manager (PMA-265), the Naval Air Systems Command (NAVAIR), and the Commander, Naval Air Forces (CNAF). The NST development team consists of ProModel Corporation for software design and development, SASI Defense Technologies for system integration, and the Center for Naval Analyses (CNA) for data analytics.
NST comprises three primary functional modules: the Master Aviation Plan (MAP) Module, the Airframe Inventory Management (AIM) Module, and the Administration Module. The MAP Module is the primary scheduling tool for all carrier-based squadrons. The AIM Module is the primary tool for airframe sourcing, airframe maintenance scheduling, and inventory health projections. The Administration Module facilitates the establishment and management of data and properties for system users, usage rights and permissions, security, policies, roles, and many other functions within the NST environment.

The main function of the MAP Module is to create the official MAP schedule, which is a set of spreadsheets that is produced semiannually and that details the squadron composition for each carrier air wing for approximately 10 years. The MAP schedule is the official source document for all squadron-level scheduling, and the most recent version supplants the previous version after approval by CNAF N00. The MAP Module of NST replaces the previous manual scheduling that was done by Commander, Naval Air Forces - Atlantic (CNAL) Force Readiness (N40).

The MAP Module concentrates on the development of carrier air wing and squadron schedules that balance the operational needs of CSGs with the training and maintenance requirements of squadrons. CSG operational requirements and squadron maintenance requirements are represented in NST via business rules based on CNAF practices. The MAP Module helps DoN leadership immediately understand the impact of each scheduling decision upon the availability of units and assets because the NST software immediately indicates scheduling conflicts.

The AIM Module is used to iteratively manipulate the airframe schedules with the goal of ensuring that F/A-18 squadrons are properly resourced throughout the future operational schedule. The AIM Module concentrates on the development of F/A-18 airframe sourcing to squadrons and on depot maintenance schedules. It imports the F/A-18 squadron operational and training schedules from the MAP Module, and it uses DoN requirements to determine squadron demands for airframe resources (i.e., the number of airframes and amount of airframe utilization) in each area of its schedule.
For a given set of squadron and airframe schedules, the AIM Module projects individual airframe utilization, and it ultimately projects when depot maintenance events will be required or when airframe end-of-life status will be reached, based on NAVAIR rules. It also displays the projected level of resources through the schedule in each squadron, comparing that level to documented requirements.

The Administration Module contains tools relevant to both the MAP and AIM Modules. It allows the user to make additions or changes to certain values, properties, or templates within the NST environment. For example, the user can add new locations and squadron types, or the user can modify the squadron-demand templates and the squadron events that are currently available.

Benefits of NST to PMA-265 and CNAF

The Naval Synchronization Toolset provides the infrastructure and fidelity to convert high-level operational demands into specific projections for the utilization of individual tactical aircraft, specifically for the F/A-18 aircraft. This capability enables aviation resource providers to plan and manage the assignment, maintenance, and modification of their assets more efficiently. Furthermore, NST more accurately projects, as much as 10 years into the future, the impacts on the fleet-wide aviation inventory that result from scheduled operational, maintenance, and training patterns. The projection of such impacts is a critical capability for management of the DoN’s fleet of aging aircraft in a constrained budgetary environment.

With NST, PMA-265 and CNAF can now readily view and manage schedules to plan, expedite, and facilitate the sourcing of airframes to squadrons, squadrons to air wings, and air wings to carriers. The resolution of scheduling conflicts is more readily achieved with NST. Moreover, PMA-265 and CNAF can set up proposed COAs in order to consider hypothetical (“what-if”) scenarios and to make more effective and predictive sourcing decisions in support of air-wing missions. Operational, maintenance, and training schedules can be better synchronized to achieve higher levels of readiness for air-wing units and assets. This synchronization achieves improved resource management, extended operational life spans of deployed aircraft, and smoothly coordinated, well-planned schedules for squadron and air-wing operations, airframe maintenance, and training to satisfy the requirements of the Naval Aviation Enterprise.

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NST functions and deliverable products include the following:

- Master Aviation Plan – a spreadsheet-based MAP that is air-wing specific
- Slider File – squadron schedules and carrier schedules
- Naval Message – summary of the dates of squadron Immediate Superior-in-Command (ISIC) changes
- NAVAIR Resource Allocation Management Program (RAMP) Update – airframe custody/maintenance schedules
- Airframe Inventory Report – summary of future airframe inventory based on scheduling, maintenance, and utilization projections

The Impact of NST on Navy Decisions

- Easier and faster sourcing of airframes to squadrons, squadrons to air wings, and air wings to carriers.
- Increased visibility of scheduling requirements, squadron or air-wing capabilities, and shortfalls associated with such requirements or capabilities.
- Increased visibility of potential conflicts and issues about schedules for carriers, air wings, and squadrons through the predictive analytic capabilities of NST.
- Increased visibility of current and future readiness and availability of units and assets.
- Increased visibility of critical shortfalls pertaining to units and/or assets.
- Greater ability, ease, and speed in conducting hypothetical (“what-if”) scenarios and course-of-action analyses on advance planning and schedules for required operations, maintenance, and training.
- NST technology gives leadership the capability to make better decisions, faster, while accounting for risk, constrained resources, and changes in operational requirements.
- NST facilitates the abilities of key stakeholders in the Naval Aviation Enterprise to visualize, decide, and execute.

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