Unleashing the Predictive Power of the Integrated Master Schedule

The Planning and Scheduling Excellence Guide (PASEG)

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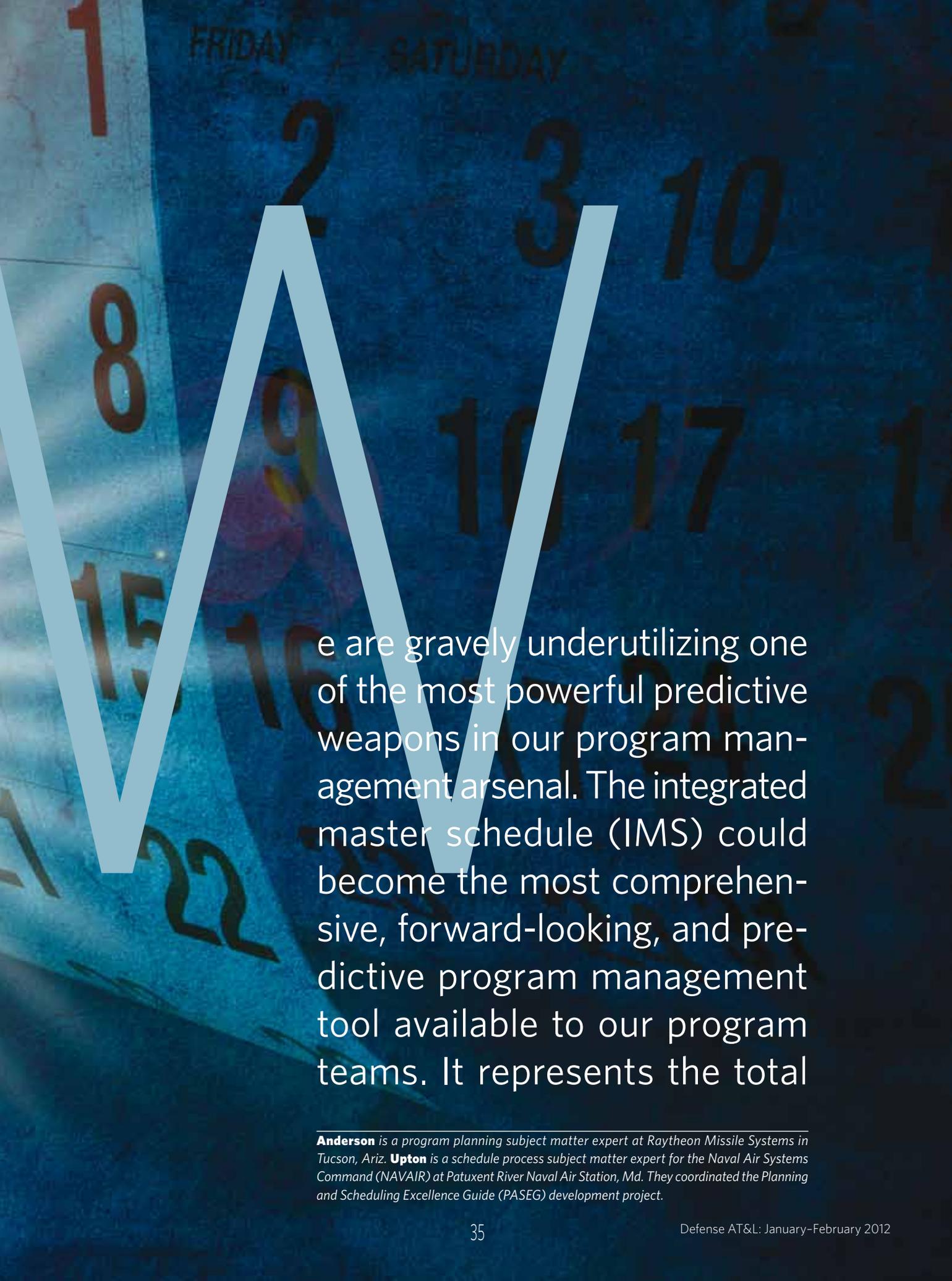
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e are gravely underutilizing one of the most powerful predictive weapons in our program management arsenal. The integrated master schedule (IMS) could become the most comprehensive, forward-looking, and predictive program management tool available to our program teams. It represents the total

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program roadmap for successful execution and is a key part of a program's management systems. Yet an IMS can only work when it is developed, maintained, and used effectively by the program team as a management decision tool instead of just as a report or deliverable.

But wait. We have earned value management (EVM), a method of managing programs with earned value processes. Do we need an IMS? Yes! After all, the IMS is the foundation of EVM. Certainly, EVM lets us accurately measure our performance and use analysis of past trends to predict future impacts. But to fully utilize EVM, there must be a sound earned value management system (EVMS) in place—i.e., internal management control systems that meet guidelines, ensuring that accurate information can be produced based on an IMS. So if we have an inaccurate and ineffective IMS, then our earned value data and decisions based on this data are also likely to be inaccurate and ineffective.

The IMS is underutilized for a variety of reasons. To a person unfamiliar with the process of schedule building and execution, an IMS can appear as a large and extremely complex network that can tend to confuse and frustrate program stakeholders more than aid them. To further complicate the situation, there are myths and inconsistent business processes throughout industry and government pertaining to the building and use of an IMS. Often, the program leadership teams treat the IMS only as a "reporting" vehicle and do not realize its true value as a predictive management tool. Additionally, there is a colossal gap in available resources skilled in the management and use of the IMS. All these factors drive the underutilization of the IMS, which plays a large part in the plague of program cost overruns and late deliveries.

the generally accepted scheduling principles (GASP), eight tenets for building, maintaining, and using schedules as effective management tools, to serve as the governance mechanism for the PPSS. Then using the GASP as a foundation, the PPSS enlisted the advice of 57 government and industry program planning subject matter experts to jointly develop the Planning and Scheduling Excellence Guide (PASEG).

Where Do We Start? The GASP

In the spirit of the generally accepted accounting principles, the PPSS opted to develop the GASP to serve as the governance mechanism for all PPSS products. The GASP is concise and easily understood, yet sets high expectations for program management teams to develop and use schedules. The first five GASP tenets describe the requisite qualities of a valid schedule; that is, one that provides complete, reasonable, and credible information based on realistic logic, durations, and dates. The latter three GASP tenets reflect increased scheduling maturity that yields an effective schedule. An effective schedule provides timely and reliable data, aligns time-phased resources, and is built and maintained using controlled and repeatable processes.

But How? The PASEG

Based on the foundational tenets established in the GASP, the PPSS utilized subject matter expertise from both industry and government entities and created the Planning and Scheduling Excellence Guide (PASEG). The PASEG provides the program management team, including new and experienced master planner/schedulers, with practical approaches for building, using, and maintaining an IMS. It also identifies knowledge, awareness, and processes that enable the user to achieve reasonable consistency and a proactive approach to program

Let's Do Something About It! The PPSS

The Industrial Committee on Program Management (ICPM) comprises program management leaders from both industry and government, as part of the National Defense Industrial Association (NDIA). In 2009, ICPM addressed underutilization of the IMS by chartering the Program Planning & Scheduling Subcommittee (PPSS). The PPSS initially created

Figure 1. Predictive Power—GASP Valid

Generally Accepted Scheduling Principles (GASP)			GASP Narrative
Valid	1	Complete	Schedules represent all authorized effort for the entire contract, with essential subcontracted or other external work or milestones integrated yet distinguishable from internal work. Level of Effort may be excluded from the IMS.
	2	Traceable	Schedules reflect realistic and meaningful network logic that horizontally and vertically integrates the likely sequence for program execution. Schedules are coded to relate tasks or milestones to source or dependent documents, tools, and responsible organizations.
	3	Transparent	Schedules provide full disclosure of program status and forecast and include documented ground rules, assumptions, and methods for building and maintaining schedules. Documentation includes steps for analyzing the critical paths, incorporating risks and opportunities, and generating schedule health and performance metrics.
	4	Statused	Schedules reflect consistent and regular updates of completed work, interim progress, achievable remaining durations relative to the status date, and accurately maintained logic relationships.
	5	Predictive	Schedules accurately forecast the most likely completion dates and impacts to the program baseline plan through valid network logic and achievable task durations from the status date through program completion.

planning, scheduling, and analysis.

Through the use of the concepts within the PASEG, program teams can start to realize the overwhelming benefit of using the IMS as a predictive management tool. The PASEG helps to decode and simplify the complexity of the IMS and offers recommendations for consistent business processes. It demonstrates how the IMS is much more than a "reporting" vehicle and gives realistic examples of how sound management decisions can be made through its use.

Figure 2. Predictive Power—GASP Effective

Generally Accepted Scheduling Principles (GASP)			GASP Narrative
Effective	6	Usable	Schedules produce meaningful metrics for timely and effective communication and tracking and improving performance, mitigating issues and risks, and capturing opportunities. Schedules are robust and functional to help stakeholders manage different levels, groupings, or areas as needed. Schedules are developed and maintained at a size, level, and complexity such that they are timely and enable effective decision-making.
	7	Resourced	Resources align with the schedule baseline and forecast to enable stakeholders to view and assess the time-phased labor and other costs required to achieve project baseline and forecast targets. Each program is unique and uses varying techniques to load, baseline, and maintain the time-phased resources at levels that are practical and produce meaningful and accurate projects. When resource-loaded schedules are used they enable flexible updates to resource requirements as conditions change. Whether or not resource-loaded schedules are used, cost and schedule data are integrated for internal and external reporting.
	8	Controlled	Schedules are baselined and maintained using a rigorous, stable, repeatable, and documented process. Schedule additions, deletions, and updates conform to this process and result in valid and accurate results for sound schedule configuration control and maintenance.

Wait—I'm a Manager, Not a Scheduler!

It's big. The PASEG is currently 194 pages. However, it is set up in a manner that facilitates an ease of use for all program stakeholders, from the program manager through the planner/scheduler. The guide is structured so that it can be read in its entirety or used as a reference document for targeted topics. There are chapters in the guide dedicated specifically to program management. Additionally, all chapters include an introductory "manager's view," which summarizes the chapter's content as it relates to program management.

To promote ease of use, each chapter was constructed using the same format and includes the following content: manager's view, description, examples, calculations, optional techniques, things to promote, things to avoid, and related topics. The table of contents is also hyperlinked to the chapters below to promote quick navigation between the various chapters.

OK, What's in This Thing Really?

The PASEG is made up of 61 separate chapters, including the appendices, which are grouped into the following 13 sections.

1. **Purpose & Scope:** Summarizes the overall guide content, layout, background, and recommendations for use.

2. **GASP:** Introduces the GASP tenets, describes its background, and provides recommendations for use.

3. **Leadership, Buy-in, & Commitment:** Covers managing using the IMS, the IMS as a tool (vice just a report), integration of management tools, and IMS related roles and responsibilities of program personnel.

4. **Schedule Architecture:** Includes IMS architecture (i.e. Work Breakdown Structure and Integrated Master Plan), schedule hierarchy (summary master, intermediate, and detailed), and top down vs. bottom up planning.

5. **Schedule Modeling Techniques:** Contains chapters on task naming, duration, relationships, lead/lag, constraints, milestones, summary lines and hammocks, level of effort, apportioned effort, and working calendars. Additionally, gives an overview of the schedule calculation algorithm and schedule margin.

6. **Cost & Schedule Integration:** Covers content on resource and non-resource loaded schedules.

7. **External Schedule Integration:** Includes integration of subproject and external schedules in addition to interface handoff milestones and schedule visibility tasks (SVTs).

8. **Horizontal & Vertical Traceability:** Contains content on horizontal and vertical traceability and includes a related chapter on task coding.

9. **Schedule Maintenance:** Includes status to "time now," forecasting, estimates at complete, baseline change maintenance, and rolling wave planning.

10. **Schedule Analysis:** Contains content on critical/driving path analysis, schedule health, incorporation of risk and opportunities, schedule risk assessments, Critical Path Length Index (CPLI), Schedule Performance Index (SPI), Baseline Execution Index (BEI), Current Execution Index (CEI), duration vs. scope based percent complete, and schedule rate charts.

11. **Business Rhythm & Submittal:** Includes IMS supplemental guidance, desktop procedures, submittal of IMS data, business rhythm, and program schedule reviews.

12. **Training:** Covers IMS related training for all program personnel including program managers and planning/scheduling professionals.

13. **Program & Contract Phase Considerations:** Describes scheduling in a production environment and considerations for proposal planning efforts.

How Do I Use It?

The PPSS recommends that the PASEG be used as a guide to assist both industry and government program stakeholders in the creation, maintenance, and use of integrated master schedules. We believe that the concepts in the PASEG will help programs realize the true value of the IMS as an invaluable program management tool.

Users of the PASEG can rest assured that it was jointly developed consistent with the IMS Data Item Description (DI-MGMT-81650), the E*arned Value Management Implementation Guide* (EVMIG), and developed to support compliance with the ANSI/EIA-748b Guidelines. The Defense Contract Management Agency (DCMA) was an integral part of the PASEG's content review board. Additionally, the PASEG was reviewed by the project lead developing the GAO's 10 scheduling best practices.

Where Do I Get It?

The PASEG is available as a free download on the ICPM website: http://www.ndia.org/Divisions/IndustrialWorkingGroups/IndustrialCommitteeForProgramManagement/Pages/default.aspx

Hey, I Have Something to Add!

Great! The PPSS' objective is to continue to evolve the PASEG over the next year and is accepting content related change requests from the general public. The process for submitting change requests is also resident on the ICPM website referenced above.

Unleashing the Power

The PPSS is extremely happy to offer this jointly developed tool for use across the industry and government ranks. We believe that by unleashing the predictive power of the integrated master schedule, through the concepts outlined in the PASEG, programs will have a better chance of meeting their cost and schedule objectives. The positive impact of effectively using the IMS will undoubtedly improve the performance and execution of acquisition programs in direct support of the Better Buying Power Initiative.

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