



Surveillance Planning

Presentation to Safety Directors Meeting

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Safety and Risk Management Division

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***Protecting the Public, Astronauts and Pilots, the NASA Workforce, and
High-Value Equipment and Property***



Surveillance Planning Team

Surveillance as a method to improve likelihood of mission success

- *Surveillance suitable to the project*
- *Surveillance proportional to the risk*
- *Surveillance that meets project management needs*



Surveillance Planning Team

Team Goals:

- **Integrate surveillance approach:**
 - **Engineering, S&MA, Finance, Procurement**
- **Improve effective utilization of surveillance resources**
- **Enhance communication of surveillance results**
- **Surveillance to proactively mitigate risk (part of RBAM)**
- **Make surveillance more response to project management**



Surveillance Planning Team

Current Members:

- JSC - Connie Poole (procurement)
- JSC - Lee Norbraten (Management Systems Office)
- KSC - Larry Tucci (S&MA)
- KSC - David Culp (Procurement)
- KSC - Terry Smith (Quality)
- MSFC - Barry Musick (Engineering)
- MSFC - Charlie Chesser (S&MA)
- SSC - Mike Smiles (S&MA)
- GSFC - Mary Clark (EVM)
- S - Nancy Porter (Program Office - Space Science)
- Y - Tom Magner (Program Office - Earth Science)
- M - John Castellano (Program Office - HEDS)
- Q - Steve Newman (PBMA)
- Q - Tom Whitmeyer (Quality)
- H - Jeff Cullen (Procurement)



Mission Success Starts With Safety

Surveillance Suitable to the Project



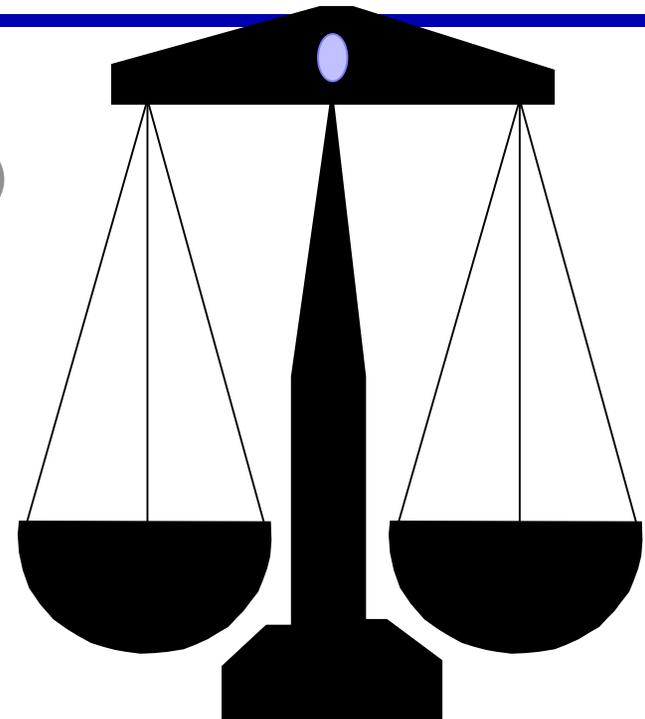
Low Dollar Amount

Non Flight

No Hazardous Operations



Dynamic



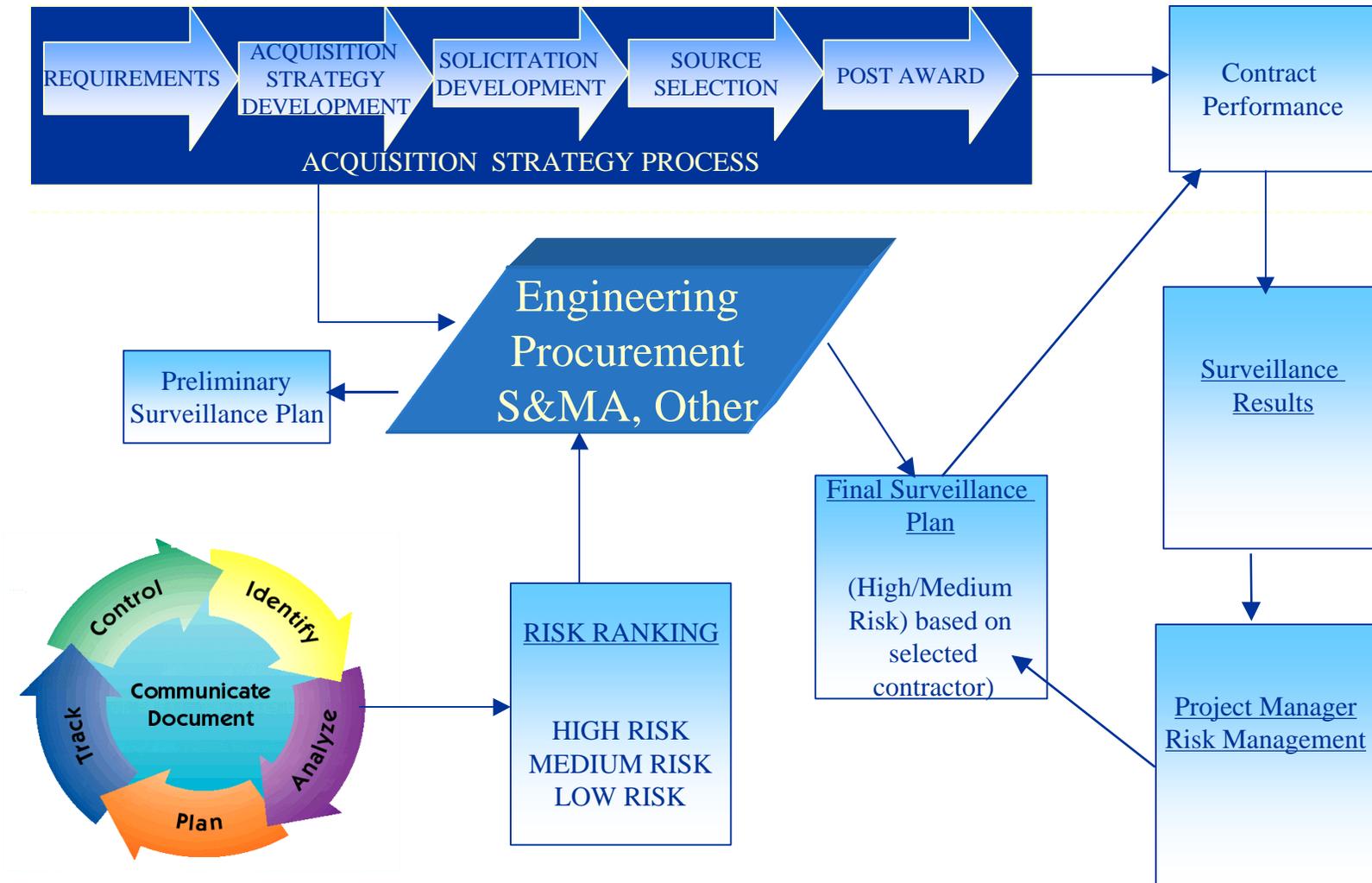
High Dollar Amount

Flight

Hazardous Operations

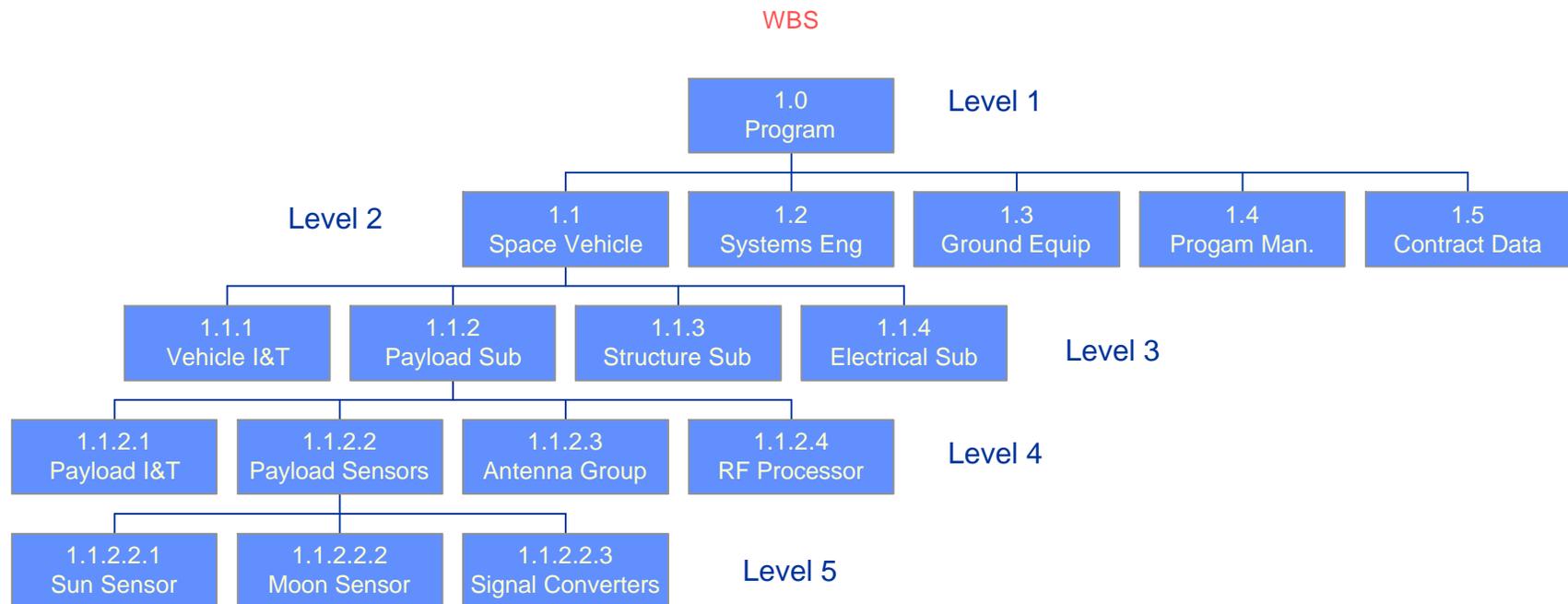
Based on “Risk Management”

Surveillance Proportional to the Risk



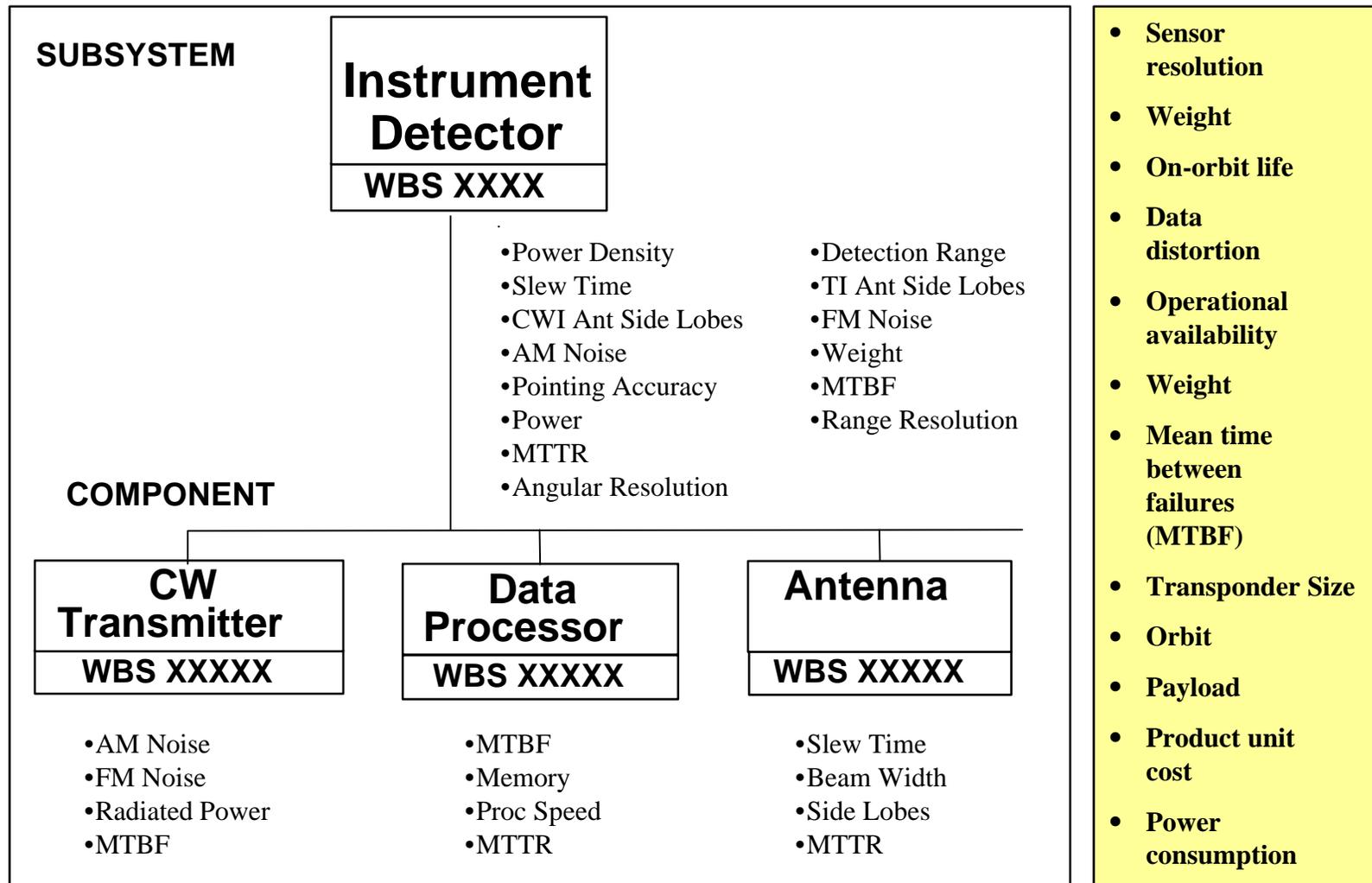


Surveillance Starts with the SOW





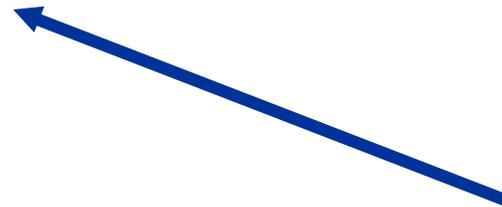
SOW Example





SOW WBS Break Down

1. SOW Paragraph Number	2. Performance Standard	3..Surveillance Method	4. Adjusted Surveillance Method	5. Reward linked to contractor's performance (as applicable)
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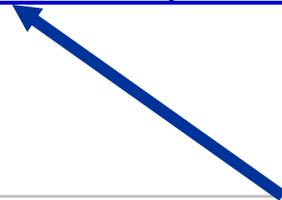


1. Needs Assessment	2. Risk Assessment	3. SOW Paragraphs
Analyze work requirement and break it down to components, resulting in a clear description of performance output requirements. WBS (top-level overview that provides the program planning and controlling basis by subdividing the work into successively smaller increments until a manageable element is reached) should be developed.	Work risk issues should be (1) identified and (2) analyzed (evaluated (impacts/severity, probability, and timeframe), classified, and prioritized).	SOW development (i.e. describing the contractor's performance requirements) should begin with those areas identified as having the highest risk impact and probability. These areas may also contain the highest level of detail. The SOW should correspond to the WBS.



Performance Standard

1. SOW Paragraph Number	2. Performance Standard	3..Surveillance Method	4. Adjusted Surveillance Method	5. Reward linked to contractor's performance (as applicable)
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4. Risk Assessment	5. Performance Standards
Risks associated with individual SOW paragraphs should be identified and analyzed. Essential and critical (but not incidental) work should be identified.	A performance standard (the measurement threshold or limit that establishes the point at which successful performance has been accomplished) and acceptable quality level (e.g. maximum error rate, or deviation from 100% achievement) should be assigned to every essential or critical task.



Surveillance Method

<p>1. SOW Paragraph Number</p>	<p>2. Performance Standard</p>	<p>3..Surveillance Method</p>	<p>4. Adjusted Surveillance Method</p>	<p>5. Reward linked to contractor's performance (as applicable)</p>
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<p>6. Measurement Method</p>	<p>7. Risk Assessment</p>	<p>8. Preliminary Surveillance Plan</p>
<p>Measurement method is defined. It can be an outcome measure (an assessment of the results of a program activity compared to its intended purpose) or and output measure (tabulation, calculation or recording of an activity that can be expressed in a quantitative or qualitative manner).</p>	<p>Determining how difficult it is to verify the performance standard and whether it should be done by the contractor or government and to what degree (how difficult it is to obtain the measurement and how accurate it is - also likelihood of detection and consequences if not detected)</p>	<p>Surveillance methods against performance requirements and standards documented. Level and methodology for surveillance dependent on the measurement method, risk of the work and confidence in contractor.</p>



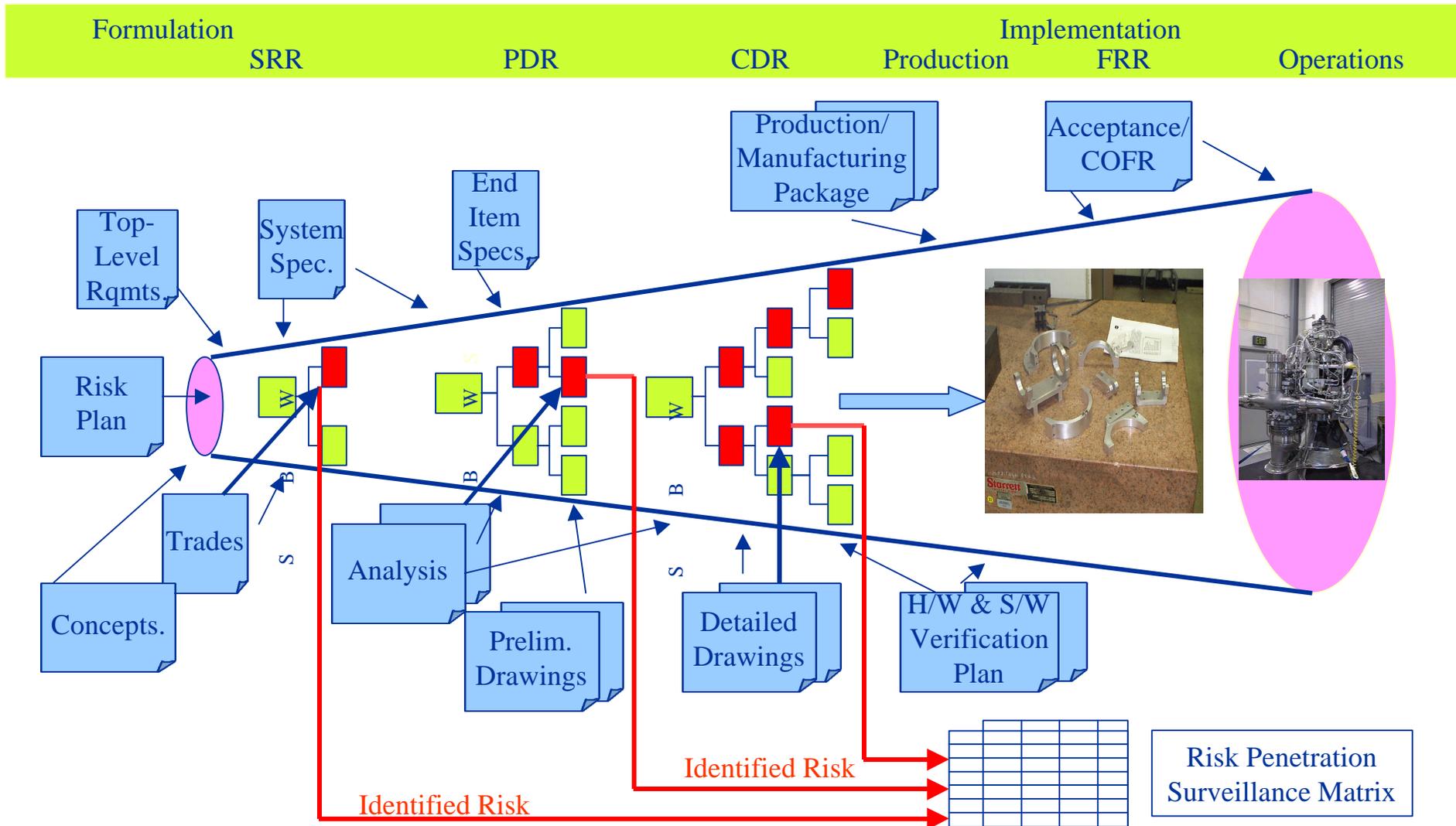
Adjusted Surveillance Method

1. SOW Paragraph Number	2. Performance Standard	3. Surveillance Method	4. Adjusted Surveillance Method	5. Reward linked to contractor's performance (as applicable)
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9. Contractor Selected and Award Made	10. Risk Assessment	11. Surveillance Plan
	Risk associated with selected contractor is identified and analysed.	Preliminary surveillance plan adjusted based on risk associated with selected contractor

13. Risk Assessment	14. Adjusted Surveillance Method
At periodic points in the contract, risk associated with the work and contractor should be reviewed. to determine if	Revisions to the type and level of surveillance should be made based on the risk.

Surveillance Evolves as Risk is Better Defined

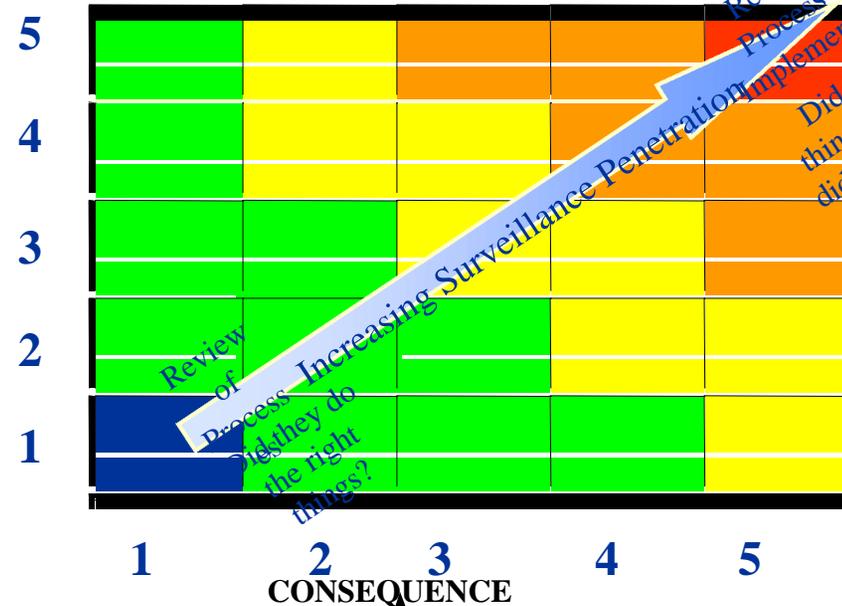




WBS Based Risk Analysis Process

Level	Process Variance/ Probability of Occurrence
1	Minimal/Remote
2	Small/Unlikely
3	Acceptable/Likely
4	Large/Highly Likely
5	Significant/Near Certainty

LIKELIHOOD

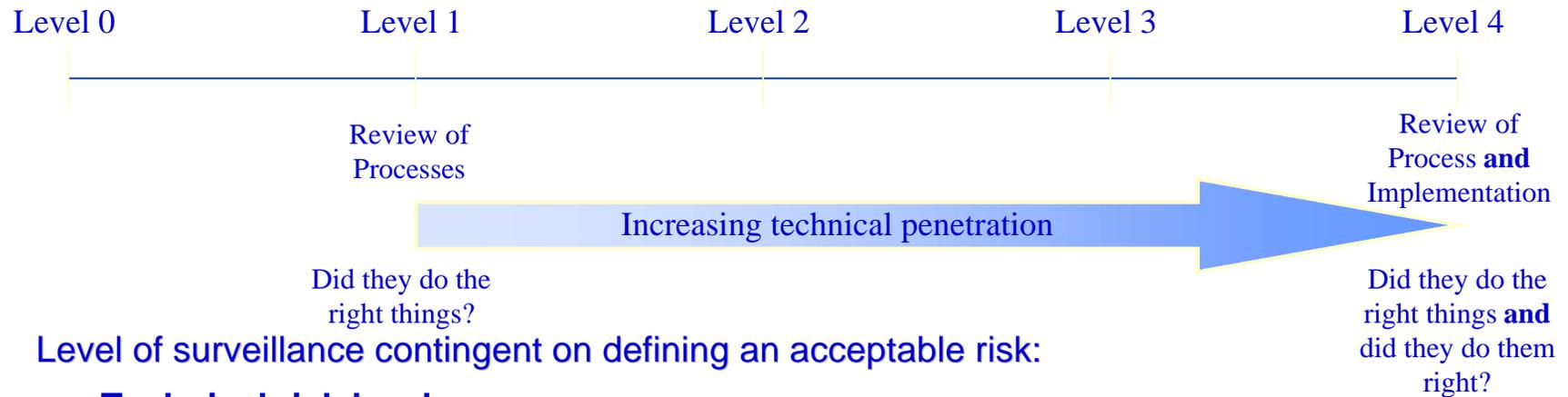


Level	Performance	Schedule	Cost
1	Minimal or No Impact	Minimal or No Impact	Minimal or No Impact
2	Acceptable with some reduction in margin	Additional resources required; able to meet need dates	<5%
3	Acceptable with significant reduction in margin	Minor slip in key milestone; not able to meet need dates	5-7%
4	Acceptable, no remaining margin	Major slip in key milestone or critical path impacted	>7-10%
5	Unacceptable	Can't achieve key team or major program milestone	>10%



Surveillance Is a Continuum

No Penetration



Level of surveillance contingent on defining an acceptable risk:

- **Technical risk levels**
- **Amount of trust in performing organization's abilities**
- **How well processes are defined**
- **Level at which NASA is performing Task Agreements for the program**
- **Human rating of vehicle**
- **Program visibility and impact of failure**
- **Design complexity, manufacturing complexity, producibility**
- **Value of asset**



Level of Surveillance By Discipline (Technical)

Level 0	No Penetration <ul style="list-style-type: none">• Accept performing organization's tasks at face value (based on assessment that no penetration is required)• Contractor develops and implements verification plan
Level 1	Low Penetration <ul style="list-style-type: none">• Participate in reviews and Technical Interchange Meetings and assess only the data presented• Perform periodic audits on pre-defined process(es)• Chair board or serve as board member, or RID writer, at a formal review• Participate in resolution and closure of issues• Review verification plan and its implementation
Level 2	Intermediate Penetration <ul style="list-style-type: none">• Includes low penetration with addition of daily or weekly involvement to identify and resolve issues• Review verification plan, its implementation, and selected verification closure data
Level 3	In-depth Penetration <ul style="list-style-type: none">• Includes intermediate penetration with addition of:<ul style="list-style-type: none">• Methodical review of details• Independent models to check and compare vendor data, as required• Review verification plan, implementation, and concur in all verification closure data
Level 4	Total Penetration <ul style="list-style-type: none">• Perform a complete and independent evaluation of each task• Independent review of all verification documentation (including closure data) and witness verification testing



Level of Surveillance By Discipline (Business)

Level 0	No Penetration <ul style="list-style-type: none">• Accept performance at face value (assess that no penetration is required)
Level 1	Low Penetration <ul style="list-style-type: none">• Participate in or perform periodic audits on pre-defined process(es) and/or systems• Participate in resolution and closure of issues• Hold periodic status and open actions/issues reviews
Level 2	Intermediate Penetration <ul style="list-style-type: none">• Includes low penetration with addition of daily or weekly involvement to identify and resolve evolving issues• Institute specific, regularly planned status and open action/issues reviews
Level 3	In-depth Penetration <ul style="list-style-type: none">• Includes intermediate penetration with addition of methodical review of details• Government Senior Business Managers may participate in reviews
Level 4	Total Penetration <ul style="list-style-type: none">• Perform a complete and independent evaluation of each task• Independent review of all Contractor final contract documentation• Regularly scheduled meetings of Senior Business Managers (Contractor and Government) to review current/anticipated issues and overall status



Defining Who Is Responsible For Surveillance

SOW Section

Organization

Purpose

PMS Number	SOW Section	PMS Title	Product OPR	CoFR	Award Fee
A-GO-001	1.4.1.3	Verify Orbiter Launch Readiness	PH-M	✓	✓
A-GO-002	1.5	Procedures Are Available to Support Operations	PH-M	✓	✓
A-GO-003	1.5	Provide Accurate Integrated Test Schedules	PH-M	✓	✓
A-GO-004	1.5.2.4	USA is Ready to Start Launch Countdown (LCD)	PH-M	✓	✓
A-GO-005	1.5.5.1	Provide Operational Services to Non-SFOC Users	PH-J		✓
A-GO-006	1.5.5.2	Maintain Systems, Software, Firmware, Facilities and Equipment	PH-J	✓	✓
A-GO-007	1.5.5.3	Document Contractor Generated Changes	PH-J	✓	✓
A-GO-008	1.5.5.3	Configuration Engineering Documentation & S/W Code Released with Minimal Errors	PH-J	✓	✓
A-GO-009	1.5.5.3	Engineering Documentation Released Complete and with Minimal Errors	PH-J		✓
A-GO-010	1.5.5.3	Document CCMS Changes to Configured Facilities, System and Equipment	PH-J		✓
A-IL-001	1.5.5.4	Logistics Parts & Material Provisioning	PH-N		✓
A-IL-002	1.5.5.4	Logistics Hardware Suitability	PH-N	✓	✓
A-IL-003	1.5.5.4	Orbiter Logistics Cannibalization	PH-N		✓
A-IL-004	1.4.1.2	Orbiter Logistics Hardware Goodness Report	PH-N	✓	✓
A-IL-005	1.4.1.2	Orbiter Logistics TPS Hardware Timeliness	PH-N		✓
A-IL-007	1.5.5.4	Logistics GSE Cannibalizations	PH-N		✓
A-IL-008	1.4.1.2	Orbiter Reparable (LRU) Fill Rate On-Time	PH-N		✓
A-IL-009	1.4.1.2	Orbiter Non-Reparable (MSP) Hardware Fill Rate On-Time	PH-N		✓
A-IL-010	1.4 & 1.5.5.4.2	Ground Operations Hazardous Waste Reduction	TA-D2		✓



Defining How Surveillance is Conducted

Ground Operations Surveillance Matrix

Responsible Organization Key PH, PH-M1, PH-P, PH-B, OP, TA, Appropriate Org. PH-M2, PH-F, PH-G, PH-H, PH-J, PH-K

TMR Resp	SOW Section	Contractor Performance Evidence	NASA Activity	Frequency of NASA Activity
	The contractor shall conduct Contract Management Reviews (CMR) to provide NASA with current status of the contractor's financial, work force, and technical activities. CMR's shall be conducted in accordance with an agreed to schedule.	USA Ground Operations S&MA provides input and safety assessments to the PAR, SSRP, and PRCB		
MI	1.1.1.2.2 PROGRAM REVIEWS The contractor shall participate in and support program meetings and reviews. This shall include presentations covering the contractor's areas of responsibility; identification of impacts due to proposed requirements changes; the planning and implementation of the program meetings and reviews; and the coordination and resolution of action items with NASA and other contractor representatives. Examples of these meetings and reviews are: Flight Readiness Review (FRR), the Prelaunch MMT Review, program level control/change boards, anomaly resolution meetings, and government and non-contractor design reviews that impact the contractor's area of responsibility.	Participation in presentations at Program Reviews	Preflight review meetings Chief Engineer as defined in KPH-010 insight plan under launch/landing execution Joint NASA and Contractor participation in Milestone reviews per KPD 8630.3. Attendance roster is maintained by USA, or Space Shuttle Program Office if Level II review.	Per flow Each Milestone per KPD 8630.3.
MI	1.1.1.2.3 FLIGHT READINESS The contractor shall review flight preparations to ensure flight readiness in accordance with NSTS 08117, Requirements and Procedures for Certification of Flight Readiness, and SSP 50108, Certification of Flight Readiness for Space Station. The contractor shall develop and implement an auditable approach to verify and ensure that flight preparation responsibilities and requirements are met and all problems dispositioned. This approach shall include as a minimum open item reviews, Flight Readiness Reviews (FRRs), Prelaunch MMT Reviews, pre-test briefings, and presentation of an integrated SFOC Certificate of Flight Readiness (CoFR) endorsement. This CoFR shall be prepared in accordance	PMS Metrics GO-123, GO-124 Shuttle Engr. Directive (SED) T-55 LRR- Engr. Req. Satisfaction (ERS)	Reviewed during NASA internal CoFR process per insight plan KPH-010 (PE CoFR) Reviewed during NASA internal CoFR process per insight plan KPH-010 (PE CoFR) NASA signature required on ERS as defined per SPI SP-507 Joint NASA and Contractor participation in Milestone reviews per KPD 8630.3.	Per flow Each Milestone per KPD 8630.3.

TMR Responsibility Key
 ✓ - Full Responsibility
 GO - Ground Ops Only
 MI - Management Insight

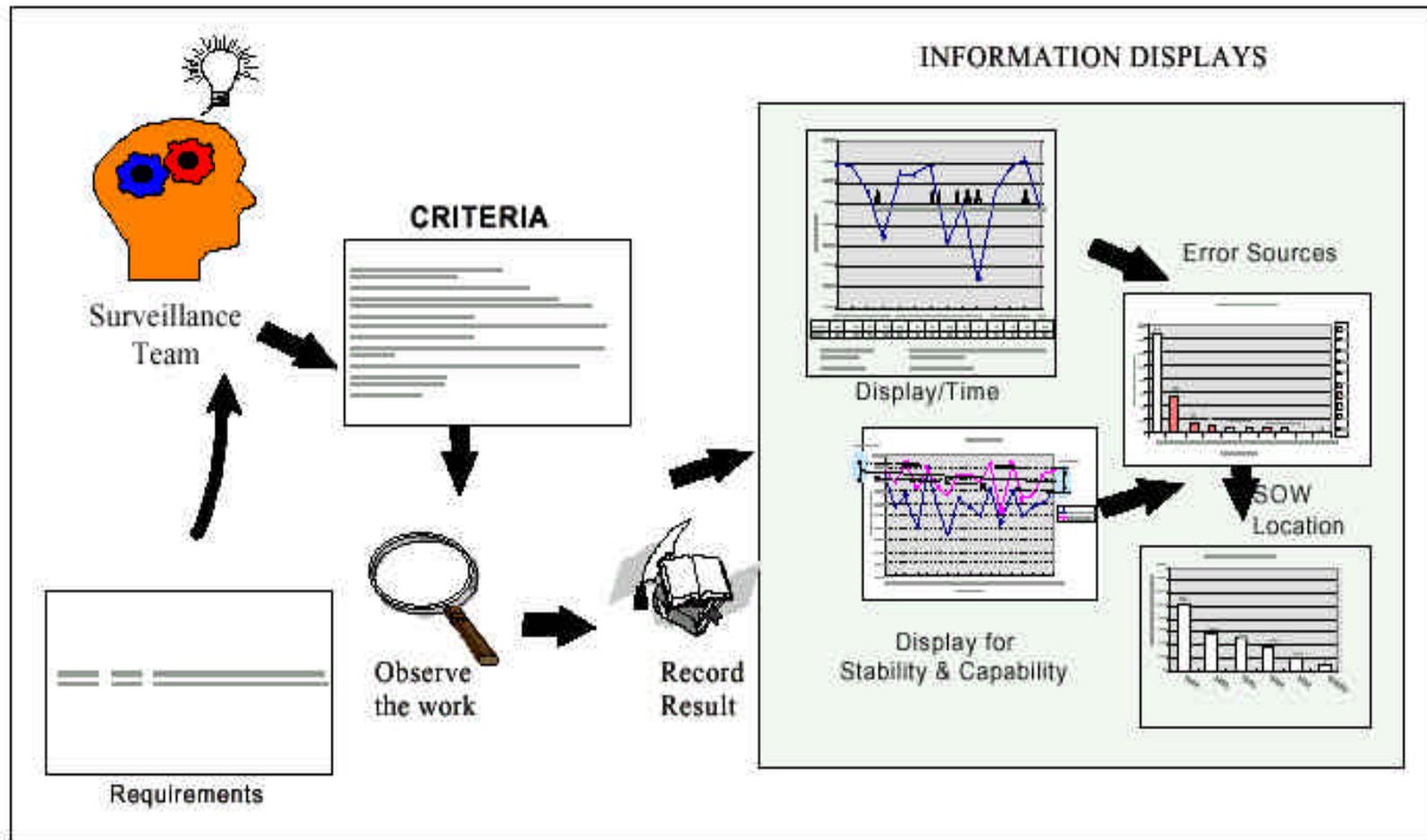
Contractor Performance Evidence Data, Reports and/or Metrics generated by the contractor and used by NASA to assess performance (proof of performance required).

NASA Activity NASA activity used to review or assess contractor performance. Proof must be provided that activity was executed.

Frequency of NASA Activity Frequency required to assess contractor performance (e.g., once per specific flow activity, once per month, etc.).



General Process For Metric Development





Sample of Surveillance Metric

Metric Description:

- What is measured
- Why it is measured
- How is it validated

Historical Trend:

- Average Past Performance

Current Performance:

- Statistically valid data (random sample)
- Metric limits (performance requirements, process variance, etc.)
- Data properly normalized
- Direction indicator for desirable trend

Historical Error Types:

- Denotes historical distribution of problem type
- Examples are bad paper, bad parts, workmanship, etc.

Historical Error Sources:

- Denotes historical responsibility for the errors
- Examples are organizations, core processes, etc.

Data Table:

- Numerical data used to produce metric
- Provides sample size (number of measurements)
- Provides scope (value of normalization)

Error Types:

- Denotes distribution of problem type
- Examples are bad paper, bad parts, workmanship, etc.

Error Sources:

- Denotes responsibility for correcting errors
- Examples are organizations, core processes, etc.

Assessment:

- Objective/Factual assessment of the metric
- Summary of metric results (value and trends)
- Contributing factors to exceptional or poor performance (requires core process expert)



Surveillance Planning Team Activity

