



Data Collection: Interviews

- **Interview as soon as possible.**
- **Prepare for the interview (prepared questions, recording devices, comfortable room).**
- **Obtain witness permission before taking notes or recording.**
- **Explain interview purpose (Use NASA written statement)**
- **Establish rapport with the interviewee.**
- **Get facts (name, company, witness location, duty, etc).**
- **Begin with open ended statement: "Can you tell me in your own words what you know about the accident?"**
- **Use neutral questions "Then what did he do?"**
- **Request suggestions on prevention strategies.**
- **Listen, Listen, Listen....**
- **Get interviewee agreement on content of statement.**
- **Provide interviewee with copy of statement and/or recording.**
- **Provide call back information.**
- **Thank them.**



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Statement to Witnesses

NASA Procedures and Guidelines (NPG) 8621.1

The purpose of this safety investigation is to determine the root cause(s) of the mishap that occurred on _____, and to develop recommendations toward the prevention of similar mishaps in the future. It is not our purpose to place blame or to determine legal liability. Your testimony is entirely voluntary, but we hope that you will assist the board to the maximum extent of your knowledge in this matter. Your testimony will be documented and retained as part of the mishap investigation report background files but will not be released as part of the investigation board report.

NASA will make every effort to keep your testimony confidential and privileged to the greatest extent permitted by law. However, the ultimate decision as to whether your testimony may be released may reside with a court or administrative body outside NASA.

For the record, please state your full name, title, address, employer, and place of employment.



Data Collection: Interviews

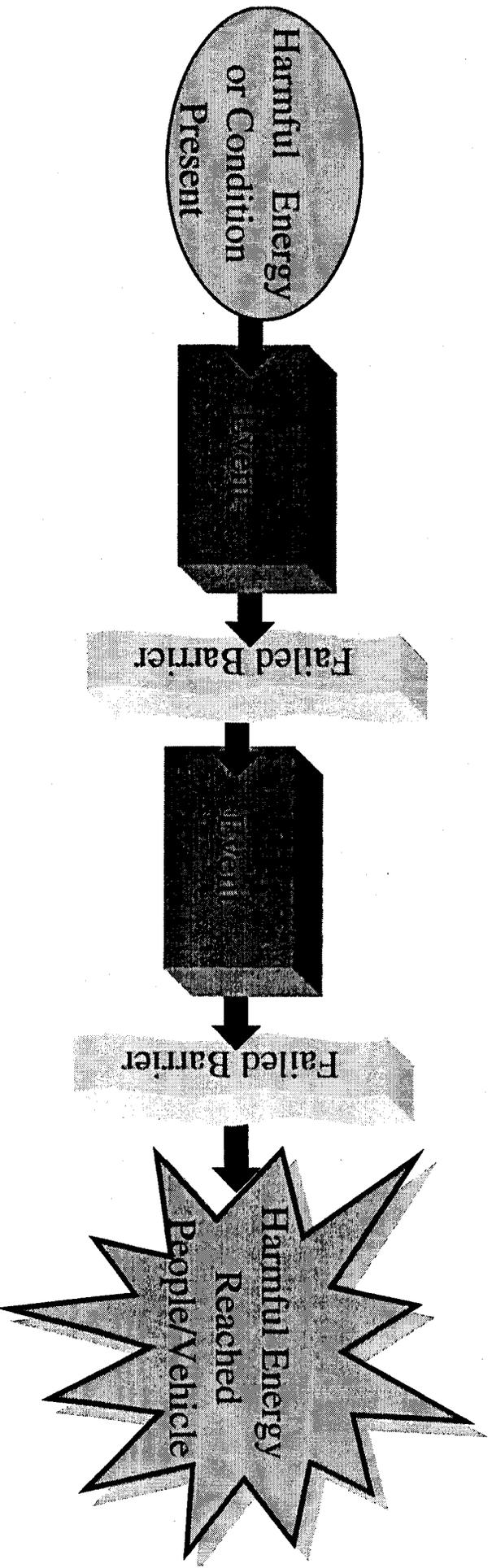
Interview problem areas to avoid:

- **Intimidating or interrogating the witness.**
- **Leading the witness by answering your own questions.**
- **Jumping to conclusions.**
- **“Sharing” information provided in other interviews or by other data sources.**



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Create Time Line of Events

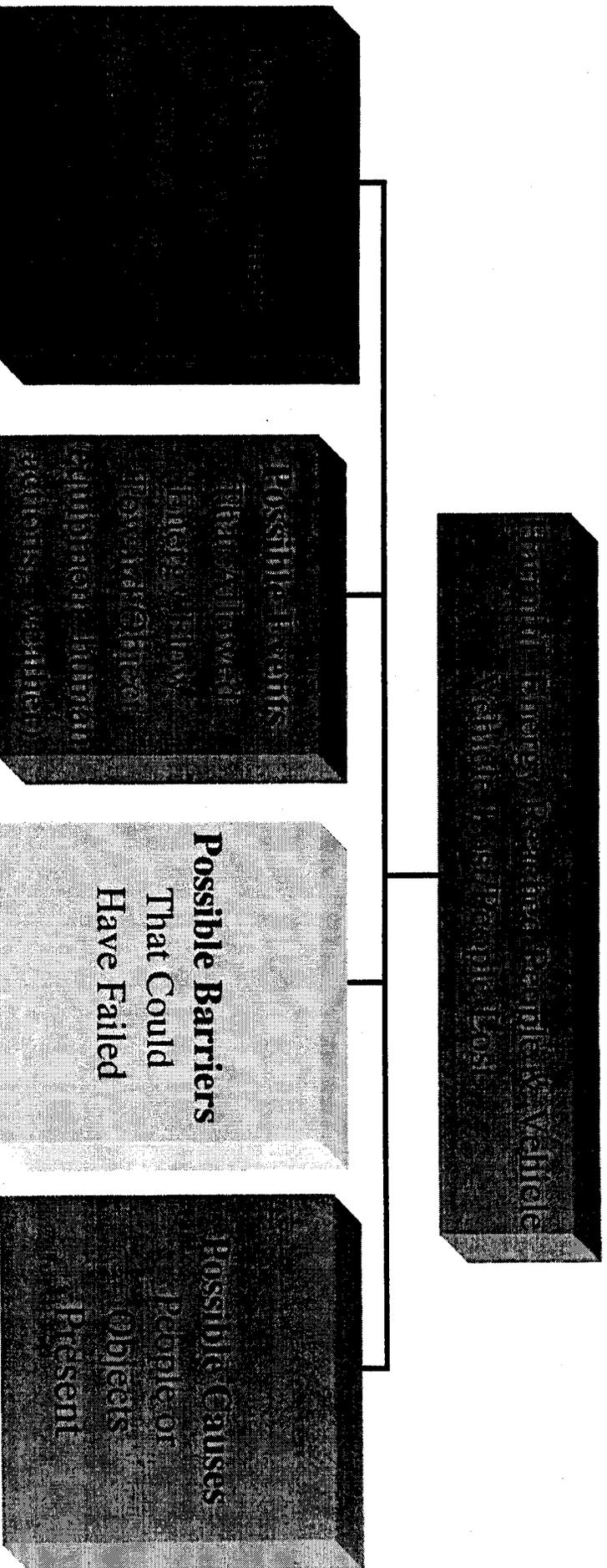


- Documents mishap scenario in chronological order.
- Begin well before the accident – e.g., Shuttle Processing or Launch.



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Create Fault Tree of Events

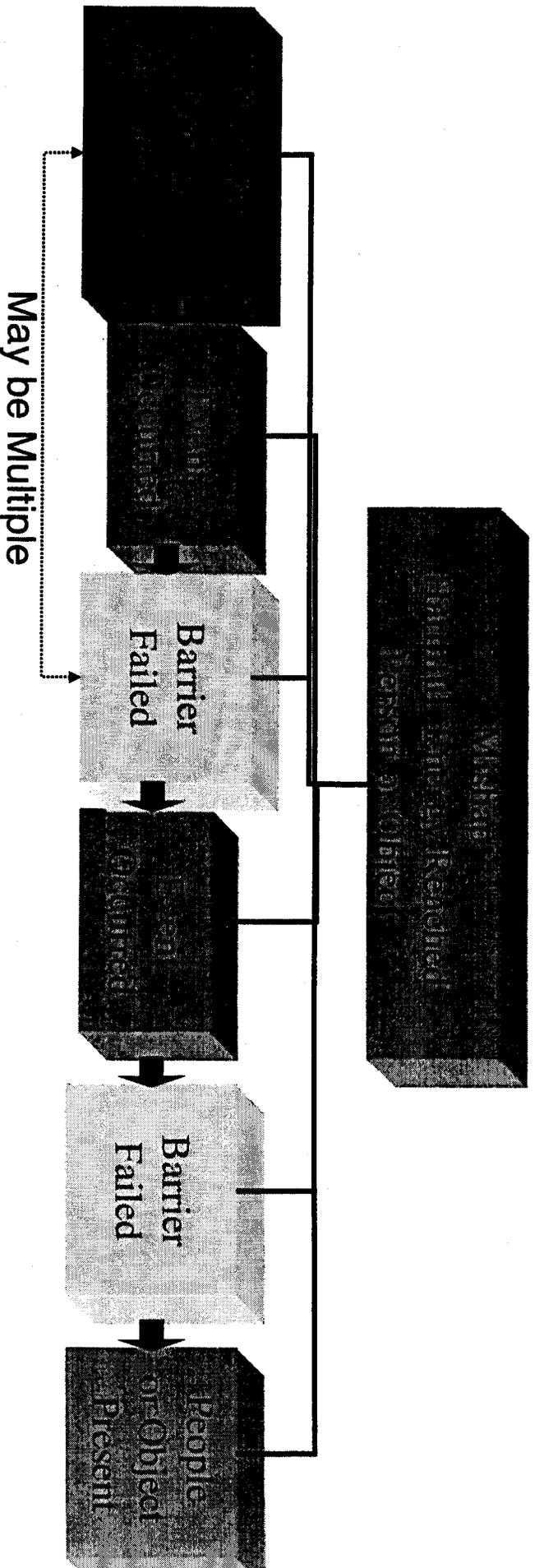


- The resultant tree should lead to a comprehensive picture of all **POTENTIAL** causes of the accident (including conditions and events).



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Form Event & Causal Factor Tree



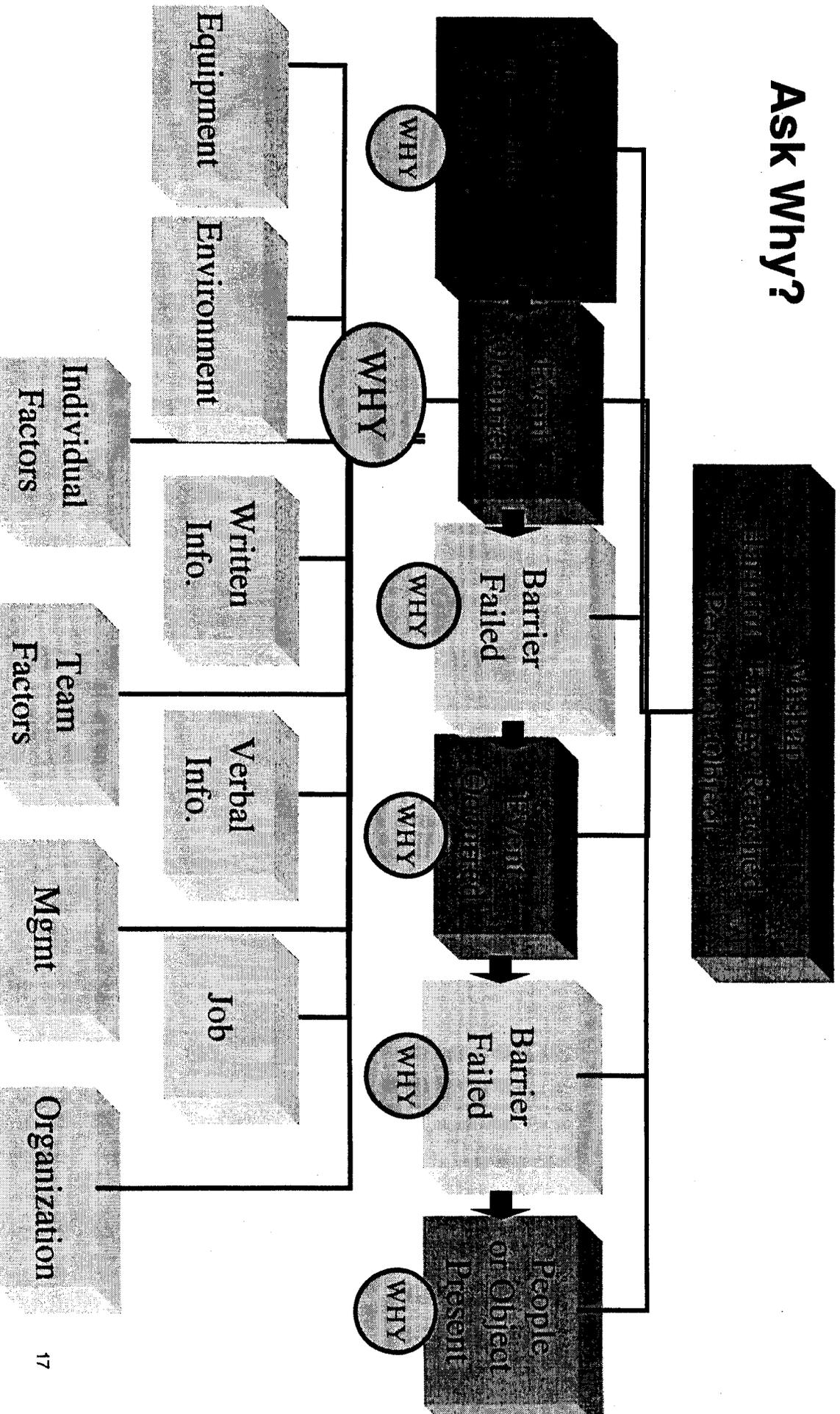
- Merge fault tree and event data to document actual events of and failed barriers.
- If possible, show events in chronological order.



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Event & Causal Factor Tree (Root Cause)

Ask Why?





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Root Cause Analysis

- **Each lower box should answer the question “why” from the box above. (Be sure to keep the logic – questions should be in line with the original issue.)**
- **Should continue asking “why” until the analysis identifies “organizational” root causes.**
- **Tools such as the Incident Analysis Tool – Modified can be used to ensure that all possible areas of cause are considered.**



Analysis – Human Factors

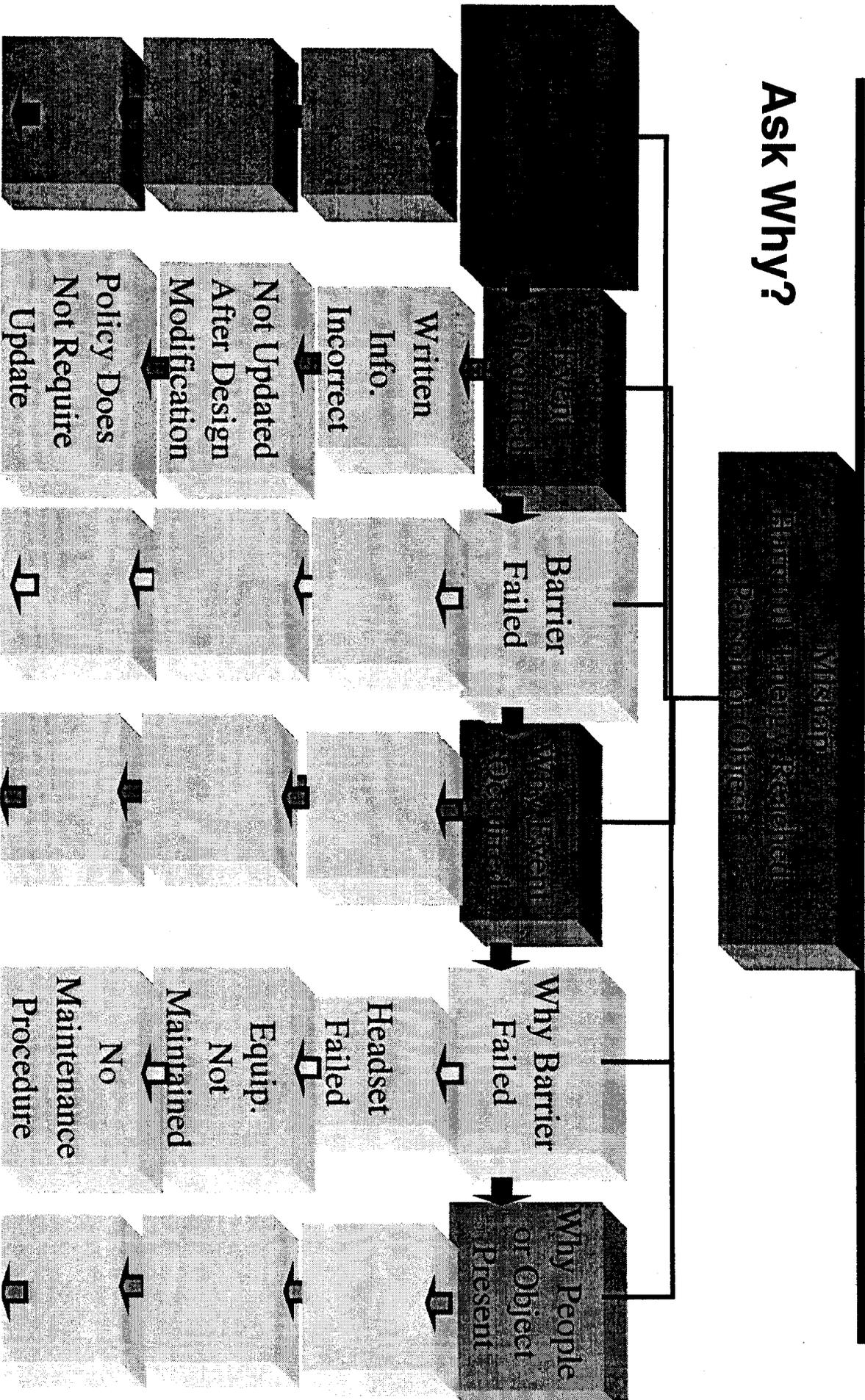
- Cause of human error(s) should be analyzed.
- Cause of unsafe act(s), violations and/or undesired action(s) should be analyzed.
- Can be done through many analysis techniques (e.g., root cause, MORT, barrier analysis, Incident Analysis Tool – Modified, etc).
 - Must define the type of human action before cause is identified. For example:
 - perceptual error
 - interpretation error
 - decision making error
 - action execution error, violation



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Root Cause Analysis

Ask Why?





Root Cause Analysis

Apply the cause test

- **If the deficiency or decision in question were corrected, eliminated or avoided, would the problem be prevented or avoided?**

If yes, then it is a cause.

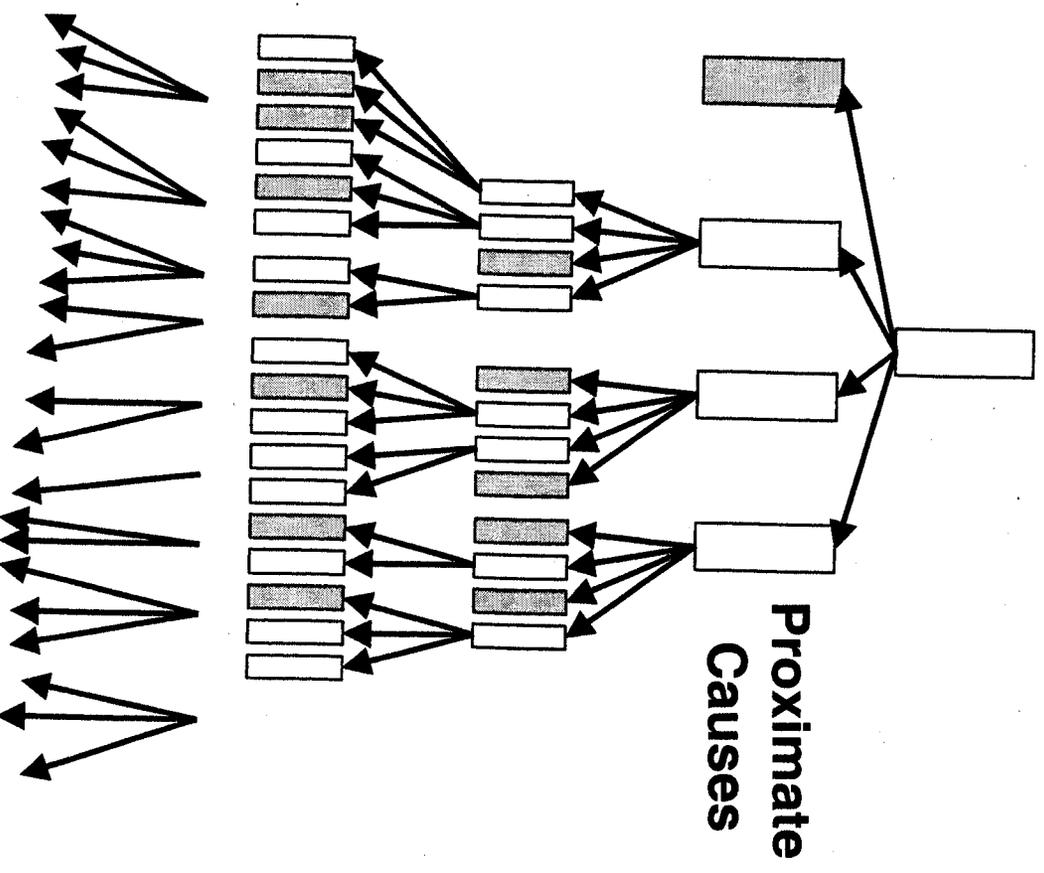
If no, then eliminate from the tree.

- **Some choose to leave contributing factors on the tree... if done, illustrate them differently (e.g., different shape).**



Root Cause Analysis

- There may be more than one root cause and many contributing factors.
- Don't be surprised if more than one paths leads to similar causes.
- Once the tree is complete, perform a detailed review of each cause, verifying logic and that facts support causes.





Analysis Pitfalls

There is a great temptation to grasp the first plausible “WHY”, cease investigating and start writing.

If the first “why” is grabbed three things happen:

- 1. Communications are made that steer the investigation in a narrow direction... which may be the wrong direction.**
- 2. It becomes difficult for the Investigation Team to change its mind/direction even when new solid contradictory evidence is discovered.**
- 3. The Investigation Team becomes discouraged and frustrated when new facts surface.**



Analysis

There is a great temptation to eliminate possibilities too quickly.

- **There should be sound reasoning to indicate that it doesn't apply. Better to leave it, and eliminate it later than fail to consider it completely.**



Report

- **NPG: Appendix H-3 Sample Table of Contents**
- **Demonstrated tie from the**
 - **Facts to...**
 - **Findings (causes, contributing factors & observations) to ...**
 - **Recommendations.**
- **Recommendations**
 - **Address both proximate and root causes.**
 - **Eliminate or decreases risk (probability and/or severity).**
 - **Clearly state intended action.**



Summary

- **NASA philosophy:**
 - **Identify root cause and contributing factors to prevent mishap recurrence using structured and proven investigation methodology.**
 - **Non-punitive system.**
- **NASA needs quick and thorough investigation to ensure safety of process and return to flight to support Agency mission objectives.**
- **Policy and guidelines:**
 - **Ensures an unbiased, independent, and thorough investigation of the facts.**
 - **Provides description of data collection, analysis, and reporting methods.**



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Overview Backup



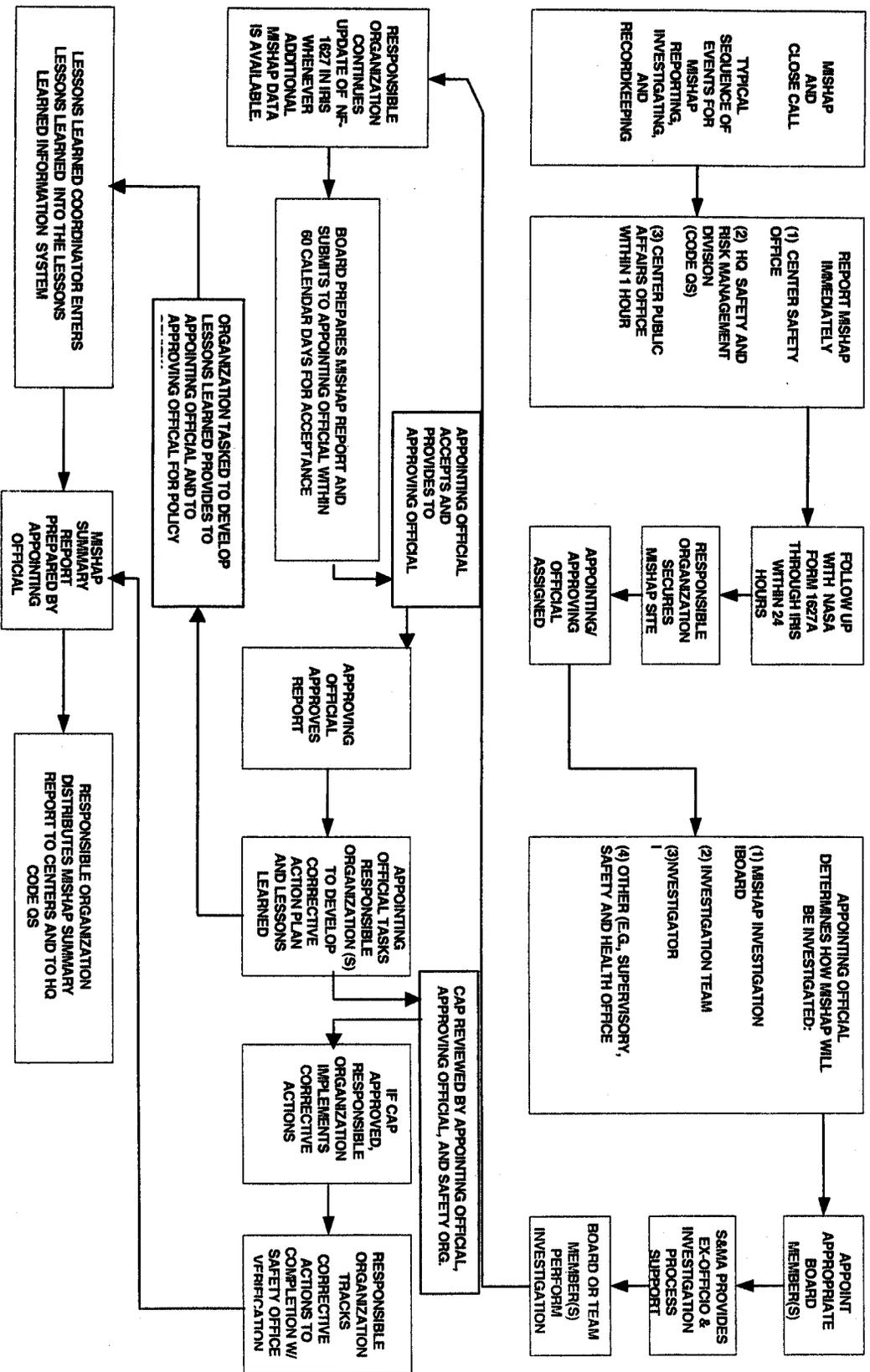
Definitions

- **Proximate Cause(s)** – The event(s) and condition that occurred immediately before the undesired outcome, directly caused its occurrence, and if eliminated, or modified, would have prevented the undesirable outcome.
- **Root Cause(s)** – One of multiple organizational factors that contributed to / created the proximate cause and subsequent undesirable outcome, and if eliminated or modified would have prevented the undesirable outcome.
- **Contributing Factor** – A condition or event that may have contributed to the occurrence of an undesired outcome but if eliminated or modified would NOT by itself prevent the recurrence.
- **Significant Observation** – A factor, event, or circumstance identified during the investigation that did not contribute to the mishap or close call, but if left uncorrected has the potential to cause a mishap, injury, or increase the severity should a mishap occur.



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Sequence of Events for the MI Process – NPG 8621.1, Page 169





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MORT OVERVIEW



What is MORT?

Management Oversight Risk Assessment Tree

- **An analytical “logic tree” that arranges safety program elements in an orderly, coherent, and logical manner.**
- **Representation of an “ideal” safety model using a fault tree methodology**
- **Method for analyzing safety programs by evaluating the adequacy of implementation of individual safety elements.**



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MORT OVERVIEW

Purpose

Mort can be used to analyze a specific accident and determine general causal areas and root causes.

Goal of the Analysis

To find out “why” the “trigger” was allowed to occur and to analyze every cause.



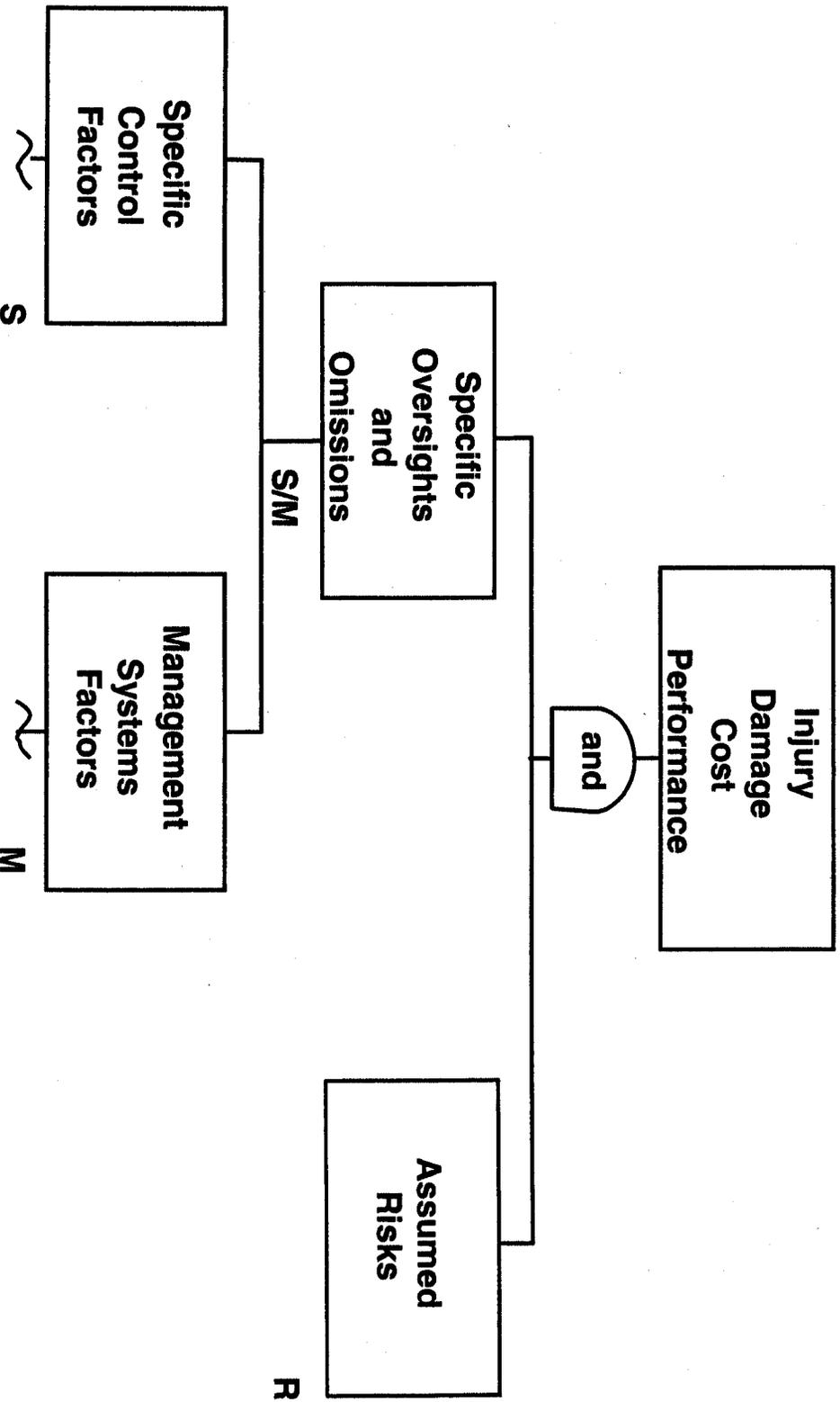
MORT Definitions

- ENERGY** - the physical capacity to do work
- ACCIDENT** - An unwanted flow of energy or environmental condition that results in adverse consequence
- INCIDENT** - A barrier - control inadequacy or a failure without consequence
- BARRIER** - Safety devices, both physical and administrative used to reduce hazards to acceptable levels
- CONTROLS** - Elements of the system that function as barriers or ensure that barriers operate functionally
- TRIGGER** - Human error, process or equipment failure that immediately proceeds and “triggers” the accident or problem



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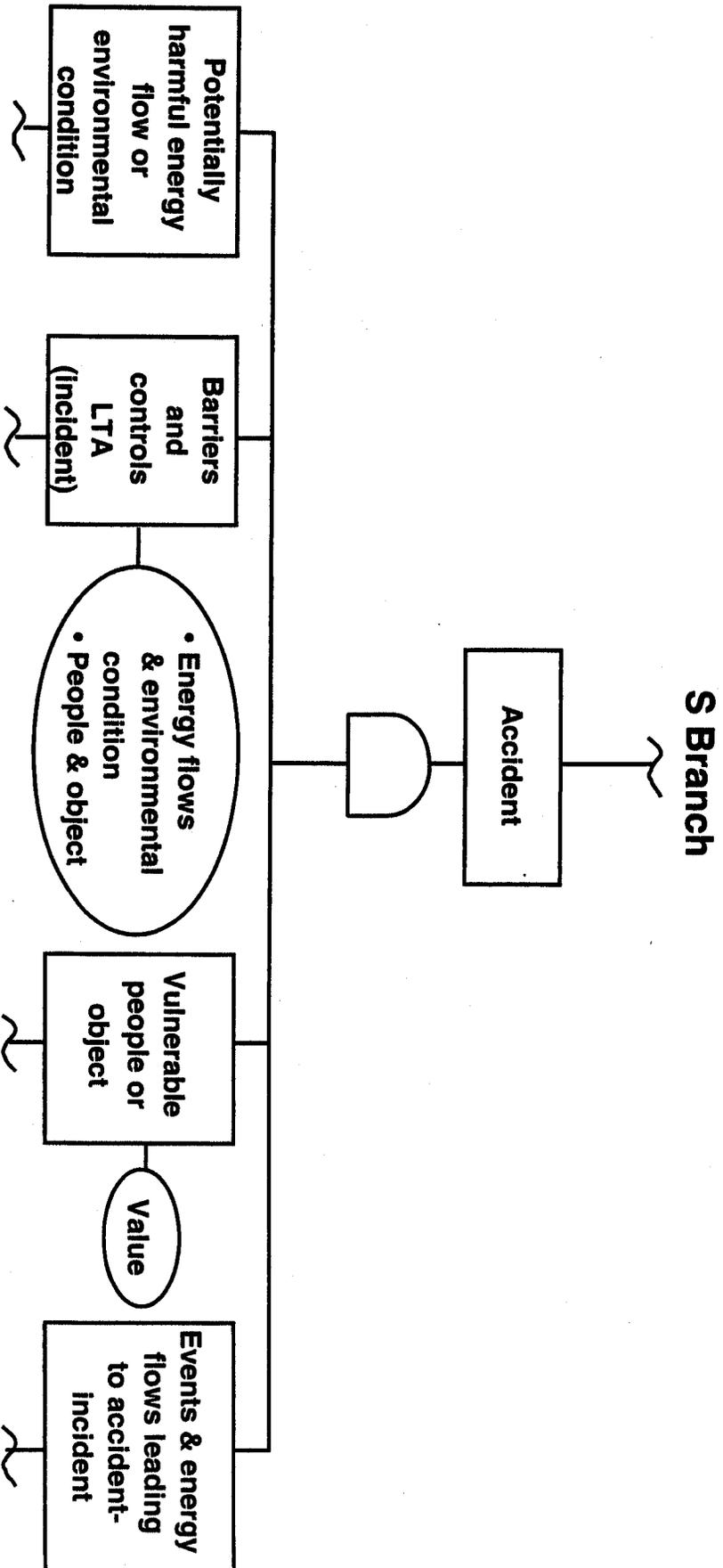
MORT Tree Main Branches





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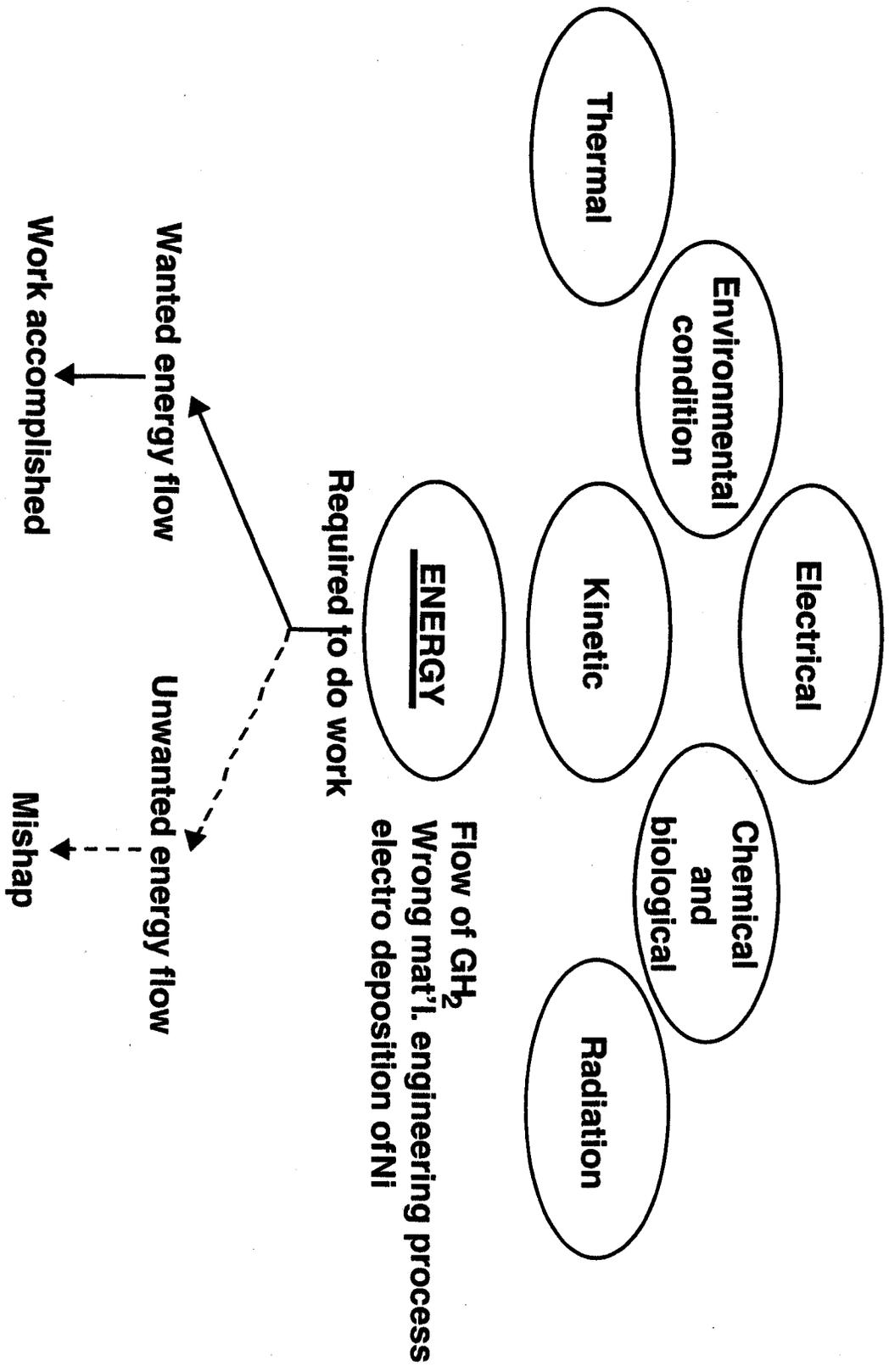
MORT Tree Main Branches - Accident





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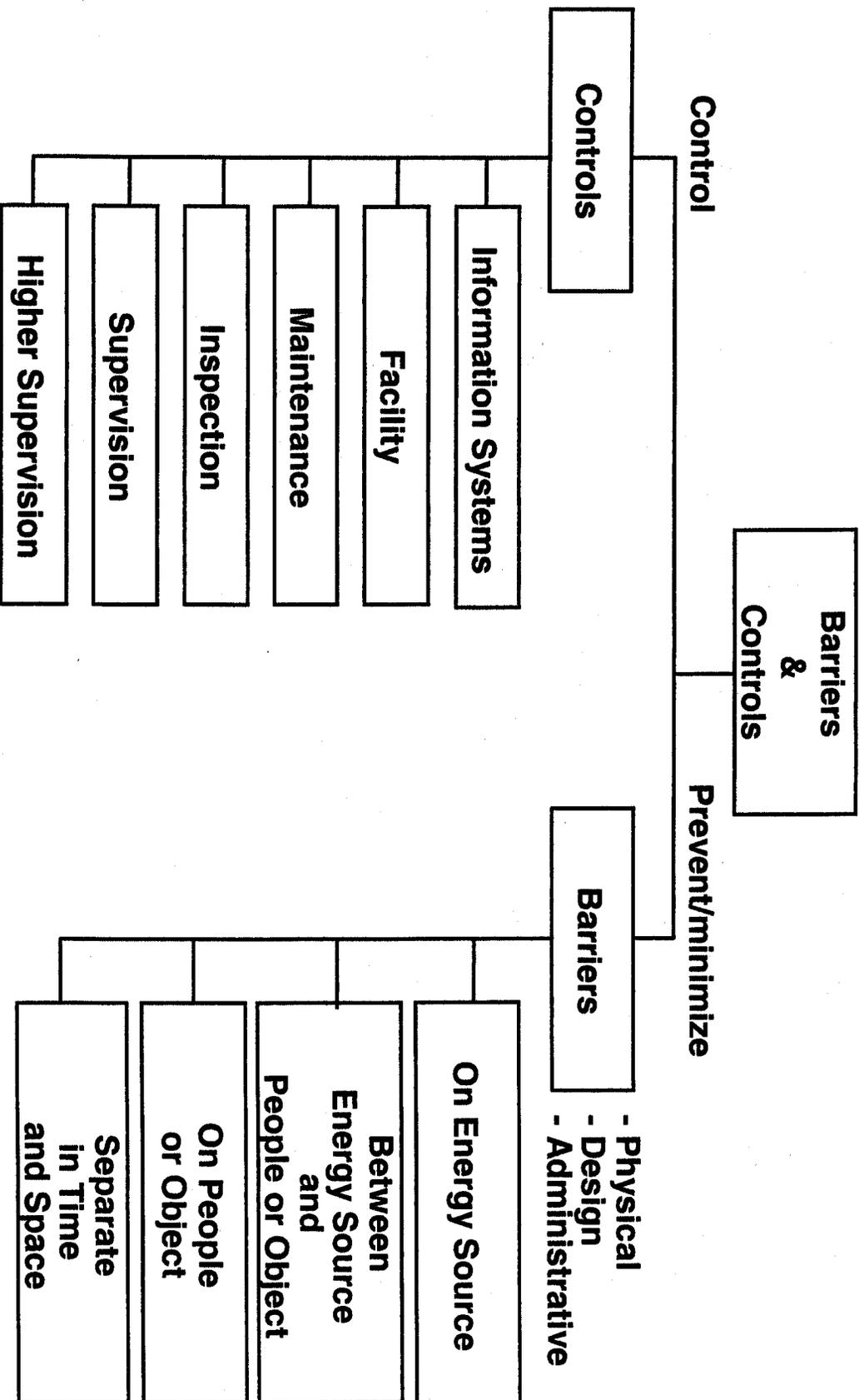
Energy Flow





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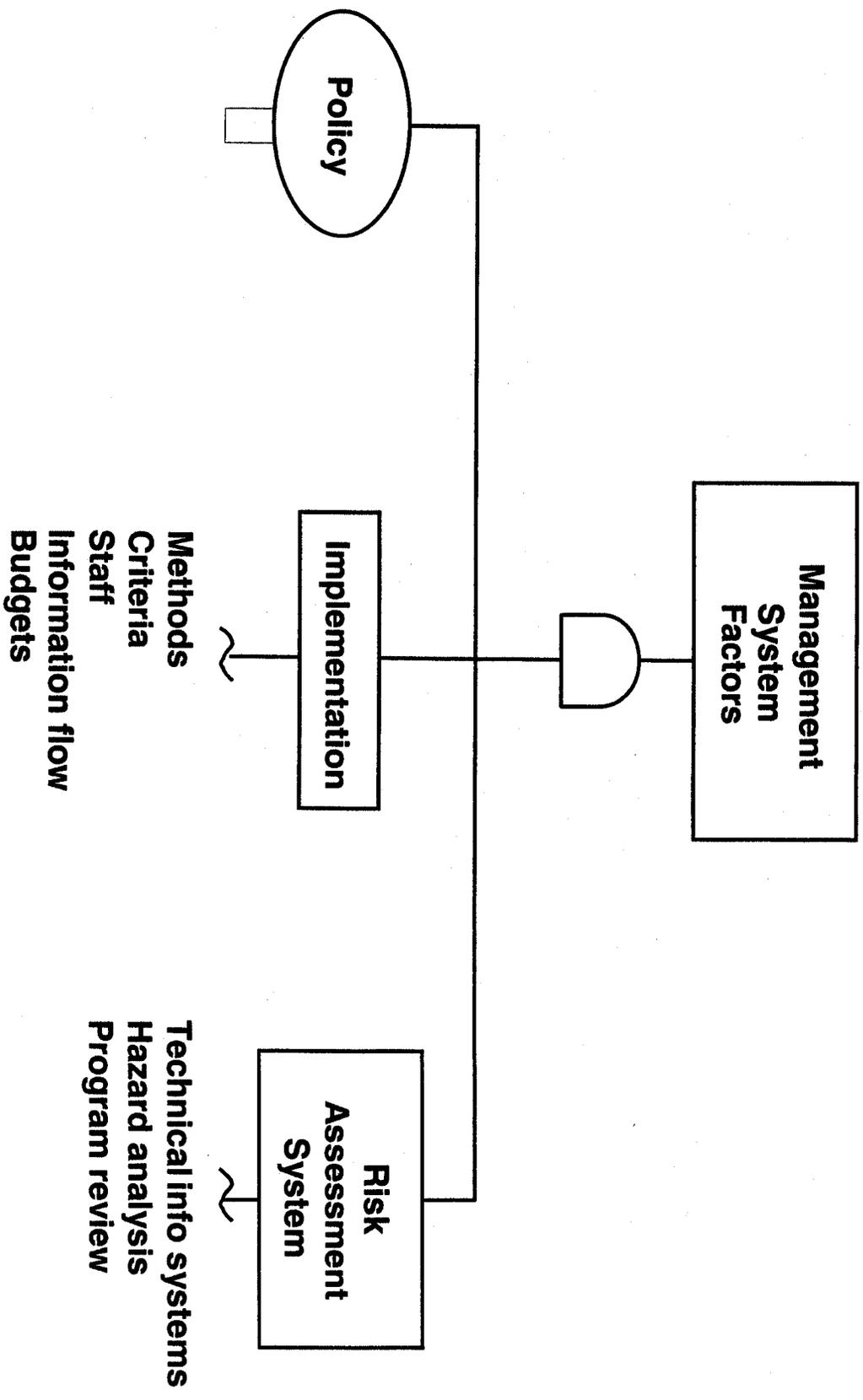
Barrier & Controls





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Management Branch (M Branch)





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MORT BACK UP

LEGEND Top Number

Page number in SSDC 4

Bottom Number

MORT Cause Sequence Number

Alphanumeric Number

Location of boxes on diagram

13 INJURIES, DAMAGE, OTHER COSTS,
PERFORMANCE LOST, OR DEGRADED,
PROGRAM / PUBLIC IMPACT

FUTURE
UNDESIRABLE
EVENTS

What Happened?

S / M

14 OVERSIGHTS
AND
OMISSIONS

Why?

51 ASSUMED
4 RISKS
R

14 SPECIFIC
CONTROL
FACTORS LTA

14 AMELIORATION LTA

39 MANAGEMENT
SYSTEM
FACTORS LTA

SA1 Accident

17 POTENTIALLY HARMFUL
ENERGY FLOW OR
ENVIRONMENTAL
CONDITION

17 BARRIERS AND
CONTROLS
(INCIDENT)

17 VULNERABLE
PEOPLE OR
OBJECT

17 EVENTS AND ENERGY
FLOWS LEADING TO
ACCIDENT/INCIDENT

SC1 CONTROL LTA

SC2 BARRIERS LTA

20 SD1 TECHNICAL
INFORMATION
SYSTEMS

23 SD2 FACILITY
FUNCTIONAL
OPERABILITY

24 SD3 MAINTENANCE

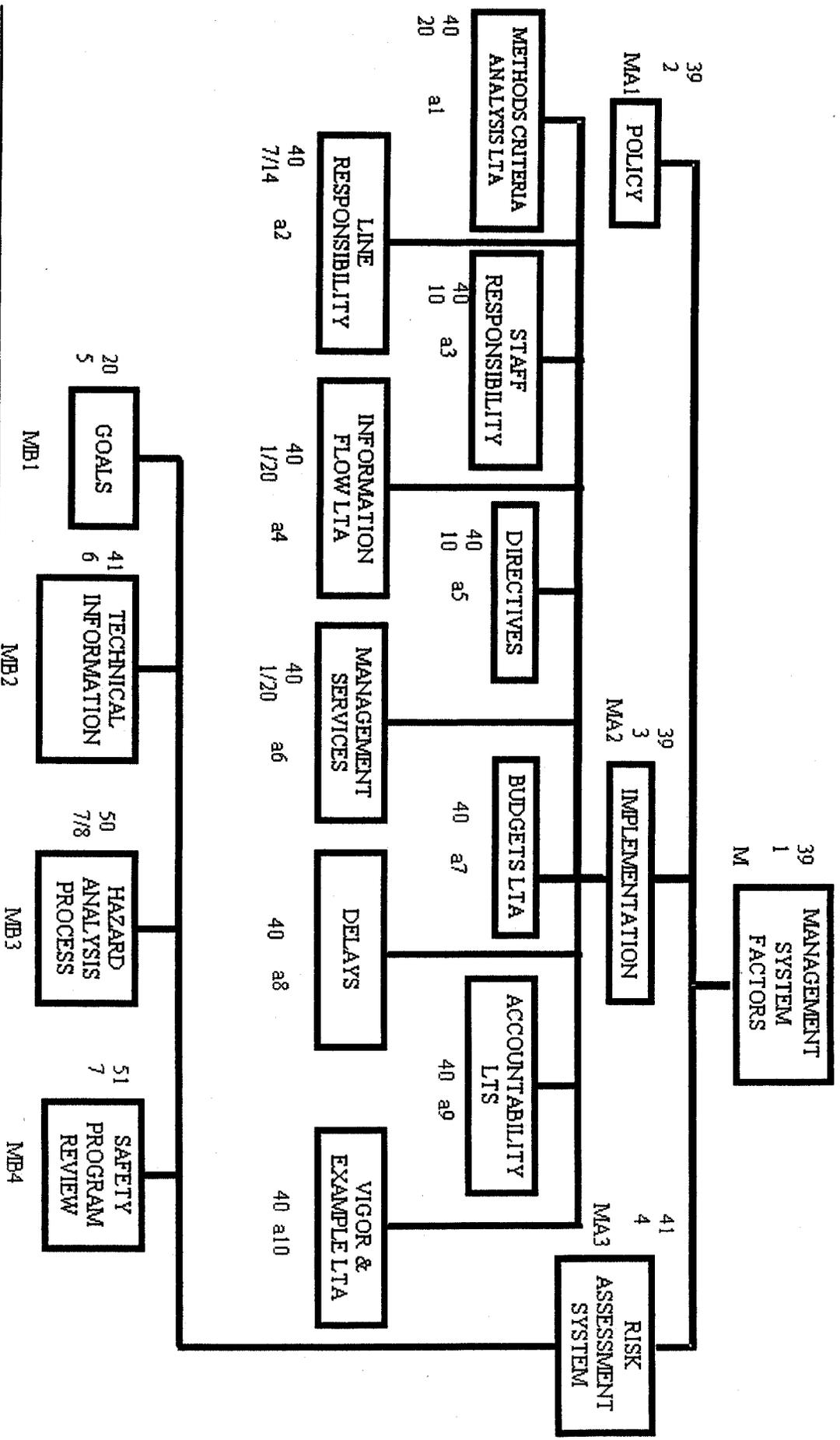
24 SD4 INSPECTION

26 SD5 SUPERVISION

38 SD6 HIGHER
SUPERVISION
SERVICES



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To: HCAT@hq.nasa.gov
From: Faith Chandler <fchandle@hq.nasa.gov>
Subject: Fwd: Crash and Crime Scene Investigation Software application
Cc: prichard@hq.nasa.gov
Bcc:
Attached:

Bill,

A tool to consider in use during the accident reconstruction.
I do not have much knowledge of this tool.
Darcy is a HF person in Ronnie Goodin's safety office at KSC.

From: "Miller-1, Darcy" <Darcy.H.Miller@nasa.gov>
To: "fchandle@hq.nasa.gov" <fchandle@hq.nasa.gov>
Subject: Crash and Crime Scene Investigation Software application
Date: Tue, 4 Feb 2003 14:07:40 -0500
X-Mailer: Internet Mail Service (5.5.2653.19)

Faith,

I would like to pass this information on to someone who may be able to use it in NASA, either now in Texas or in the future. It looks promising. It is designed for crash and crime scene investigation. It was referred to me by someone that I worked with in the past and the company has a good reputation with us. I would like to get this to the right person who can see if it could improve our recovery and reconstruction process. Optimus, the company, is not asking for money, just to help out, but of course the publicity would be outstanding for the product.

- > Here are the additional benefits that I noted when I called Wesley Winn of
- > Optimus. Although I do not know the system that we are using in Texas and
- > I have not seen the Optimus system, Wesley compared it to other typical
- > systems when he explained it.
- > * Logging location of parts: Other systems are accurate within about
- > 30 feet, this one is accurate within 1 cm.
- > * Other systems require more than one person to take the reading, this
- > one requires only one person with a laptop.
- > * Makes use of 'WAS', a satellite system and a patented filter.
- > * It uses drop down menus and has areas for text entry to describe and
- > document the parts for later reconstruction.
- > * They work in the DC area, but can go to Texas.
- > * Training to collect the data in the field requires about 30 minutes.
- * It was just released last month for commercial use, so not many
- people would know about it yet.

Thank you,

> Darcy Miller
> PH-P1
> 321-861-1846

> -----Original Message-----

> From:
> Sent: Tuesday, February 04, 2003 9:54 AM
> To: Darcy.H.Miller@nasa.gov
> Subject: OPTIMUS Corporation - AutoDOCS

> Ms. Miller,

> Acting Director of Public Safety gave me your name and
> contact information. As you may recall he and worked on the
> NASA EPIC project. I am contacting you in regards to another product we
> developed that came out of the SBIR program, AutoDOCS. It is a crash and
> crime scene reconstruction system using GPS technology. Points are
> measured within 1 CM of accuracy and car, plane, etc. parts are input
> electronically through scroll-down menus on a laptop computer. Upon
> completion of the measurements and data input, information is then stored
> in a database with a GIS to display all the points. We are trying to setup
> a pilot with NTSB for the use in air disasters, and wanted to know if you
> (or knew someone that would be) interested in using the product for the
> Columbia Disaster?

> If you are interested in learning more about the product or would like to
> use the system to assist in the data collection at no charge, please feel
> free to give me a call or email me.

> Sincerely,

> OPTIMUS Corporation

>
>

From: "RAILSBACK, JAN (JSC-NX) (NASA)" <jan.railsback-1@nasa.gov>
To: "Michael Stamatelatos" <mstamate@hq.nasa.gov>,
"BOYER, ROGER L. (JSC-NC) (SAIC)" <roger.l.boyer1@jsc.nasa.gov>,
Bill Vesely <wvesely@columbus.rr.com>,
"Dennis Moore (E-mail)"
<Dennis.R.Moore@msfc.nasa.gov>
Cc: "STEWART, MICHAEL A. (JSC-NC) (SAIC)"
<michael.a.stewart1@jsc.nasa.gov>,
"ROELANT, HENK (JSC-NC) (NASA)"
<henk.roelant-1@nasa.gov>
Subject: RE: Sequence
Date: Mon, 3 Feb 2003 09:06:42 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

This morning Yolanda came into my office and said that Bryan O'connor would be asking us for information, via channels, regarding the PRA model. Attached is his note and a one-pager outlining his request. David Cazes also informed Yolanda that we have archived copies of the PRA on CD and that a copy of the analysts' hard drives have been partitioned on a secure drive.

Dennis, if you haven't locked down a copy of the models from MSFC, I suggest you do so. I have asked Bill Vesely to do the same.

Talk with you at 10:30 Central.

Jan W. Railsback
Lead Analyst
Safety, Reliability, and Quality Assurance
Advanced Programs and Analysis Division
Ph: 281-483-7265
Fax: 281-244-2318
jan.railsback-1@nasa.gov

-----Original Message-----

From: Michael Stamatelatos [<mailto:mstamate@hq.nasa.gov>]
Sent: Monday, February 03, 2003 8:43 AM
To: RAILSBACK, JAN (JSC-NX) (NASA); BOYER, ROGER L. (JSC-NC) (SAIC);
Bill Vesely
Subject: Sequence

To: Pete Rutledge <prutledg@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Supporting Bryan on the Columbia Accident Investigation Board (CAIB)
Cc:
Bcc:
Attached: C:\Documents and Settings\mstamate\Desktop\Scenario.doc;

Pete:

Attached is a short description of a scenario that may be important for STS-107.

I have a telecon with the shuttle PRA group at 11:30 AM today.

Can I share this with them?

Michael

At 07:49 PM 2/2/2003 -0500, you wrote:

Code Q staff members,

As you may know Bryan is the ex-officio member of the Columbia Accident Investigation Board. He left for Barksdale AFB this afternoon around noon time. That is where he will meet up with the other CAIB members.

One of our main jobs in the immediate future will be to support him. We can support him in at least three ways: 1. We can respond to his requests. 2. We can collect, on our own initiative, data that could be of use to him (but we need to proceed most carefully on this one). 3. We can suggest questions or avenues of investigation that he might be able to inject into the work of the board.

Attached is a rough list we prepared today of investigative areas--for the most part these are areas in which the SMA community has some special expertise. For each area we have tentatively named an OSMA lead (and in some cases more than one person to work together). If you can think of other areas that we have not captured, and should, let me know. If we've associated you with the wrong area(s) or failed to associate you with the right area(s), let me know. We don't want to disrupt the investigation--we want to be prudent; we want to help Bryan. Think about whether and how you might be able to be helpful in these areas; then, before you take any action, write down your plan in a clear, concise manner, and send it to me--state what you might be able to do and how you would propose to do it. Then wait for a go-ahead from Jim or me. Keep in mind that we have asked the SMA directors at JSC, MSFC, KSC, LaRC, ARC, and SSC to work with us as needed, so this can be part of your plan, if appropriate.

We have also asked all 10 SMA directors to think of questions or issues that Bryan might pursue with the CAIB. I will be collecting these inputs. Your questions and issues are solicited, as well. Put your investigator hat on, think about this, do your own personal fault trees and

hazard analyses, send me your ideas. I'll collect them up, as well, to send to Bryan.

Let's do a great job for Bryan on this important matter.

Thanks,

Pete

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579

FAX:202-358-2778

e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

Pete Rutledge, 09:20 AM 2/3/2003 -0500, Re: Supporting Bryan on the Columbia Accident Inv

X-Sender: prutledg@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 03 Feb 2003 09:20:46 -0500
To: Michael Stamatelatos <mstamate@hq.nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Supporting Bryan on the Columbia Accident Investigation Board (CAIB)

Yes, as they know its your scenario and not from the MIB.

Pete

At 08:59 AM 2/3/2003 -0500, you wrote:

Pete:

Attached is a short description of a scenario that may be important for STS-107.

I have a telecon with the shuttle PRA group at 11:30 AM today.

Can I share this with them?

Michael

At 07:49 PM 2/2/2003 -0500, you wrote:

Code Q staff members,

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We have also asked all 10 SMA directors to think of questions or issues that Bryan might pursue with the CAIB. I will be collecting these inputs. Your questions and issues are solicited, as well. Put your investigator hat on, think about this, do your own personal fault trees and hazard analyses, send me your ideas. I'll collect them up, as well, to send to Bryan.

Let's do a great job for Bryan on this important matter.

Thanks,

Pete

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579
FAX:202-358-2778
e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

Dr. Michael Stamatelatos
Manager, Agency Risk Assessment Program
NASA Headquarters - Mail Code QE
Office of Safety and Mission Assurance
300 E Street, SW
Washington, DC 20024
Phone: 202/358-1668 Fax: 202/358-2778
E-mail: Michael.G.Stamatelatos@nasa.gov
(Please note change in e-mail address)

"Mission success starts with safety"

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division

Pete Rutledge, 09:20 AM 2/3/2003 -0500, Re: Supporting Bryan on the Columbia Accident Inv.

Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579

FAX:202-358-2778

e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

From: "RAILSBACK, JAN (JSC-NX) (NASA)" <jan.railsback-1@nasa.gov>
To: "'Michael Stamatelatos'" <mstamate@hq.nasa.gov>
Subject: RE: Status of accident investigation and RTOPS
Date: Fri, 28 Feb 2003 14:07:56 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

Michael,

Okay with me. As a preview I'm attaching a couple of org charts for the accident investigation team.

Jan W. Railsback
Lead Analyst
Safety, Reliability, and Quality Assurance
Advanced Programs and Analysis Division
Ph: 281-483-7265
Fax: 281-244-2318
jan.railsback-1@nasa.gov

-----Original Message-----

From: Michael Stamatelatos [<mailto:mstamate@hq.nasa.gov>]
Sent: Friday, February 28, 2003 11:56 AM
To: RAILSBACK, JAN (JSC-NX) (NASA)
Subject: Re: Status of accident investigation and RTOPS

Jan:

I believe we should have a telephone conversation on all these items next week. Tuesday would be better for me. How about you?

Michael

At 05:36 PM 2/27/2003 -0600, you wrote:

>Michael,

>

>I apologize for not getting back with you from time to time on the status of

>the accident investigation. If you have a chance, you should get on a plane

>and come down here for a good view of how the accident investigation fault

>tree is going. We have been working considerable hours on this effort and

>the Shuttle Program has expressed their approval. We have many people

>working on the tree in a "badgeless" atmosphere. But we do have some concern
>on the RTOPs and their progress with which we could use your advice. The
>same goes for the Shuttle PRA, though we are working on a revised schedule.
>
>I'll try to call you tomorrow.
>
>Jan W. Railsback
>Lead Analyst
>Safety, Reliability, and Quality Assurance
>Advanced Programs and Analysis Division
>Ph: 281-483-7265
>Fax: 281-244-2318
>jan.railsback-1@nasa.gov

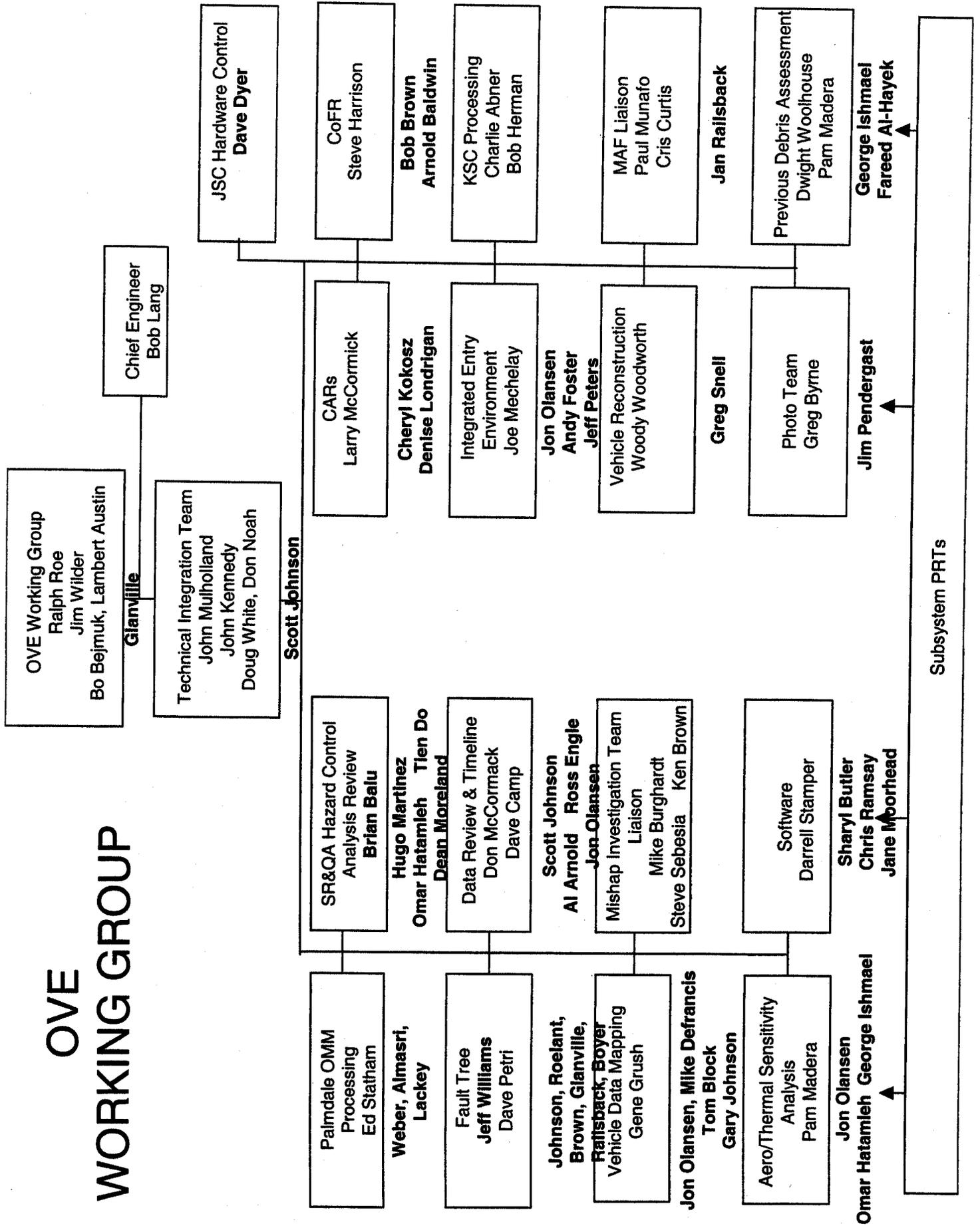
Dr. Michael Stamatelatos
Manager, Agency Risk Assessment Program
NASA Headquarters - Mail Code QE
Office of Safety and Mission Assurance
300 E Street, SW
Washington, DC 20024
Phone: 202/358-1668 Fax: 202/358-2778
E-mail: Michael.G.Stamatelatos@nasa.gov
(Please note change in e-mail address)

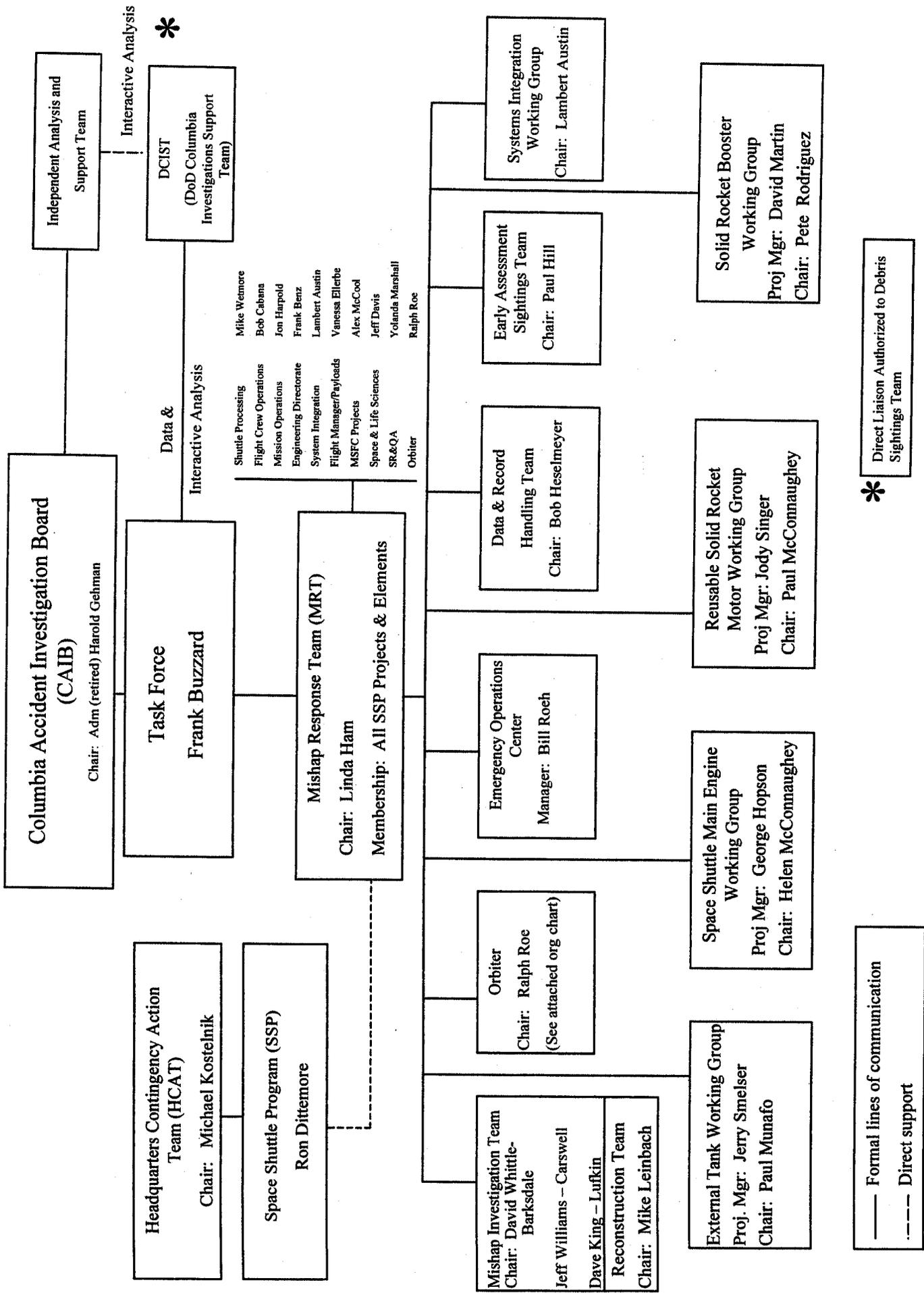
"Mission success starts with safety"

 OVE Working Group Small Org Chart.ppt

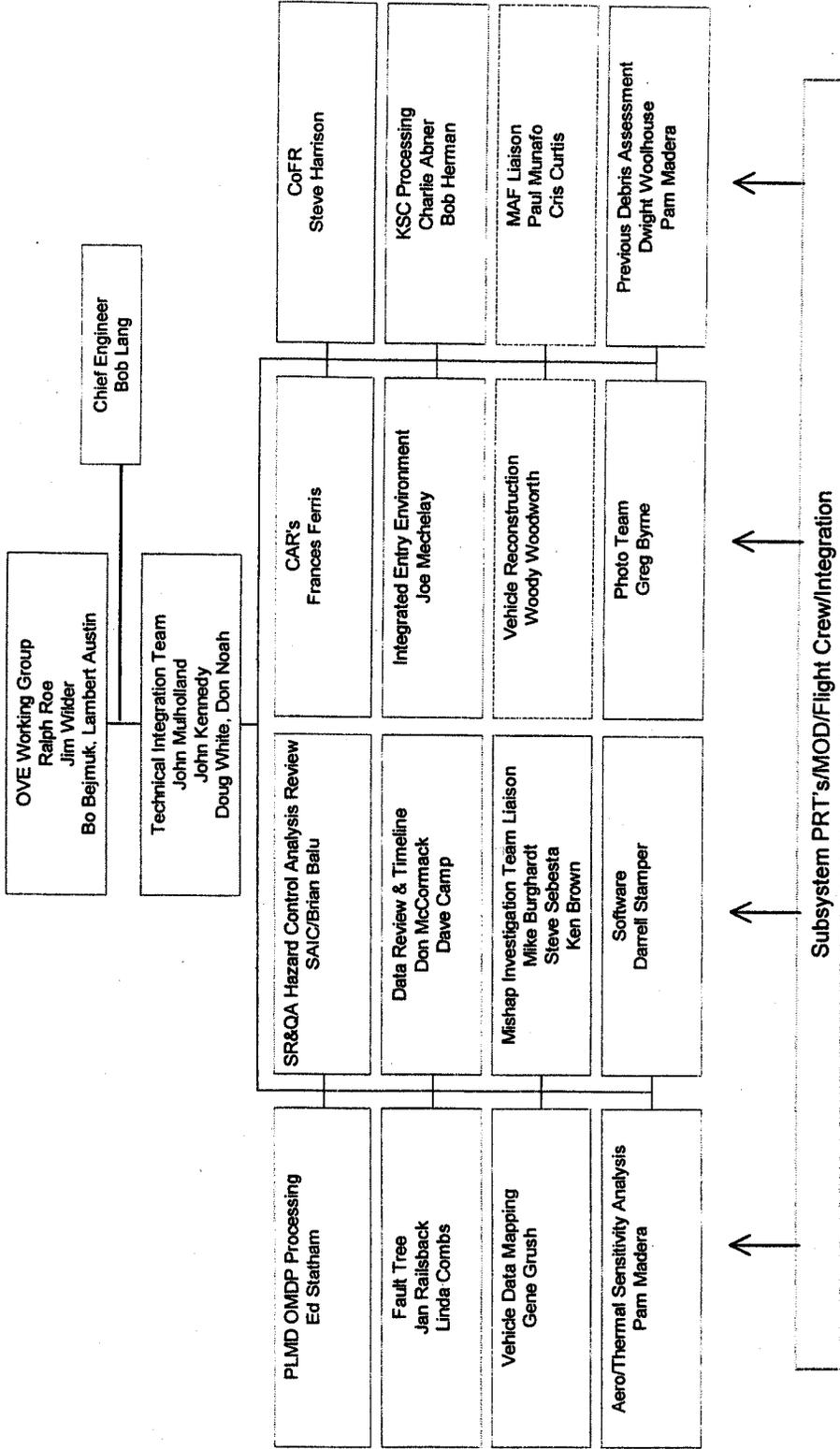
 02112003MRT STS-107-Investigation-Organization.pdf

OVE WORKING GROUP





OVE WORKING GROUP



Daily Meetings (02/02/03)

7:30 a.m. MER Technical Integration Team Subteams

All OVE working group teams have representation from SR&QA, CB/Astronaut Office, etc.

02/10/2003 1:26 PM

02/10/2003 1:26 PM

X-Sender: mkowales@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 03 Feb 2003 09:55:31 -0500
To: jlloyd@mail.hq.nasa.gov
From: Mark Kowaleski <mkowales@hq.nasa.gov>
Subject: STS-107 OSMA data
Cc: prutledg@mail.hq.nasa.gov, wbihner@mail.hq.nasa.gov,
fchandle@mail.hq.nasa.gov

Jim & Pete,

I gathered together all the STS-107 OSMA-related data that OSMA touched, saw, or responded to.

Jim: As requested, I will hand it over to you when I see you in person.

I asked Bill to provide copies of any email and launch day notes that he may have.
I'll add those to the binder when I get them.

Here is the outline of the two-volume data set:

Mark

STS-107 OSMA mission related data products

- 1) Volume I, STS-107 OSMA Data
 - a) Safety & Mission Assurance Report
 - i) FRR version
 - ii) PMMT version
 - b) Pre-flight Assessment Reviews (PFA)
 - i) RSRM-88 PFA
 - ii) SRB - B1116 PFA (SR&QA Review)
 - iii) SSME PFA
 - iv) ET-93 PFA
 - c) Preflight Assessment Review
 - i) PAR-5 Minutes Topics (PAR Planning Notes from JSC)
 - (1) Jan 10, 2003
 - (2) Jan 17, 2003
 - (3) Jan 24, 2003
 - ii) Pre-Flight Assessment Review
 - iii) PFA - FRR Tag-up

- iv) PFA - PMMT Tag-up
- v) Range Safety Data Package

- 2) Volume II, STS-107 Email Exchange
 - a) Email Exchange
 - i) Email MER daily status reports

 - ii) Email OSF status messages to Code Q
 - iii) Email SR&QA Reports
 - iv) Email Inter-office (OSMA)
 - b) Launch Operations Data (on-console)
 - i) Interim Problem Reports (Pre-tanking report)

- ii) ET Tanking Meeting SRB Special Topic
- iii) PMMT (L-1) and Launch Day Notes (Kowaleski)
PMMT (L-1) and Launch Day Notes (Bihner)

X-Sender: wfrazier@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 03 Feb 2003 11:44:05 -0500
To: sneyman@hq.nasa.gov
From: "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
Subject: Fwd: FW: MSFC STS-107 Contingency Working Groups
Cc: fchandle@hq.nasa.gov, jlemke <jlemke@hq.nasa.gov>

for posting to the PBMA website. Since this has phone numbers, I presume we can keep this internal to NASA.

I have passed on to Bryan.

From: "Malone, Roy" <Roy.W.Malone@nasa.gov>
To: "wfrazier@hq.nasa.gov" <wfrazier@hq.nasa.gov>
Subject: FW: MSFC STS-107 Contingency Working Groups
Date: Mon, 3 Feb 2003 10:35:48 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

Here is the information that we discussed.

R/Roy

-----Original Message-----

From: Coleman, Sandy
Sent: Sunday, February 02, 2003 6:43 PM
To: McCool, Alex; Hopson, George; Singer, Jody; Smelser, Jerry; Martin, David M; Mullane, Dan; Adams, Alex; Goldman, Gene; Otte, Neil; Lusk, Joe; Cash, Steve; Burt, Rick; Murphy, Alan; Schutzenhofer, Scott A; Tepool, Ronald; Greenwood, Terry; Martin, Jolene; Goodson, Amanda; Kilpatrick, Bill; Fuller, Pat; Humphries, Randy Jr; Harris, Yolanda; Nave, Lionel R; Brettel, Stephen P; Munafo, Paul; Rodriguez, Pete; McConnaughey, Helen; McConnaughey, Paul; Brunty, Joseph; Malone, Roy; Washington, Tereasa; Cloud, Shella; Kross, Denny; Singer, Chris

Subject: MSFC STS-107 Contingency Working Groups

Attached is a summary sheet of the five MSFC Contingency Working Groups including chairpersons, team members/focus areas, and room numbers/phone numbers for the working groups. Also attached are more detailed lists of the five teams which include phone numbers for the team members. Please send me updates as appropriate.

<<MSFC Contingency Working Groups.xls>> <<STS-107 Final LH Space Shuttle Contingency Working Group List .doc>>

Sandy

Deputy Manager
Space Shuttle Projects Office
(256) 544-6201



MSFC Contingency Working Groups.xls



STS-107 Final LH Space Shuttle Contingency Working Group List .doc

~~~~~  
Wayne R. Frazier  
NASA Headquarters - Code QS  
Office of Safety and Mission Assurance  
Washington, DC 20546-0001  
Ph: 202 358-0588 Fax: 202 358-3104  
~~~~~

"Mission success starts with safety"

</x-html>

**STS-113 MSFC SPACE SHUTTLE CONTINGENCY WORKING GROUPS
FEBRUARY 2, 2003**

EXTERNAL TANK WORKING GROUP			
TITLE/AREA OF RESPONSIBILITY	NAME	MSFC ORG	PHONE (AS REQUIRED)
ACTING CHAIRPERSON	P. MUNAFO	ED30	OFC 256-544-2566
ALTERNATE	N. OTTE	MP31	OFC 256-544-7231
SUPPORT MEMBERS			
STRUCTURAL	P. ROGERS	ED22	OFC 256-544-4632
	ALT: W. GREGG	ED22	OFC 256-544-5501
MATERIALS	S. GENTZ	ED35	OFC 256-544-2570
S&MA	K NEMECEK	QS20	OFC 435-863-2926
THERMAL	D. BRYAN	ED25	OFC 256-544-4265
ELECTRICAL	J. RATLEY	ED12	OFC 256-544-3448
DYNAMICS/ENVIRONMENTS	L. FOSTER	TD50	OFC 256-544-1589
PHOTO ENG ANALYSIS	T. RIECKHOFF	TD53	OFC 256-544-7677
EX-OFFICIO	S. BRETTEL	MP31	OFC 504-257-0700
EX-OFFICIO	J. SMELSER	MP31	OFC 256-544-4082
INTEGRATION	R. CLAYTON	JSC/MS2	OFC 281-483-7117
MATERIALS	S. SPARKS	ED34	OFC 256-544-2670
ORBITER	C. CURTIS	KSC	OFC 321-861-8278
PROJECT/TPS	S. HOLMES	MP31	OFC 256-544-8713
SECRETARY	J. TEREK	ED02	OFC 256-544-6817
PROPULSION	J. HONEYCUTT	TD52	OFC 256-961-1964

SOLID ROCKET BOOSTER ACTING WORKING GROUP

TITLE/AREA OF RESPONSIBILITY	NAME	MSFC ORG	PHONE (AS REQUIRED)
ACTING CHAIRPERSON	P. RODRIGUEZ	ED20	OFC 256-544-7006
ALTERNATE	J. LUSK	MP41	OFC 256-544-1907
SUPPORT MEMBERS			
STRUCTURAL	J. GENTRY	ED23	OFC 256-544-6591
ELECTRICAL & INSTRUMENTATION	M. MEADOWS	ED15	OFC 256-544-3248
S&MA	R. TUCKER	QS20	OFC 256-544-0640
SYSTEMS ANALYSIS	J. TOWNSEND	ED21	OFC 256-544-1499
THERMAL	D. DAVIS	ED25	OFC 256-544-7257
TVC	B.PAGAN	TD55	OFC 256-544-7144
MATERIALS	T. MALONE	ED33	OFC 256-544-2593
PHOTO ENG ANALYSIS	T. RIECKHOFF	TD53	OFC 256-544-7677
BSM'S	G. STORY	TD51	OFC 256-544-7618
PYRO	J. DAVIS	MP41	OFC 256-544-7019