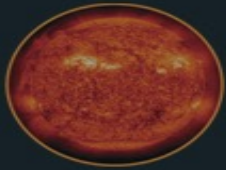


# Technical Authority and Formal Dissent



7/13/23

Tupper Hyde  
Tim Trenkle  
Jesse Leitner

NASA GSFC SE Seminar, 13 July 2023

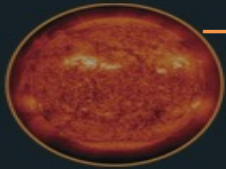
- **Technical Authority**

- Part of NASA's system of checks and balances for independent oversight of programs and projects for safety and mission success
- Parallel to programmatic authority
- Individuals formally delegated down from the Administrator responsible for this independent parallel responsibility for mission success
- Three types of TA:
  - Engineering (ETA)
  - Safety and Mission Assurance (SMATA)
  - Health and Medical (HMTA)

TA's are responsible for shepherding the Formal Dissent process.

- **Formal Dissent**

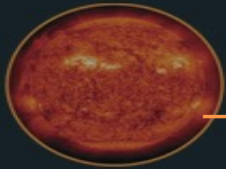
- A substantive disagreement with a decision or action that an individual judges is *not in the best interests of NASA* and is of sufficient importance that it warrants a timely review and decision by higher-level management
- Can be elevated up successive levels, even to the NASA Administrator
- Was called “Dissenting Opinion” until 2020.
- A dissenting opinion (lower case, or informal dissent) occurs with a well reasoned and communicated disagreement and is important in a healthy organization. It may be elevated to Formal Dissent after consultations and documentation and without retribution or suppression.



## If you want to go read the policies....

- Technical Authority

- NPD 1000.0 establishes TA as part of NASA governamce
- NPR 7120.5 defines how TA applies to spaceflight projects
- NASA/SP-2014-3705 PM Management Handbook has additional discussion of TA



- GPR 7120.11 GSFC's TA Policy and delegates down to heads of 500 and 300.



- 500-PG-7120.0.1 the ETA Implementation Plan
- 300-PG-7120.0.1 the SMATA Impl. Plan

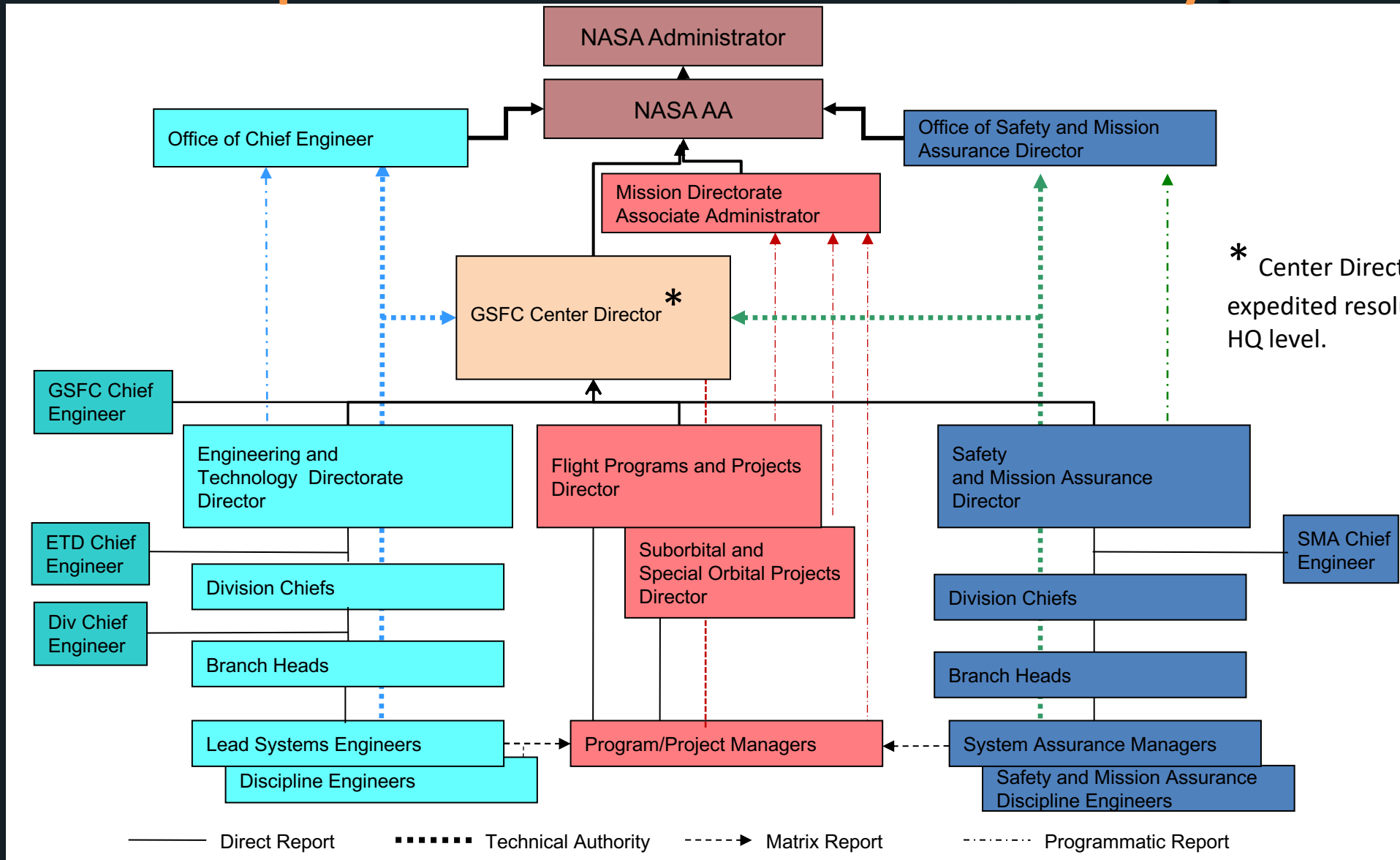


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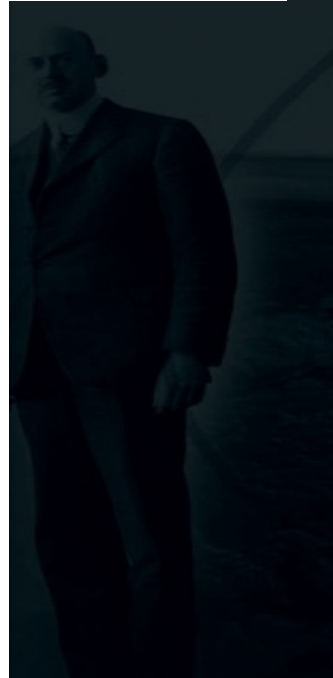
- Formal Dissent

- NPD 1000.0 has FD definition and calls out TA for the implementation of FD
- GPR 7120.5 discusses FD as part of TA
- GPR 7120.11 has GSFC's FD policy
- 500-PG-7120.0.1 has Code 500 FD guidance
- 300-PG-7120.0.1 has Code 300 FD guidance

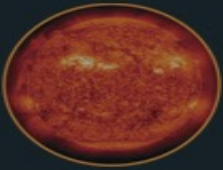
# GSFC Implementation of Technical Authority



\* Center Director can invoke an expedited resolution path to a HQ level.



# Technical Authority



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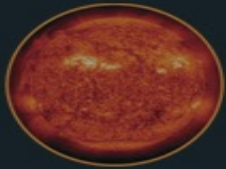


# Technical Authority Establishment

R7.5-1 Establish an independent Technical Engineering Authority that is responsible for technical requirements and all waivers to them, and will build a disciplined, systematic approach to identifying, analyzing, and controlling hazards throughout the life cycle of the Shuttle System.

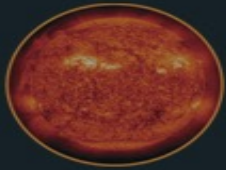
*Columbia Accident Investigation Board (CAIB) Recommendation*

- The CAIB report also stated: **The Technical Engineering Authority should be funded directly from NASA Headquarters, and should have no connection to or responsibility for schedule or program cost.**
- NASA's response to the CAIB (the Diaz Report) included Technical Authority for all programs and projects, not just the Shuttle or Human Spaceflight projects.
- Supports safety and mission success.
- Other Centers supporting exploration programs, like Shuttle, were organized around programs.
  - Program-centric organizations often spanned multiple Centers,
  - Checks/balances within each Center somewhat disconnected from lines of authority.
  - Adequacy questioned of the check/balance system, and its ability to forward concerns which the program did not embrace.
- GSFC matrixes engineering support into projects
  - Parallel reporting paths and checks/balances are largely unencumbered.
  - GSFC projects/programs typically do not span multiple Centers, but we sometimes deliver hardware to other Centers (e.g. SAM to JPL/MSL, ELC to JSC), and often manage activities (e.g. GOES) for other Agencies like NOAA.



## History & Evolution

- Initial response to CAIB recommendation was to establish Independent Technical Authority (ITA)
  - CAIB recommended NASA implement something similar to the Naval Reactors SUBSAFE program
  - Proposed technical warrant system, with agency warrant holders who were to be independent of program project authority and funding
- NASA has moved away from this warrant system model
  - Moved toward one that was more consistent with what was already in place at GSFC
  - Consists of three balanced pieces
    - Program/Project Management
    - Engineering
    - System Safety and Mission Assurance
  - Engineering and S&MA chains independent from the program/project in terms of funding, and reporting/arbitration paths



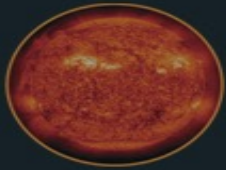
# Technical Authority Delegation Chain at Goddard

- ETA:

- NASA Administrator
- NASA AA
- NASA Chief Engineer
- GSFC Center Director
- ETD Director
- ETD Division Chiefs
- ETD Branch Heads
- Program and Project Lead Systems Engineers (MSEs, ISEs, GroundSEs)

- SMATA:

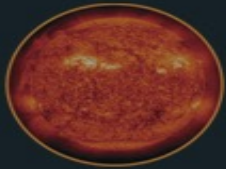
- NASA Administrator
- NASA AA
- NASA Chief of Safety and Mission Assurance
- GSFC Center Director
- SMA Director
- SMA Division Chiefs
- SMA Branch Heads
- Program and Project CSOs



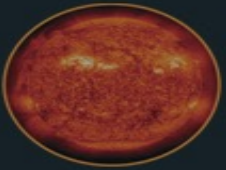


## How Does ETA Work?

- Engineering Technical Authority (ETA) parallel to project/program management
  - Responsible for Engineering Technical Excellence
  - Lead systems engineers are formally designated as the Technical Authority (TA) through an engineering management chain of authority
  - Documented in “Engineering Technical Authority Implementation Plan,” 500-PG-7120.0.1
- Responsibility of ETA
  - Set and enforce technical standards and engineering requirements
  - Inform Programmatic Authority (PA) (e.g. the Program Manager) with an engineering community response when Technical Authority direction is given
    - Why is this design the right design solution?
    - Has this design been developed and reviewed by the GSFC Engineering community?
    - Not necessarily the TA’s personal perspective
- Discipline Engineers can raise issues through the ETA
  - Work to resolve issues at lowest level first
  - Unresolved issues can be raised through Center management chain or Project TA
- This TA construct is fundamentally aimed at maintaining “healthy tension” Consistent with GSFC organizational structure



# Formal Dissent

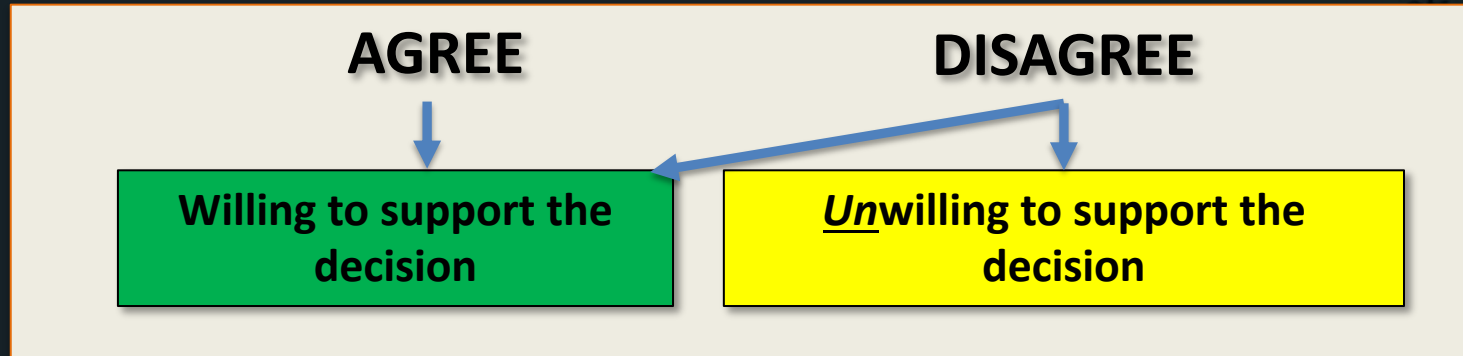


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# The Formal Dissent process and when it should be used:

When a technical decision is made, an individual has these choices:

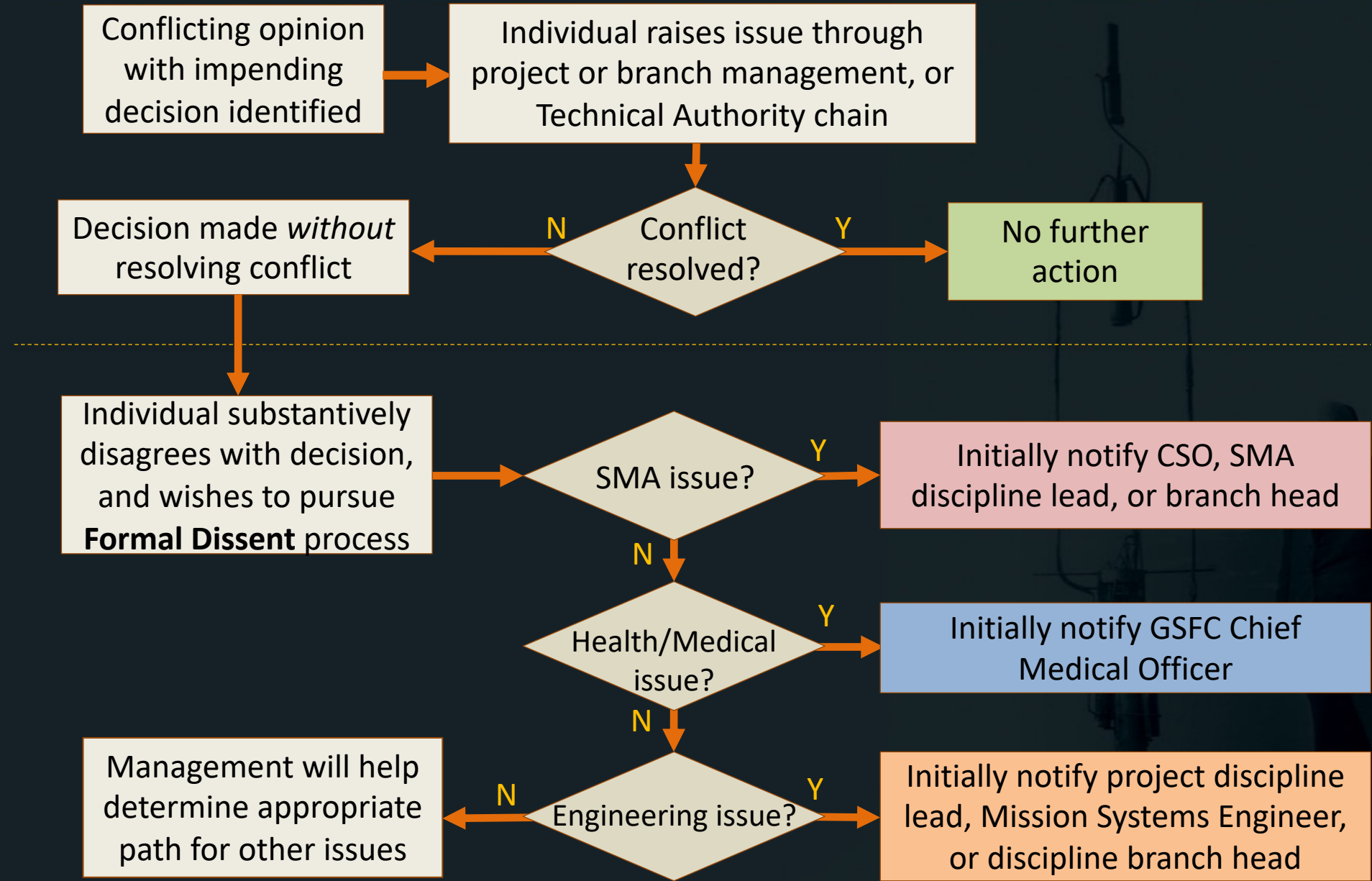


*When there is substantive disagreement with a decision that may result in negative consequences, the Formal Dissent process offers a path for elevation*

**Encouraging dissent is essential in a healthy collaborative environment. It is everyone's responsibility to bring forward any substantive dissent.**



# How to initiate Formal Dissent:

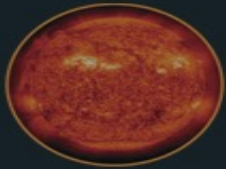


## What happens next?

The Formal Dissent process is **data-driven**, and the dissenter is expected to bring forward a well-supported argument.

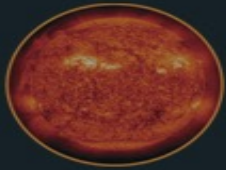
After notifying the TA of the dissent, the following steps are taken:

- 1. The details of the disagreement are noted and agreed upon*
- 2. Each side details their view of the risks and impacts of the decision*
- 3. Each side will identify specific points of disagreement, and a decision will be made*
- 4. If consensus is not reached, the dissenter may continue to elevate the issue through the Technical Authority chain*



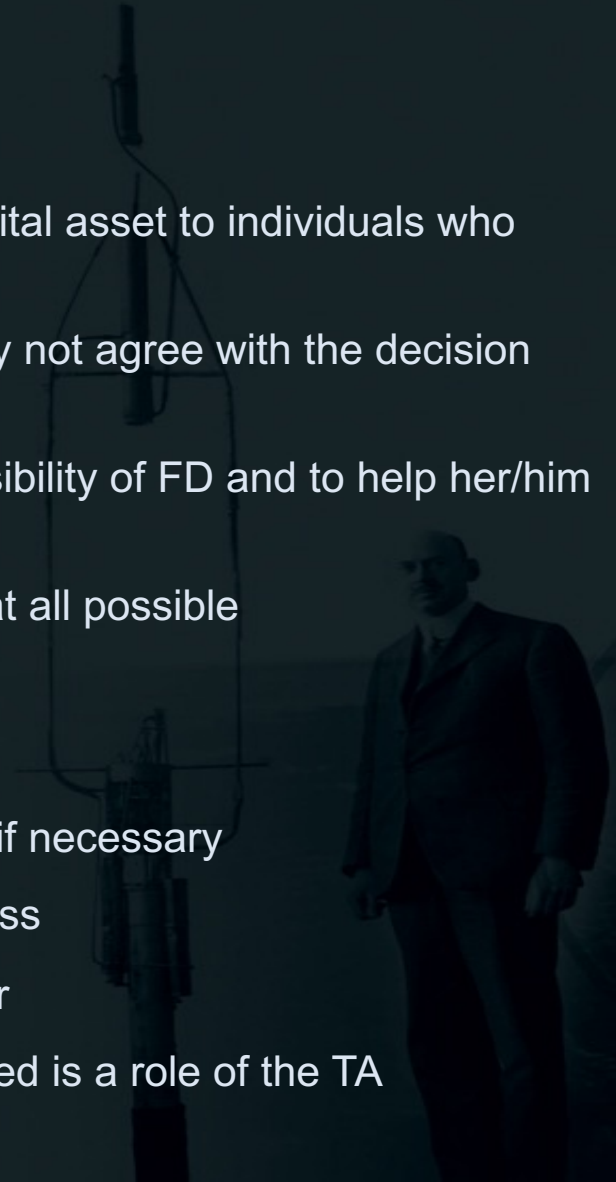
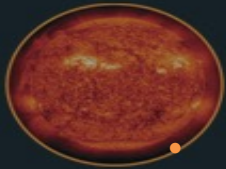
## Dissent is essential:

- Inviting dissent is a healthy part of NASA's culture.
- The *data-driven* Formal Dissent process is available for any organization or individual, *regardless of seniority*, providing:
  - A decision has been made
  - There is a substantive disagreement with that decision, based on clear rationale
  - The dissenting individual believes that the decision is not in the best interest of the Agency, and warrants decision by higher-level management
- The Formal Dissent process is initiated through the appropriate Technical Authority
- *Retribution for raising Formal Dissent is not permitted.*

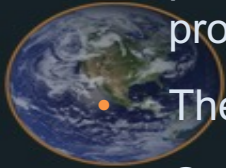


## Role of the TA in Formal Dissent

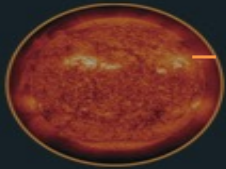
- Before the Formal Dissent Process Begins:
  - As senior individuals with years of applicable experience, TA personnel are a vital asset to individuals who believe that a Project/Program decision is wrong
  - It is expected that TA personnel will seek out individuals/organizations that may not agree with the decision and aid in the resolution of the differences of opinion to help resolve it w/o FD
  - It is also a TA responsibility to inform the Project/Program Manager of the possibility of FD and to help her/him understand the dissenter's rationale
  - Function as the mediator to bring the issue to resolution at the Project level if at all possible
- After a Formal Dissent has been filed:
  - Shepherd the dissenter through the formal dissent process through resolution if necessary
  - Treat the dissenter in a fair and equitable manner throughout the appeal process
  - Assure that the necessary data are collected and presented in a timely manner
  - Ensure the formal dissent is properly documented after it has been dispositioned is a role of the TA



- Much has been made of a “lesser degree” of Formal Dissent, also referred to as informal dissent (or the dissenting opinion in earlier nomenclature)
- No Agency-level description/definition of informal dissent as a requirement/policy exists
- Informal dissent is a natural everyday and commonplace event where an individual/group may disagree on a specific project decision or direction. Informal dissents are day-to-day disagreements that should be handled within the projects and should not be treated as Formal Dissent



- These should be handled through a deliberate and timely discussion at the Program/Project level
- Good engineering should not be considered as “Churn”



“Churn” is the situation where at least one of three conditions exist:

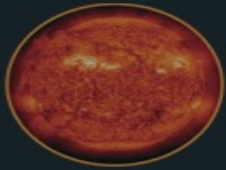
- A technical issue exists where there is strong disagreement but the issue has not been raised in a timely manner as a formal dissent through the TA chain, or the threat of filing Formal Dissent delays programmatic decisions
- The Program has made a technical risk acceptance decision, but the issue continues to fester and cause distraction because there is still strong disagreement but no Formal Dissent has been filed to force resolution (most often occurring condition)
- A Formal Dissent was filed, and went through the process to a management level that was adequate in the view of the filer, but after the decision, the filer disagrees with the risk posture





# XRISM's RCS Safehold Example

Tupper's Formal Dissent Example

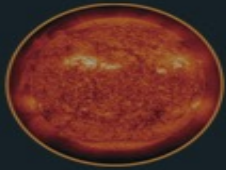


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# ATLAS Laser Example

Tim's Formal Dissent Example

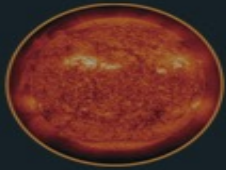


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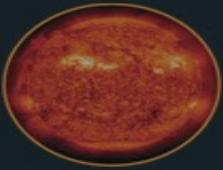
# Class 1/Div 2 Example

Jesse's Formal Dissent Example



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# Questions and Discussion



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