

S3107: Monthly Status Report (MSR) Guidance

Version: Basic

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Note: The official version of this document is maintained in IV&V's internal IV&V Management System Website (<https://confluence.ivv.nasa.gov:8445/display/IMS>). This document is uncontrolled when printed.

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Purpose

The purpose of this document is to provide guidelines to the NASA Independent Verification and Validation (IV&V) Project Managers (PMs) for developing, reviewing, and distributing the NASA IV&V Program Monthly Status Report (MSR) to IV&V stakeholders.

Scope

The scope of this supporting document is the MSRs developed for the IV&V Office (IVVO) Projects.

Background

The MSR is a mechanism used to convey IV&V program and project status to stakeholders throughout the NASA IV&V Program, NASA and within the Projects being supported. Stakeholders are notified by email of monthly updates to the MSR content, around the middle of each calendar month. The information contained in the MSR covers status up to the end of the prior month and is intended for NASA Internal Use Only. External stakeholders are requested not to modify or distribute the MSR in its entirety and/or any portion thereof without requesting permission directly from the NASA IVVO Lead and/or NASA IVVO Deputy. No CUI information should be included in the MSR.

Stakeholders can access the published versions of the MSR content from the OSMA portal: <https://IV&V.sharepoint.com/sites/OIV&V-IVV/IVVReporting>

Individuals responsible for updating the MSR content can access the latest working draft from the following link: <https://nasa.sharepoint.com/:f:/r/teams/IVVOPMTeam/Shared%20Documents/General/Reporting?csf=1&web=1&e=bomm94>

A best practice is to only make updates in the macro-enabled version of the file only when necessary. Experience has shown that when more than one user is making updates, there is higher likelihood for collisions that prevent saving if one or more user is using the macro-enabled version. In addition, the macro-enabled version is less user friendly for undo's.

There are multiple tabs in the spreadsheet, and status is reported in various levels of granularity (e.g., dashboards vs. Project specific) depending upon the audiences' time available to review the information and whether they require more details. Reporting in the MSR should be simple, understandable, repeatable, and consistent across the program, especially about reporting risks or potential risk. At the Project level, status is assessed for the following:

- Assessment of Development Project Software
- Issue Resolution
- Accessibility
- Risks

Assessment Philosophy

In its simplest form, the MSR dashboard conveys status using the simple “stoplight” colors (Green/Yellow/Red) with the following definitions:

- “Green” = No/Minimal Concerns
- “Yellow” = Moderate Concern(s)/Challenge(s)
- “Red” = Major Concern(s)/Challenge(s)
- “N/A” = Not Applicable (If “N/A” is used, a note should be included to explain why the status is not applicable)

Start with Green – All assessment areas should be understood for what characteristics constitute a “Green” assessment. All projects and all assessment areas should start in a “Green” condition initially with the goal being to ultimately return to that status.

Escalation/De-escalation – Guidelines and criteria defined in this supporting document will determine what constitutes a change in the assessment from a “Green” to “Yellow” as well as “Yellow” to “Red” status and vice versa. Avoid assessments that make it impossible to go back to a “Yellow” or “Green” status. “Green” indicates there are “No/Minimal Concerns” and no potential risks, but that doesn’t mean you cannot express concerns or other topics with your POC in the project reporting page, in fact, it is encouraged to communicate.

Timed Insight/Indicators – Status should give decision makers an opportunity to understand the impending risk before it becomes necessary for them to act and before impacts of the risk are unavoidable. No one likes surprises, so this gives project members a chance to address the risk before going “Red”

Guidelines Not Rules – Some criteria are provided for consistency across the program; however, there will always be exceptions to the rule, and the criteria should be considered guidelines and/or examples of the most common reasons to escalate the assessment to Yellow or Red and they should be considered. Any one-off conditions will require more extensive explanation by the IV&V project making the case.

Constantly Blinking Lights are Ignored – The dashboard at the mission levels will display information to make stakeholders aware of the impending or identified risks in each assessment category, but once those risks are captured and communicated, the assessment category should return to Green so that stakeholders can be alerted to any future changes. Similarly, staying in a “Yellow” state may also get ignored eventually, so consideration should be given to limiting the overall length of time in the “Yellow” state to no longer than 3 months as a guideline.

Guiding Principles and Considerations

The following information is intended to provide NASA PMs with some general guiding principles and considerations to apply when determining how to populate the content of the MSR. Best practices, experience, and engineering judgment should be used along with specific knowledge of a project to subjectively interpret and apply these principles to ensure the content is conveyed appropriately to a given project’s stakeholders.

Primarily and foremost, consider the audience for the reporting and what information they are interested in receiving and in the most efficient manner. Monthly status checks by some stakeholders may only allow for a limited amount of time per project, so it is imperative that only projects that require attention will receive attention and that those areas that do require attention are getting as much as needed. Also consider the reason to report status to stakeholders and management – because they need to make informed decisions. They need to take action, or they need to accept the residual risk, outcome, etc. or monitor the situation closely. Accordingly, the MSR should be used to convey status that requires a decision or action, and this implies Decision Authority (DA) (and Technical Authority (TA)) needs to be informed on the risk. The MSR therefore will be risk-centric and the status of said reporting will impart the level of risk in each assessment area. Risks usually grow over time and indicators of risk can be observed and used to warn stakeholders of the growing or receding risks.

The following are some specific principles to consider when filling out the MSR:

- Keep the rationale brief, concise and to the point - Consider the amount of time required to read/digest the associated rationale
- The project-level data is likely to be consumed within IV&V and/or by the Project; the overall assessment of project software (rating – G/Y/R) and supporting text will be conveyed at higher levels to other customers/stakeholders outside of IV&V, i.e., OSMA, SMD, HQ, NASA Office of JPL Management and Oversight (NOJMO), etc.
- Consider what you want the audience to get out of the assessment – are you providing information, are you asking for assistance, are you requesting a decision to be made, etc.
- Consider the current month in view of the previous month and ratings for the overall trending for the 6-month time period
- Consider the current month and following month(s) when assessing the potential trending for the next month, holding steady (denote by sideways arrow, ⇌), increasing (denote by upward arrow, ↗) or decreasing (denote by downward arrow, ↘)

- Consider where the project is in the lifecycle - did they just complete a milestone, are they coming up to a milestone, is their specific entrance/exit criteria to be considered, etc.
- Consider the totality of the content on the dashboard when providing an assessment of the project software – does the information presented support the chosen assessment color – G/Y/R
- Consider how you delineate “Software” for your project and if the assessments for Issues, Risks, and Accessibility at lower levels (e.g., Lander Bus, Payload, Ground Segment) are consistently applied and ‘roll up’ consistently with overall assessment of all project software
- Ensure that the rationale directly supports the assessment, i.e., “Green” (no/minimal concerns), “Yellow” (moderate concern(s)/challenge(s)) or “Red” (major concern(s)/challenge(s))
- Start with an assessment of “Green”, with the goal to return to that state if there is a need for escalation
- Ensure that the approach for de-escalation is clearly understood when communicating rationale for an assessment
- Consider the value of remaining in a “Yellow” or “Red” color for an extended period of time – does it lose its impact/value/attention
- Consider the length of the project development and adjust time limits accordingly, e.g., for an extended project life, the time limits may need to be extended as well to allow sufficient time for adjudication of technical issues, risks, concerns, etc.

Reporting Details:

This section outlines the reporting details such as Audience, Frequency, and Format.

Roles and Responsibilities:

The following roles and responsibilities are identified to build and maintain the MSR Dashboard

- MSR Dashboard/Process Owner (“Owner”) – Referred to simply as “Owner”, currently this role falls on the IVVO Lead. Owns the MSR Dashboard, process and supporting document.
- MSR Dashboard Reviewer (“Reviewer”) – Currently this falls on the IVVO Deputy. Reviews the content that is populated for the current month to ensure completeness and consistency.
- MSR Dashboard Administrator (“Admin”) – Maintains the dashboard and associated scripts/macros that support generation of the MSR Dashboard.
- MSR Dashboard Contributor PM (“PM”) – Completes the population of the project-level and higher-level dashboard content on a monthly basis. IVVO Project PM and or DPM; can be delegated to or assisted by the Project Lead (PL).
- Internal/External Stakeholder – The audience for the MSR dashboard. Any requests to change or add content should be provided to the MSR Administrator and the MSR Dashboard/Process Owner.

Audience:

The audience for the MSR is extremely varied and can change over time. This list should not be viewed as mutually exclusive or all encompassing. Expect the MSR to reach all parts of the agency.

Internal (to NASA IV&V) stakeholders

- IVVO Leadership
- SSO Leadership
- Senior Leadership
- Contractor Management

External (to NASA IV&V) stakeholders

- NASA HQ Representatives
- GSFC Management
- OSMA Management
- Project IV&V POCs
- Project Management
- NOJMO Representatives
- SA Tech Fellow
- FFRDC POCs
- Center POCs
- MDAAAs (SMD, MSD, ESDMD, SOMD)
- NSC POCs

Frequency:

The MSR information will be available continuously; however, the frequency of the information updates is monthly as the name suggests. A snapshot of the MSR data will also be preserved each month such that historical information will be available to the stakeholders.

The MSR Dashboard content can undergo revision at any time past its prior delivery; however, the formal start of internal IV&V revisions is with the capture of TIM metrics. All status and assessments should be reflective of the period leading up to the capture of the TIM Metrics for consistency. PMs will then have a period to input/update their respective Project information prior to the start of a peer review carried out by the Owner and the Reviewer. The Admin will then roll up and correct any formatting errors, prior to the formal submission/delivery by the Owner. The following table captures the relevant dates and periods.

- TIM Metrics Capture: 1st of the month
- Project Information Update: 1st – 7th of the month
- Project Review and Update: 8th -13th of the month
- Dashboard and Portfolio Update: 14th of the month
- Owner Review and Delivery: 15th of the month

Note: The MSR Dashboard will be available in the middle of the month to reflect status consistent with the close of the prior month. For example, the May MSR will be available from May 15th through June 15th and will contain information/status up to and including April 30th.

Format/Content:

The MSR Dashboard is a macro-enhanced excel file where information is entered in a single location and rolled up and reported in different views. The file is located on SharePoint to enable concurrent editing and viewing of the file by multiple users. Please ensure that the file is opened in the Desktop mode to properly enable macro functionality.

There are multiple tabs within the MSR Dashboard. Below is a brief description of the content on each of those tabs – subsequent sections of S3107 provide additional details.

- Read me – Brief overview/introduction to the MSR
- IV&V Portfolio – Listing of all NASA projects currently receiving IV&V services from the NASA IV&V Program, including date of first engagement by IV&V and dates for project milestone reviews
- IV&V Dashboard (External) – Six-month view of the IV&V assessment of in-scope software for all NASA Projects currently receiving IV&V services from the NASA IV&V Program, including rationale supporting current assessment, name of NASA IV&V Project Manager (PM), and next project milestone review
- IV&V Dashboard (Internal) – Same as “IV&V Dashboard (Ext)” tab with the addition of the current IV&V Assessment for Issue Resolution, Risks, and Accessibility
- TIM Metrics – Contains the TIM Metrics for all projects that are currently part of the IV&V Portfolio.
- *Projects* – Each project receiving IV&V services from the NASA IV&V Program has an individual tab with the following content:
 - IV&V assessment of in-scope project software for 6 prior months Status of IV&V analysis activities across the software development lifecycle (Concept through Test),
 - Status of IV&V assessment of issue resolution, risks and accessibility,
 - Status of IV&V-identified technical issues (including 6-month burndown and metrics on Severity 1-3 TIMs),
 - Summary of IV&V risks, IV&V watch items, and project-identified risks
 - Listing of project milestone reviews.
 - Listing of acronyms used for a given month

IV&V Portfolio Tab - Mission Coverage

This page serves as a “home page” for the MSR Dashboard. The tab contains a listing of all NASA projects currently receiving IV&V services from the NASA IV&V Program, including date of first engagement by IV&V and dates for project milestone reviews.

Table 1: Sample Mission Coverage

NASA Internal Use Only - Do Not Download or Distribute																			
Project/ Milestone	IV&V Engagement	MCR	SRR	SwRR	MDR	SDR	PDR	CDR	PRR	SIR	TRR	SAR	PER	PSR	ORR	FRR	SMSR	LRR	Launch
SOMD																			
ISS																			
ESDMD																			
Artemis Integration	10/1/2012									5/31/2023					4/20/2024	11/15/2024	11/13/2024		11/23/2024
EGS 2012			1/11/2012				1/15/2014	10/6/2015		12/6/2017					4/1/2024	11/7/2024	11/13/2024		11/23/2024
Gateway	7/11/2019		11/18/2019				11/29/2021	10/15/2023											
HLS							11/7/2022	8/31/2024											12/31/2025
MCC																			
Orion	10/1/2012		3/2/2007				7/8/2014	10/21/2015		11/15/2016					4/15/2024	11/18/2024	11/15/2024		11/23/2024
SLS	2/15/2012		2/15/2012				5/15/2015									11/11/2024		11/11/2024	11/23/2024
SMD																			
Dragonfly	8/11/2020		8/11/2020				2/21/2023	3/25/2024		5/14/2026			7/28/2026	12/26/2026	3/21/2027	5/19/2027	5/10/2027	6/15/2027	6/20/2027
Europa Clipper	10/15/2015		1/10/2017				8/20/2018	12/18/2020		11/15/2021				4/12/2024	7/30/2024	TBD	TBD	TBD	10/10/2024
Mars Sample Return ERO	8/1/2021		7/12/2022				10/17/2023	6/11/2024		11/17/2025				8/12/2026				10/12/2027	10/12/2027
Mars Sample Return SRL	8/1/2021		7/12/2022				10/17/2023	6/11/2024		11/17/2025				7/1/2027				6/20/2028	6/22/2028
Psyche	2/8/2018		4/18/2018				1/11/2019	5/11/2020		12/8/2020				4/14/2022	7/25/2023	10/2/2023	9/5/2023	10/3/2023	10/5/2023
RST	4/27/2017		2/21/2018				10/28/2019	9/20/2021		6/25/2024			1/8/2025	3/2/2026				10/30/2026	5/1/2027

The MSR Dashboard Owner maintains the recent, current, and future list of Missions and Projects. The Project Milestone Lifecycle information (i.e., dates) is maintained by each project in their respective Project tab. Currently, the Portfolio page is updated from information captured in the Project tabs and using macros/scripts maintained by the MSR Admin.

Each project name listed is a hyperlink to the respective Project tab of the same name.

IV&V Dashboard (Ext) Tab

This tab contains a six-month view of the IV&V assessment of in-scope software for all NASA Projects currently receiving IV&V services from the NASA IV&V Program, including rationale supporting current assessment, name of NASA IV&V Project Manager (PM), and next project milestone.

Table 2: Sample IV&V Dashboard (External)

NASA Internal Use Only - Do Not Download or Distribute										
May-23										
	PM	SW Assessment						Next Milestone	Rating Rationale	
		Dec	Jan	Feb	Mar	Apr	May		SW Assessment	
SOMD										
ISS	Raju Raymond	G	G	G	G	G	G →	X2_R22 STRR - 10/05/2023	Overall assessment remains green. IV&V coordinated with ISS Safety and Mission Assurance, Flight Operations Directorate, Engineering, and the developer to ensure that the timing delay increase that was introduced by an Internal Thermal Control System software change to avoid false leaks was not too long (i.e., allowed too much water to leak, posing a shock hazard) in a real leak scenario. Due to IV&V coordination, the teams reached consensus that the implementation of this change met safety requirements and mission needs. Additional significant results from this action include uncovering and correcting a software development process error where Engineering (Thermal) was not being included on requirements changes affecting their subsystem.	
ESDMD										
Artemis Integration	NA	G	G	G	G	G	G →	SIR - 05/31/2023	Overall assessment remains green for integration. Integration artifacts for Artemis II are mature, and artifacts for Artemis III/IV are on a good path moving forward. IV&V Teams are maintaining awareness of changes. R-655 communicated to note IV&V's concern of lack of ICPS artifacts, leveraging Artemis I data. This month, Artemis IV&V attended the Integrated Avionics and Software Integrated Task Team F2F at KSC from 4/11/23-4/13/23 to provide IV&V status and gain understanding of integration related progress, risks and challenges.	

The information within this dashboard is entirely pulled from the corresponding Project tab. The text for each rationale for that assessment will be pulled and populated from the Project tab. Each project listed in the dashboard is a hyperlink to the respective Project tab of the same name.

If an assessment for any criteria for a Project is non-Green, an additional hyperlink will be included following the rationale to allow the user to navigate directly to the Project tab to review details of the assessment.

IV&V Dashboard (Int) Tab

This tab contains the same information as "IV&V Dashboard (Ext)" tab with the addition of the current IV&V Assessment for Issue Resolution, Risks, and Accessibility along with a summary rationale.

Table 3: Sample IV&V Dashboard (Internal)

NASA Internal Use Only - Do Not Download or Distribute															
May-23															
	PM	SW Assessment						Next Milestone	Rating Rationale			IV&V Assessment			
		Dec	Jan	Feb	Mar	Apr	May		SW Assessment			Issue Resolution	Risks	Accessibility	
SLS	Roger Harris	G	G	G	G	G	G →	MIR - 05/31/2023	The SLS Assessment remains green for May, and overall development is on track for Artemis II. IV&V is performing test analysis in phase with the developer's effort on TRR 2.0 and 2.1. Unexpected changes to FCAS are causing delays to ECAS development. Updating FCAS TIMs based on feedback from the PR Process, which is now required for any requirements changes. AFTU Static Code Analysis being performed on-site at Boeing.			G	G	G	
Dragonfly	Chad Ollila	G	G	G	G	G	G →	CDR - 03/25/2024	Overall assessment continues to be Green. Development is on track and the Developer is working to address IV&V findings, having closed 18 TIMs within the last month. There are no open risks or watch items and IV&V's relationship with APL is very amicable and cooperative. IV&V continues to monitor changes to the requirements and there are no open major issues.			G	G	G	
Europa Clipper	Charles Broadwater	Y	Y	Y	Y	Y	Y →	PSR - 04/12/2024	Assessment of Development Project Software - maintained Yellow rating: Bulk Data Storage (BDS) development is behind but continues to make progress. A new point release was introduced, scheduled 6/8/23 (TBC), following the slip of R10.3 from 7/1/23 to 9/6/23 (TBC) last month. This adds to the growing concerns with V&V schedule. Project is tracking risks 981, 1146, 1125 (see lower right quadrant) that also reinforce V&V concerns.			Y	G	G	Go to Europa

The information within this dashboard is entirely pulled from the Project specific tab. The text for the rationale for that assessment will be pulled and populated from the Project tab. If an assessment for any criteria for a Project is non-Green, a hyperlink will also be included to allow the user to navigate directly to the Project tab to review details of the assessment.

TIM Metrics Tab

The TIM Metrics Tab contains a table of TIM Metrics data that users can observe status across the entire portfolio. This includes metrics on the Open, Resolved, and Project Accepts Risk (PAR) TIMs broken down by severity.

Table 4: TIM Metrics Table

		Open TIMs			Resolved TIMs		Residual Risk	TOTALS	Severity				
		Submitted	In Dispute	TBV	NTBV	Closed			PAR	1	2	3	4
SOMD	ISS							0					
ESDMD	Artemis IV&V							0					
	EGS							0					
	Gateway							0					
	HLS							0					
	MCC							0					
	Orion							0					
SMD	SLS							0					
	Dragonfly							0					
	Europa							0					
	Mars Sample Return							0					
	Psyche							0					
	RST							0					
NASA Internal Use Only - Do Not Download or Distribute													

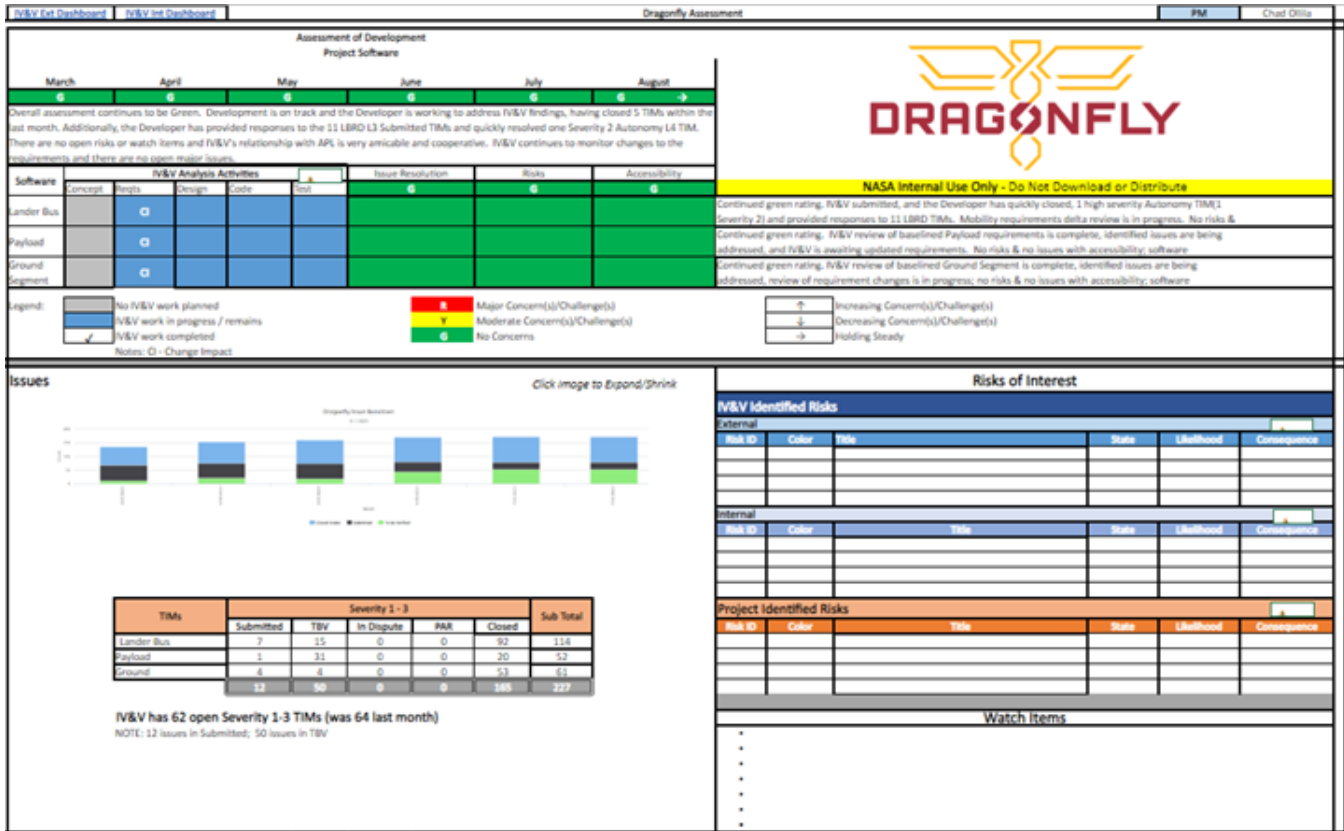
The information in this tab is updated by the MSR Admin.

Project Tab - Assessment Dashboard

Each project receiving IV&V services from the NASA IV&V Program has an individual tab with the following content:

- Project Name, Image/Patch, IV&V Start Date and current IV&V PM
- IV&V assessment of in-scope project software for 6 months (current + 5 prior months)
- Status of IV&V analysis activities across the software development lifecycle (Concept through Test)
- Status of IV&V assessment of issue resolution, risks and accessibility
- Status of IV&V-identified technical issues (including 6-month burndown and metrics on Open Severity 1-3 TIMs)
 - Note: Some scenarios may require additional clarification or text relating to TIM data, added under the TIM Table.
- Summary of IV&V risks, IV&V watch items, and project-identified risks
- Listing of project milestone reviews and dates (if known)
- Acronyms

Table 5: Project Tab - Assessment Dashboard



Each IV&V Project will maintain one Project tab Assessment Dashboard and will maintain a breakdown of the dashboard for each mission as applicable (For example Orion – Artemis I, and Orion - Artemis II). Each Project will decide how to delineate the various pieces (elements, capabilities, components, etc.) of their project and how those pieces are associated with one or more missions. For example, MSR may choose to have a line item for MAV, CCRS, SRL, and SRH. Whereas another Project, e.g., Psyche may choose to simply list Psyche FSW. That decision is up to each PM.

Project Reporting Aspects and Criteria:

This section details the Reporting Aspects and the criteria used to select the corresponding reporting color.

Assessment of Development Project Software

The Assessment of Development Project Software is an overall, high-level assessment of the software for the entire project. Considers programmatic (schedule, costs, staff, etc.) and technical (issues, risks, quality, completeness, correctness, security, etc.) factors. It should be approximately 2-3 sentences that describe the assessment for the current month. Think of an elevator speech for the software, with intended audience to be project manager and up (IVV SL, OSMA, NOJMO, SMD, HQ). Trending arrows allow for indication of what direction things are moving in future months – holding steady, increasing concerns/challenges, or decreasing concerns/challenges.

The Software Development Assessment for a given project is determined by two main factors: 1) Programmatic Status (e.g., Development Schedule) and 2) Technical Status. Each IV&V project will determine the Software Development Assessment for each Software Component shown in their Project dashboard, based on Issue Resolution, Risk, and Artifact Accessibility, as well as an overall assessment for their project.

Given the tight space on each project dashboard, the two criteria are assessed and reported in a single field rather than being captured separately. It will be important to note the reason (e.g., the number of issues or a delay in schedule) in determining the escalation of status from "Green" to "Yellow" or "Red", etc.

Fundamental Question Being Addressed: How is each component of the system/software fairing? (consider Quality, Completeness, Correctness, Safety, Security, and Timeliness) How much more work is left to go?

Why Technical Authority/Decision Authority (TA/DA) would care? – If the software or portions of the software are not meeting certain technical checks, then there is likely to be downstream impacts. Is it on track? (Schedule). Is it performing as intended (Assured). Is there any waste?

How do we track technical development? - TIMs/Counts – There is a “normal” amount or spread of TIMs of each Severity. An excessive number of TIMs can speak to quality of the development (or may just speak to the complexity of the problem.) This needs to include both open and closed TIMs because TIM aging is already addressed, and open items are transient. Sev 1/2 TIMs usually address safety concerns for assets and lives; however, risks may need to be written for processes, procedures, or policies that do not directly correspond to products under review or have a specific TIM.

Programmatic – Maintaining schedule, staff, and funding to meet commitments of Incorporating Requirements/capability into the releases per the plan. (i.e., the need to burn down the requirements)

Table 6: Software Development Assessment Color-Coding Criteria

Color	Collective/Suggested
<i>Green</i>	<p>Programmatic:</p> <ul style="list-style-type: none"> • On Schedule <p>Technical:</p> <ul style="list-style-type: none"> • TIM counts are in the norm • No/minimal Safety or Security concerns
<i>Yellow</i>	<p>Programmatic:</p> <ul style="list-style-type: none"> • Software schedule is slipping (% of margin available) to the right, but not on critical path OR <90% of implementation, verification targets achieved per plan for >90d. <p>Technical:</p> <ul style="list-style-type: none"> • TIM counts exceed Sev-4 and Sev-3 norms, OR Sev-3 PAR TIMs exceed threshold OR Sev-1/2/3 TIMs In-Dispute >30d (for technical reasons as opposed to staff) • Safety/Security Concern Identified
<i>Red</i>	<p>Programmatic:</p> <ul style="list-style-type: none"> • Software schedule is slipping to the right, and is now on critical path OR <90% of implementation, verification targets achieved per plan for >180d <p>Technical:</p> <ul style="list-style-type: none"> • TIM counts exceed Sev-1 and Sev-2 norms, OR Sev-1/2 PAR TIMs exist OR Sev-1/2/3 TIMs In-Dispute >90d (technical) • Safety/Security Risk Identified

IV&V Analysis Activities:

The status of the IV&V analysis activities is performed by each IV&V project through one or more SW Component entries indicating the progress by phase of lifecycle development. The breakdown for the IV&V project can be per capability, entity, or sub-entity as desired. The only restriction is that the breakdown needs to fit within the space allocated (nominally a limit of 7). An example is shown in the following figure. The NASA PM can use discretion to provide additional content to describe the progress by phase, e.g., using terms like “CI” to indicate Change Impact analyses being performed or “N/A” to indicate that a particular phase is not applicable. If used, these terms should be added as “Notes” in the Legend.

Software	IV&V Analysis Activities				
	Concept	Reqs	Design	Code	Test
FCAS	Blue	Blue	Blue	Blue	Blue
RS-25	Grey	Grey	Grey	Grey	Grey
ICPS	Grey	Blue	Grey	Grey	Blue
DOLILU	Grey	Grey	Grey	Grey	Grey
RINU	Grey	Grey	Grey	Grey	Grey
Security	Grey	✓	Grey	Grey	✓




Legend:		No IV&V work planned
		IV&V work remains
		IV&V work completed

Figure 1: Software Component Status

NOTE: The IV&V Analysis Activities status information is not rolled up into subsequent views of the mission. Also, note that the current color-coding scheme does not describe the type of development approach under use (e.g., waterfall, incremental, agile, or iterative). Be sure to provide clarification in the free-form field in project page.

In addition to specifying the status of IV&V analyses per software component, the Project Status also includes a free-form text field per software component to describe rationale of any areas that are not green or to provide any other type of clarification.

Issue Resolution

Issue Resolution is an overall assessment of state of resolution of submitted issues to the developer. Consider how many have been submitted, how many are currently open, what severity the TIMs are, how long have the TIMs been open, is there a plan towards resolution/burn-down, what is 6-month trending showing, is there a milestone coming up, etc. A high-level, qualitative assessment is acceptable given that the lower left-hand portion of the dashboard will include trending for the past 6 months and a snapshot of TIM metrics for the current month. Use that data to formulate the assessment. Capture the 2-3 sentence assessment in the text box. The color coding in the Issue Resolution field is only applicable to the TIMs in that domain and does not consider developer issues.

This area is focused on the resolution of IV&V TIMs primarily, but there is potential for the developer's ability to address all issues within the schedule. Staffing and effort needs to not only add functionality but address any that isn't fully developed or working as intended.

Fundamental Question Being Addressed: Are the issues going to be addressed with the current trajectory and in time for their need (consider timeliness with regards to upcoming milestone)?

Why TA/DA would care? – If the current trajectory (staffing, resources, priority) is not in place to address the issues that IV&V or others find, then there is certainly a potential for the software/system development and the project in general to exceed any available margins and blow past any milestones.

How do we measure/track Issue Resolution?

- TIMs: TIM Aging – days in each state (Submitted, TBV) (Project Specific Fields: "Resolution Target")
- Engineering Change Requests (ECRs)/etc. – Total counts (Open vs Closed) – if the number keeps growing and doesn't converge.

Table 7: Issue Resolution Color-Coding Criteria

Color	Collective/Suggested
<i>Green</i>	<ul style="list-style-type: none"> No "Aging" TIMs
<i>Yellow</i>	<ul style="list-style-type: none"> >50% of Sev-1/2/3 TIMs Submitted/TBV >90d Any Sev-1/2/3 TIMs In-Dispute >30d Developer/Project Issue (ECRs, DCRs, PFRs, etc.) Discovery is outpacing Resolution >90d
<i>Red</i>	<ul style="list-style-type: none"> >50% Sev-1/2/3 TIMs Submitted/TBV >180d Any Sev-1/2/3 TIMs In-Dispute >90d Developer/Project Issue (ECRs, DCRs, PFRs, etc.) Discovery is outpacing Resolution >180d

Risks

Risks is an overall assessment of the risk profile, including IV&V-identified internal and external risks. The PM should first populate/update the Risks of Interest displayed in the lower right-hand portion of the dashboard. The goal is to utilize the risks portion to highlight significant risks that drive impactful change within the IV&V project or for project work. Consider how many risks, what state, what LxC, what is sunrise/sunset, how long been open, are they being mitigated, were they accepted by Project, etc. A high-level, qualitative assessment is acceptable given that the lower right-hand portion of the dashboard will include a listing of explicit risks and watch items for the current month. Use that data to formulate the assessment. Capture the 2-3 sentence assessment in the text box.

It is expected that for the other categories of assessments, that once that category reaches a "Red" status, a risk will be written, and this will in turn cause the Risk category to be populated with the corresponding risk information.

Fundamental Question Being Addressed: Do risks exist which require mitigation and awareness (beyond the project's Risk Management system and actions)?

Why TA/DA would care? – The impact can vary depending upon the risk and usually corresponds with one of the other categories of the MSR reporting. This section should also include risks which are not captured in other reporting categories.

Table 8: Risks Color-Coding Criteria

Color	Collective/Suggested
<i>Green</i>	<ul style="list-style-type: none"> No Open, External, Yellow or Red Risks
<i>Yellow</i>	<ul style="list-style-type: none"> Open, External, Yellow Risk(s) and No Open, External Red Risk(s)
<i>Red</i>	<ul style="list-style-type: none"> Open, External, Red Risk(s)

Accessibility

Accessibility is an overall assessment of timely access to artifacts, systems, tools, personnel, meetings, etc. If any of these are impacting ability to plan, execute or complete IV&V work, this should be considered. Significance of impact will drive color – "Yellow" or "Red". Also consider efficiency of access – are we able to efficiently access and utilize systems, tools, artifacts, people, meetings, etc.? Capture the 2-3 sentence assessment in the text box.

System software information includes contract specified deliverables as well as interim products and non-deliverable items which are developed or maintained while developing systems or software.

Fundamental Question Being Addressed: Is IV&V able to access the information effectively and efficiently it needs in a timely manner so as not to disrupt the planned effort?

Why TA/DA would care? – Without access to information used in the development of the systems and software, IV&V cannot perform its intended function – to provide TA/DA with insight into risk. It is likely that other stakeholders within NASA are also being withheld from performing oversight or gaining insight.

Table 9: Accessibility Color-Coding Criteria

Color	Collective/Suggested
Green	<ul style="list-style-type: none"> No Accessibility Problems
Yellow	<ul style="list-style-type: none"> Artifact/Resource(s) not available to IV&V within 14d of delivery to other NASA stakeholders (been 14d since requested by IV&V) Artifact/Resource(s) incomplete or unusable in delivered format - IV&V investigating workaround
Red	<ul style="list-style-type: none"> Artifact/Resource(s) is not available to IV&V within 30d of delivery to other NASA stakeholders (been >30d since requested) Artifact/Resource(s) incomplete or unusable in delivered format - IV&V has no workaround

NOTE: Each SW Component should be assessed and captured individually as well as one rolled-up project assessment.

Issues (Burndown):

The issue burndown illustration is generated by the PM based upon the TIM Metrics. The tabular data below the burndown is not automatically populated and is intended to capture Severity 1-3 TIMs in the respective states for each of the areas listed in the dashboard above.

Each project will capture the number of open Severity 1, 2, and 3 TIMs against each SW Component in their Project Dashboard. This count information is related to but does not directly correspond with the Issue Resolution assessment, because it does not also show the age of those TIMs.

Fundamental Question Being Addressed: Where are most open issues residing and is the number abnormal? (This is for the project's own internal information on what areas need attention more so than for stakeholders beyond the project level.)

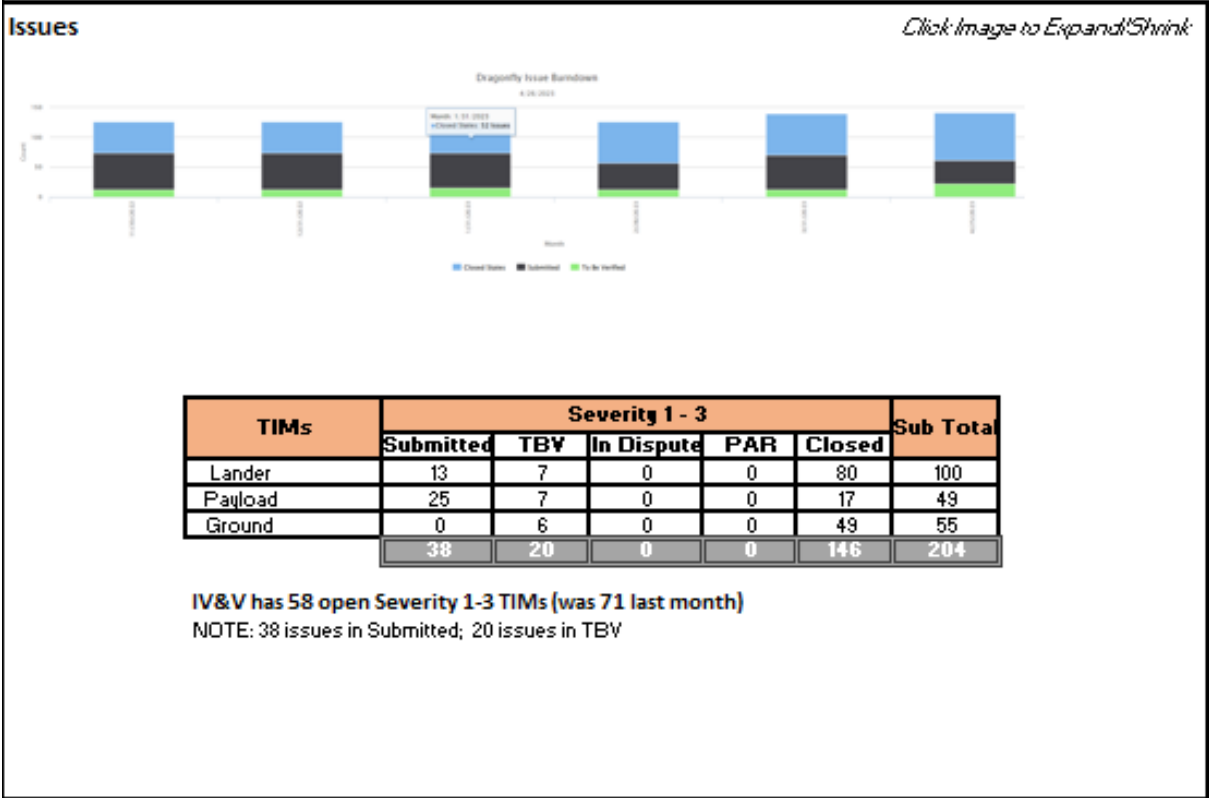


Figure 2: Sample Open Issues Project Reporting

Risks of Interest

Risks of Interest includes internal and external IV&V-identified risks, IV&V watch items, and Project-identified risks. The risks to be displayed in the lower right-hand portion of the dashboard is at the discretion of the PM. Data from Risk Manager should be utilized to manually populate the fields for Risk ID, Color (select G/Y/R color), Title, State, Likelihood, and Consequence. IV&V watch Items are items that are not formal risks, but may be areas of concern, challenge, potential risks, etc.

Risks of Interest					
IV&V Identified Risks					
External +					
Risk ID	Color	Title	State	Likelihood	Consequence
R-605	Y	Backlog of Sev-2 and 3 TIMs Impacts	External	3	3
Internal +					
Risk ID	Color	Title	State	Likelihood	Consequence
Project Identified Risks					
Project Identified Risks +					
Risk ID	Color	Title	State	Likelihood	Consequence
981	Y	Aggregate: Execution of the Overall Project V&V	Mitigate	3	3
1146	R	Staffing Impacts due to JPL Workforce Shortfalls	Mitigate	3	5
1125	R	Significant Schedule Delay during ATLO at JPL –	Mitigate	5	3
Watch Items					
<ul style="list-style-type: none"> • • • • • • • 					

Figure 3: Sample Risks of Interest

The Risks section of the MSR should focus on risks that have not been mitigated, closed, or adopted by the project or which IV&V must track independently because we don't agree with the mitigation strategy.

It is expected that for the other categories of assessments, that once that category reaches a "Red" status, a risk will be written. Risks that are "Yellow" or "Red" will be described in the MSR until they reach the "Green" status (i.e., are closed) and they should be described as reaching that state before removing all mention of the risk in subsequent MSRs. (The originating category should remain "Red" for at least one month)

Fundamental Question Being Addressed: Do risks exist which require mitigation and awareness (beyond the project's Risk Management system and actions)?

Why TA/DA would care? – The impact can vary depending upon the risk and usually corresponds with one of the other categories of the MSR reporting.

Version History

VERSION HISTORY				
Version	Description of Change	Rationale for Change	Author	Effective Date
Basic	Initial Release	N/A	Eric Sylvania	08/04/2023

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