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How to Give a BAD Technical Talk:
Observations Based on 20+ Years of Experience

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Motivation

- When preparing and presenting a technical briefing, you have three elements at your disposal to make the talk bad:

  1. **Form:** How material is visually displayed
  2. **Content:** What material to include, how it is organized
  3. **Delivery:** How you verbally present the material

- Messing up *just one of these three* will suffice to ruin the briefing.

- Messing up all three simultaneously will mark you as a *truly awful presenter*. Success in meeting this standard will:

  - Reduce the number of *bothersome requests* that come to you to make presentations in the future;
  - Diminish *your influence* on programs and organizations;
  - Minimize the *impact of your technical ideas* and contributions.

Outline

1. Form
2. Content
3. Delivery
4. Summary

Visual Presentation

- **Slides that have good form (visual presentation) will focus the audience's attention on points that the speaker wants to emphasize.**

- ***For the bad speaker*** **seeking to bore, confuse, distract, or antagonize his (or her) audience,** ***the use of poor form is a key enabler.***

- **Some of the elements of form to be discussed are:**

  - Slide layout,
  - Font color and size,
  - Bulleting,
  - Background colors,
  - Tables, and
  - Figures.

Layout

- Oversized logos and incidental graphics or pictures help to focus attention away from the technical content of your slides.
- This encourages the audience to “zone out” early on in the briefing.

Font Size

- **The use of undersized fonts is one of the *most popular and effective strategies* available to the bad speaker.**

- **Boldface, 18- or 20-point fonts are *just too readable* by the audience. Instead, experiment with the following:**

  - 18-point, non-bold
  - 16-point, non-bold, narrow
  - *14-point, non-bold, italic*
  - 12-point, non-bold, blue, narrow
  - **12-point, boldface, yellow**
  - 10-point, non-bold
  - 10-point, non-bold, yellow

- **Micro-fonts allow you to cram so much detail onto a single slide that the audience cannot possibly follow what you are showing!**

Font Color, Bulleting

Monochromatic black-on-white slides help the audience to lose track of the salient points in your briefing. If you don't call anything out as particularly important, they won't either. This ensures that the audience will not remember anything at all about your talk once it is completed. Using bright colors for a few key ideas or phrases calls attention to these items, something that helps the audience to understand what the speaker considers to be significant. Bad speakers want to keep this a mystery! In addition, if you fail to break out the points that you are trying to make into separate bullets, the audience will have the pleasure of trying (or not) to read through the content as you talk. They can read your prose or listen to your comments, but not both at the same time. Forcing them to choose is an effective means of generating hostility. Finally, this format encourages a monotonic presentation style by the speaker, a topic that will be covered shortly.

A Good Table

- **Well-formatted data tables, like the one shown here, can *enhance a technical briefing* by providing a concise summary of significant results or findings.**

(U) Target Recognition Results:

Target Class:	*Detection Rate (%)*	*False Alarm Rate (count/km²)*
Missile Launcher	97	0.0008
Main Battle Tank	92	0.002
Jeep	87	0.13
The content of this table is UNCLASSIFIED		

- **It is *limited in size*, *legible*, and *properly portion marked*. The *elements are listed in a meaningful order* (easiest to most difficult targets). The table has a *title*, and *provides units* for the performance measures that are reported.**

A Bad Table

(U) Table 1

	JKT	NFG-Y2
Dog	2.1	8319
Tiger	0.04	721009
Horse	3.1415	0.21
Armadillo	7005	6.97
Amoeba	6.02	98776
Donkey	1004	7472
T-Rex	86.61	42.1
Gorilla	9742	0.06
Pygmy Goat	4.7	1110
Llama	0.002	6.7
Rattlesnake	4.13	-1009
Frog	32.5	32.1
Ladybug	98.6	121.5
Zebra	1443	87.56
Weasel	1.78	43.44
Hippo	2.005	19.781
Snail	4.222	7289.3

- **Tables like the one at left are more appropriate in bad talks. *Its many features include:***
  - **No title**
  - **Small fonts**
  - **Random ordering of elements**
  - **Unclear column headings**
  - **No listing of units**
  - **Boring layout**
  - **Incomplete portion marking**
- **To further enhance the effect, *add lots more rows and/or columns,* and make a little joke to the audience about the slide being an "eye chart". *This leaves them feeling inadequate for having such poor eyesight.***

Fill Color

(U) Table 1:

	JKT.7	NFG-Y2
Dog	2.1	8319
Tiger	0.04	721009
Horse	3.1415	0.21
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Amoeba	6.02	98776
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- **A bad situation can be made even worse by selecting *background colors that are too dark for the text*.**
- **This same tactic is frequently employed in portion marking, when a bright red background is used to call attention to the classification level.**
- **If the font is left black, the lettering is difficult to read. Boldface white text on a dark background provides better contrast.**

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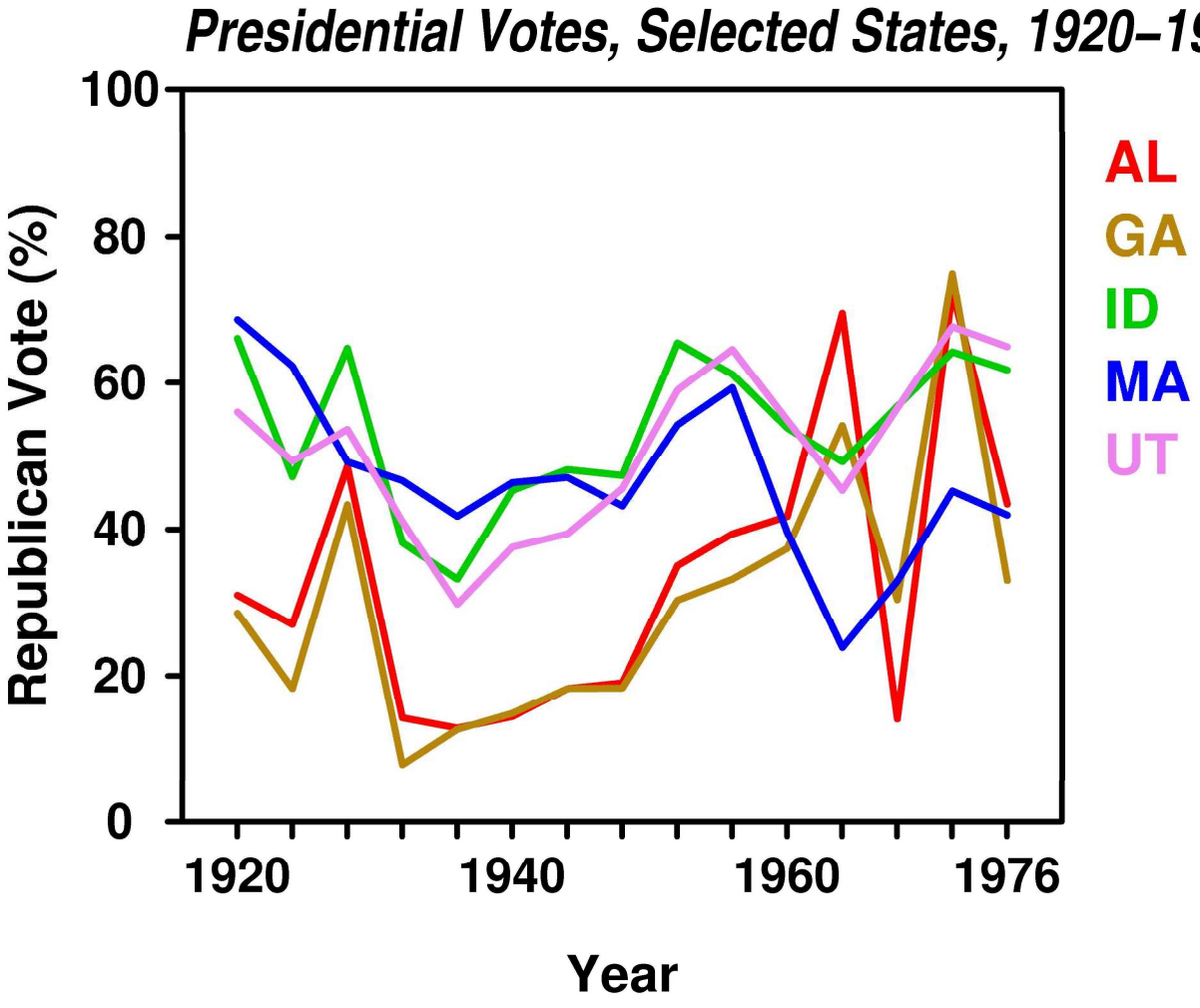
A Good Figure



A text box is used to point out interesting features of the plot, like:

- Correlations between (AL,GA) and (ID,UT).

- AL, GA vote for the hometown candidates in 1968 (Wallace, AL) and 1976 (Carter, GA).

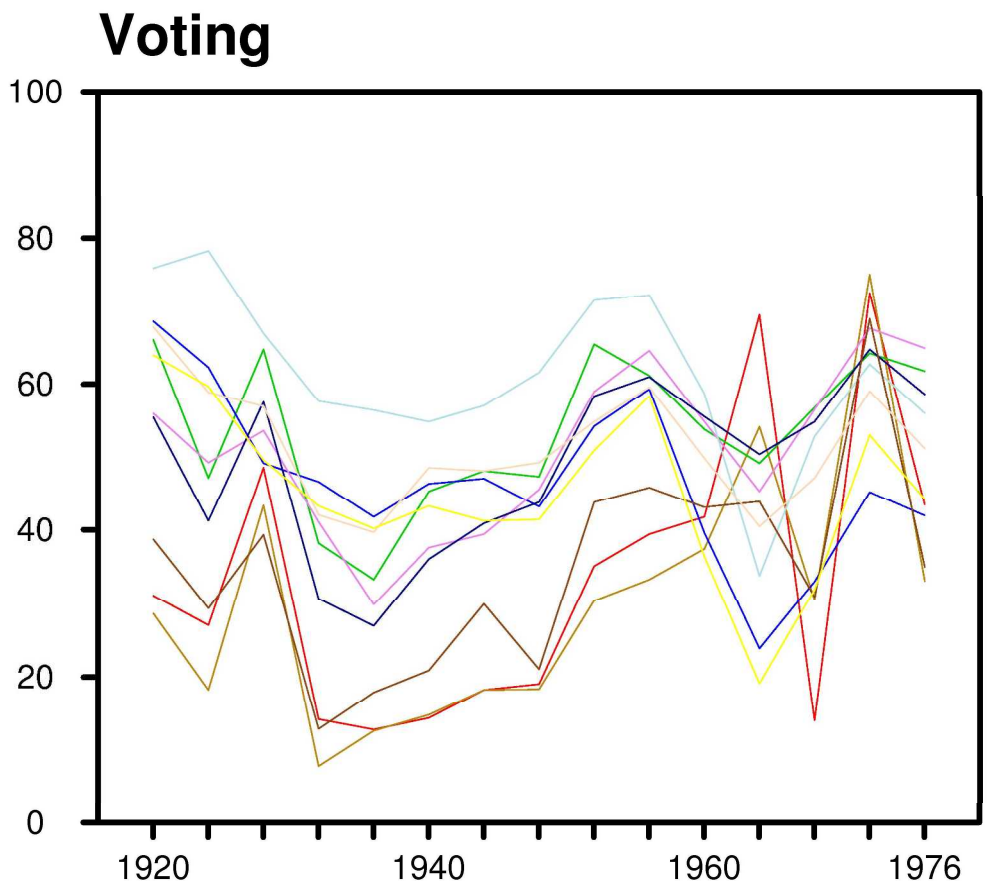
- The most Republican of these states in 1920 was Massachusetts!

Characteristics of a Bad Figure

It is easy to take a nice figure like the one on the previous slide and make it bad. This is usually accomplished by combining some (or all!) of the following strategies:

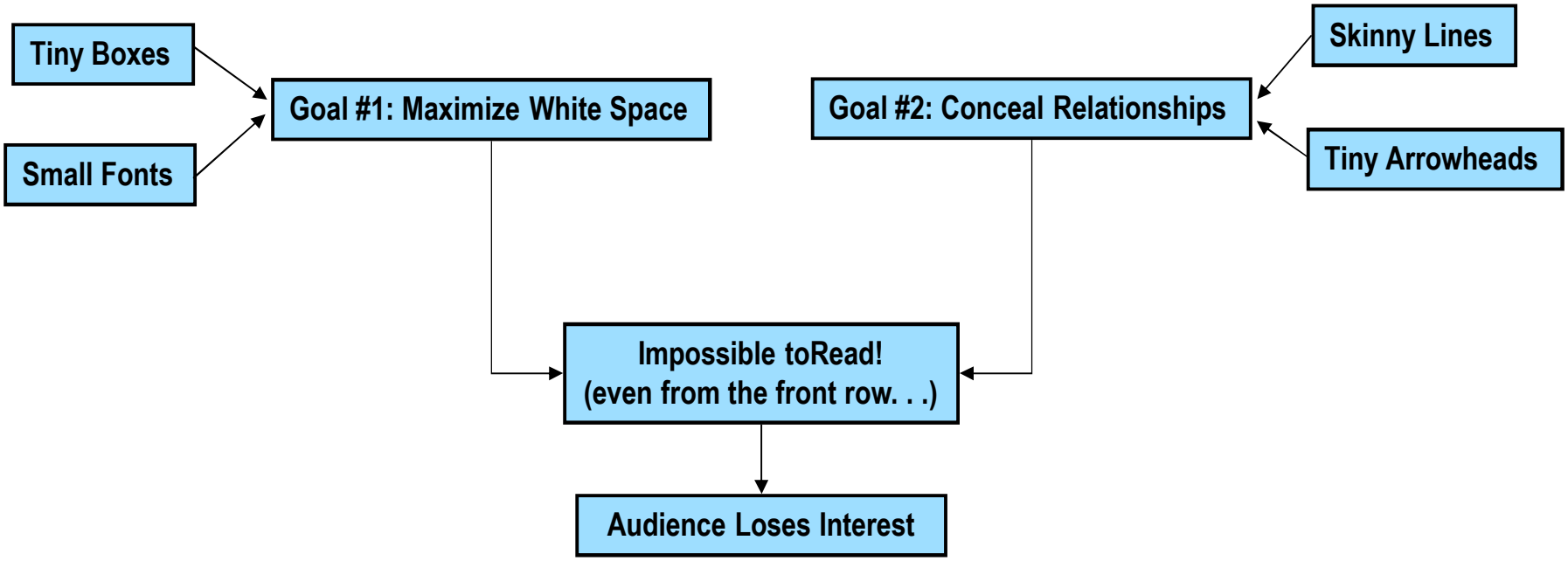
1. ***Omit title and axis labels***, **or just make them illegible.**
2. ***Do not provide units*** **for any of the quantities plotted.**
3. **Use very *narrow lines*.**
4. ***Leave off a key*** **to the meaning of colors and/or symbols.**
5. **Use *colors that contrast insufficiently*** **with one another, or with the background.**
6. **Provide *no text box*: Let the viewer figure out what matters!**
7. ***Data overload*****: Include so much information that interesting trends are lost in the detail.**

A Good Figure Gone Bad



Voilà!

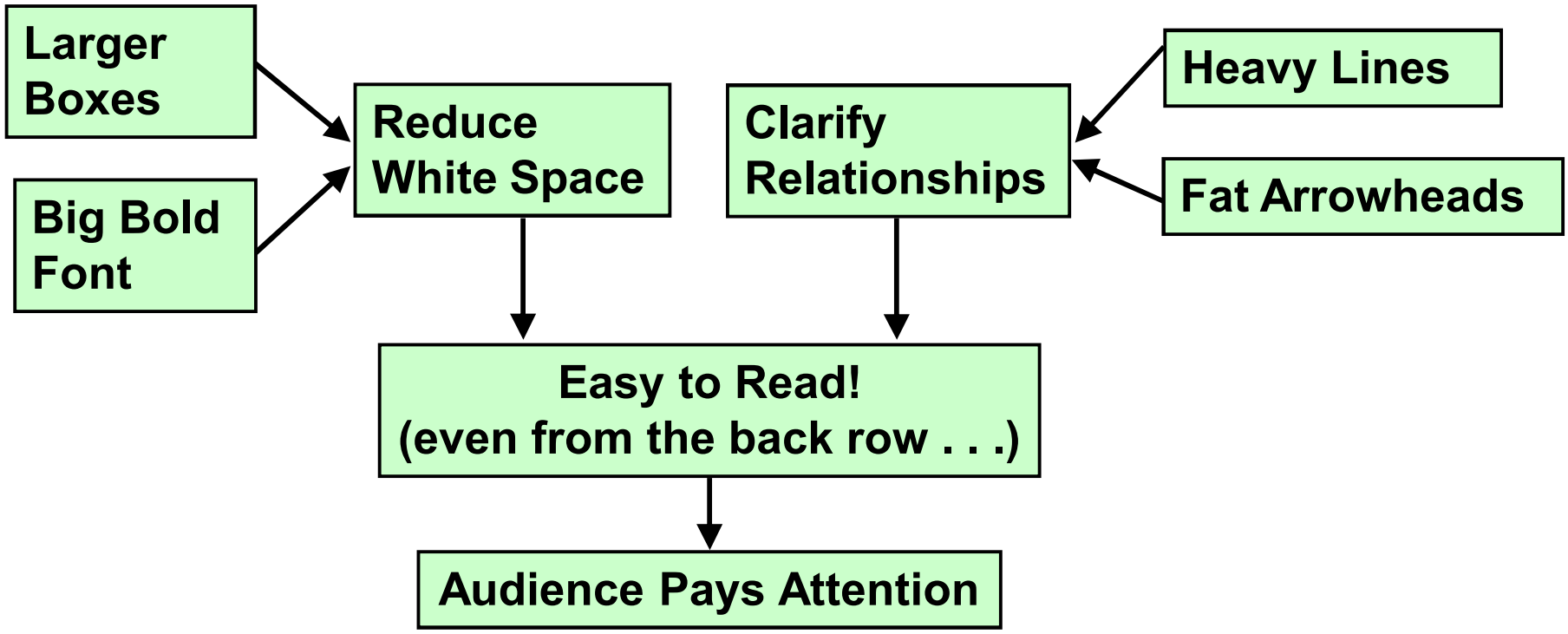
Charting a Path to Failure



Flow charts (and organizational charts) are common in technical talks.

When designing bad charts, *your primary goal should be to maximize white space* on the slide. Avoid educating the audience about the relationships between different entities.

Charting a Path to Success



To produce effective charts, make sure that your fonts, lines, and arrowheads are ***visible to the entire audience***.

Outline

1. Form
2. Content
3. Delivery
4. Summary

Elements of Content

- **Presenters who do a good job with content select the right technical and programmatic material, and organize it properly.**

- **Bad speakers *do not bother* with the following issues:**
  - **Need for slides to *stand alone*,**
  - ***Structure* of the briefing,**
  - ***Audience* technical level and interests,**
  - ***Acronym overload*, and**
  - **Choosing *interesting examples*.**

Self-Contained Slides

- In ancient times (ca. 1980), technical presentations generally used hand-written transparencies. *Slides were rarely viewed in the absence of the author*. The usual advice for speakers was to design slides that would remind them of what they wanted to say at each point in the briefing. The slides, by themselves, did not need to tell a coherent story: That was the speaker's job.

- Nowadays, electronic briefings are standard. *PowerPoint files are often widely distributed* to individuals not attending the initial presentation. For this reason, good briefing materials should be largely self-contained. This gives the author the potential for *influence well beyond the original live presentation*.

- A bad briefing, on the other hand, has no such limitations. Terse wording, plots without explanation, and unsupported conclusions are encouraged.

Need for an Outline

- **Good technical talks exceeding 10 minutes (or so) in length usually begin with an outline, which maps out for the audience what to expect.**

- **If the talk is fairly long (exceeding 25 minutes or so) repeating the outline as each new topic is introduced serves as a placeholder to keep the audience engaged.**

- ***To give a bad talk, get off on the wrong foot by omitting the outline.*** **Jump right in and let the audience try to guess where you are, and where you plan to go.**

Structure of the Briefing

- **A good technical briefing should include most of the elements of a good technical paper:**
  - ***Motivation:*** **Why are we interested in this?**
  - ***Procedures and findings:*** **What did we do? What did we learn?**
  - ***Implications:*** **What did we conclude or decide? Where do we go from here?**
- **The bad speaker will omit at least one of these.** ***Leaving off the motivation is always a good choice.*** **Instead of justifying your interest in a topic, simply assume that everyone in the audience is familiar with the technical and programmatic background.**
- **If there are new personnel present, it's not your responsibility to bring them up to speed.** ***Too bad if they are senior sponsor representatives looking for interesting research to fund.***

Know Your Audience

- **Briefing at an inappropriate level of technical sophistication and/or detail is a hallmark of the bad presentation. Some examples:**
  - ***Excessive use of equations and/or scientific concepts*** **when briefing military decision-makers. This audience needs to be convinced that your work will enable mission success. They do not care which theorems were invoked in establishing optimality.**
  - ***Belaboring the obvious*** **in an engineering or technical forum. Practicing engineers do not need a 20-minute tutorial on the need for repeated measurements in the presence of noise.**
- **Good speakers find out ahead of time what the audience will expect, and *tune their message accordingly*. The organizer of the meeting, conference, or visit should be able to provide guidance.**
  - **If expectations are still unclear, a good strategy is to set the technical level on the low side and *offer to provide more detail on request*.**
  - **You can always *prepare backup slides* to have on hand.**

Acronyms

- ***The use of acronyms has the potential to divide the audience into two groups:*** **Those who are "in the know", and those who can't follow the discussion.**

- **Good speakers avoid this situation by spelling out acronyms on the slides upon first usage (best approach), or by verbalizing the full name of the team, program, agency, or concept (acceptable).**

- ***Bad speakers are oblivious to the fact that some members of the audience don't share the same lingo.***

- **A few common acronyms are well understood by the general population; these include NATO, FBI, PhD, and radar. Some may be obvious in the context of the conversation (e.g., TD or QB when discussing football). In all other cases, *a good speaker will be sure to clarify the meaning of acronyms to the audience, while a bad speaker won't bother.***

A Few Common Acronyms

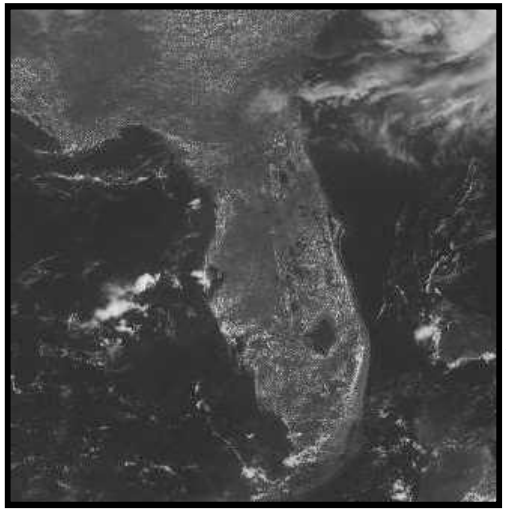
AAA	American Automobile Association, Anti-aircraft artillery
CPS	Certified Professional Secretary, Command and Pointing System
FPA	Free of particular average, Focal plane array
GPS	Gallons per second, Global Positioning System
MDA	Missile Defense Agency, Maritime Domain Awareness
OBE	Order of the British Empire, Overtaken by events
PBR	Professional Bull Riders, Pabst Blue Ribbon
PC	Personal computer, Politically correct
RFI	Radio Frequency Interference, Request for Information
RN	Royal Navy, Registered Nurse
SAR	Search and Rescue, Synthetic Aperture Radar

It only takes *a few seconds* to say the full phrase!

Choose Boring Examples

- When choosing examples to illustrate the sensor, algorithm, or processing technique under discussion, a bad speaker will *select cases that have no intrinsic interest* to the audience.

Frames from a video of a parking lot

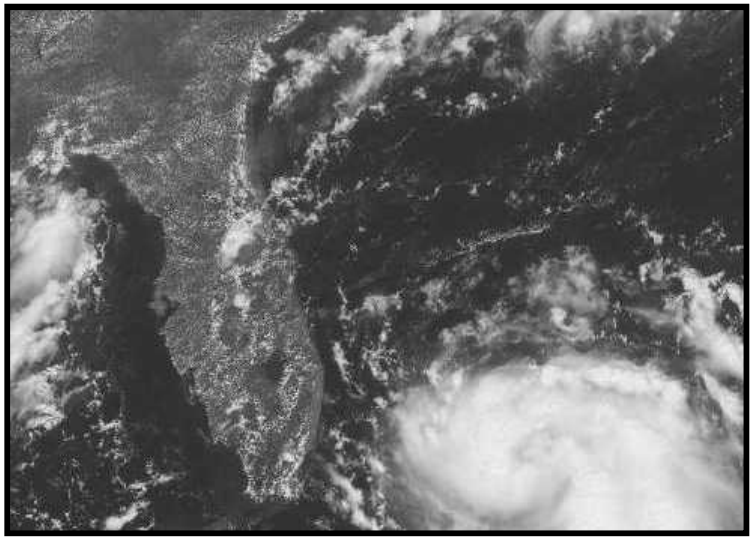


Satellite image of the Florida Peninsula, with some clouds

Interesting Examples

- **A good speaker will *draw the audience in* with interesting examples and talk a bit about the underlying circumstances.**

Frames from the Zapruder film of the Kennedy assassination



Satellite image of the Florida Peninsula, with Hurricane Katrina bearing down

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Elements of Delivery

- **If you have done a good job with form and content, all is not lost: *You can still ruin your presentation through bad delivery.***

- **This is accomplished by careful manipulation of the following variables:**

  - *Length* of the talk,

  - *Volume* of speech, and

  - *Speaking style*.

Timing

- One of the best ways to generate hostility in your audience is to *speak well beyond your allotted time*.
  - This is especially effective in the highly desirable "just before lunch" and "end of a long day" briefing slots.
- To avoid this mistake, good speakers conduct a dry run (empty room) or practice talk (friendly colleagues) to estimate timing.
  - Many experienced speakers have a consistent "slides per minute" rate, and achieve good timing without rehearsal.
- Audience members rarely complain when briefings end a bit early!
- *If you start to lose control of the clock* due to questions asked during your talk, ask the audience to *hold questions to the end*.

Volume

- ***Mumbling, muttering, and whispering*** **are guaranteed to frustrate would-be listeners.**

  - If they can't hear you, people start talking with their neighbors, and the noise environment gets progressively worse.

- **Good speakers SPEAK UP, and use the microphone when available.**

  - Ask a friend in the audience to alert you if you can't be heard.

Good Speaking Styles

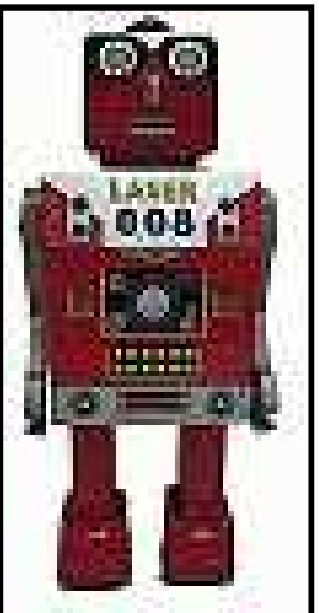
- ***No single style is best*** **for all presenters, audiences, and topics. Good technical speakers find a style that is natural for their personality and appropriate to the subject matter at hand.**

  The following are common in good briefings:

  - **Confident, Enthusiastic, and Informative**
  - **Scholarly and Tutorial**
  - **Knowledgeable and Caring**
  - **Ironic, Understated, and Dry**

Bad Speaking Styles

- ***Bad speakers have a lot of options, too!*** **Your choices include:**
  - **Dazed and Confused**
  - **Smug and Condescending**
  - **Whiny and Defensive**
  - **Monotone Robot**
  - **Scared Rabbit**



The Scared Rabbit

- ***Everyone*** **is a scared rabbit for their first presentation, or when briefing an especially large or high-powered audience for the first time.**
  - **Practice your talk with colleagues to increase confidence.**

- **If you are still very nervous, and believe that it will be evident, just admit it at the outset.**
  - **"I hope you'll bear with me, this is my first time addressing such a large group".**
  - **Everyone in the audience has been there.**
  - **This will forestall hostile questions!**

One Last Chance. . .

- **If everything about your talk has been good, you may have one final opportunity to leave a bad impression:**
  - **As you leave the podium, keep the cordless microphone attached to your lapel;**
  - **Without turning the mic off, proceed to the rest room; and**
  - **Broadcast back to the lecture hall.**
- ***This actually happened* . . . I was in the audience.**

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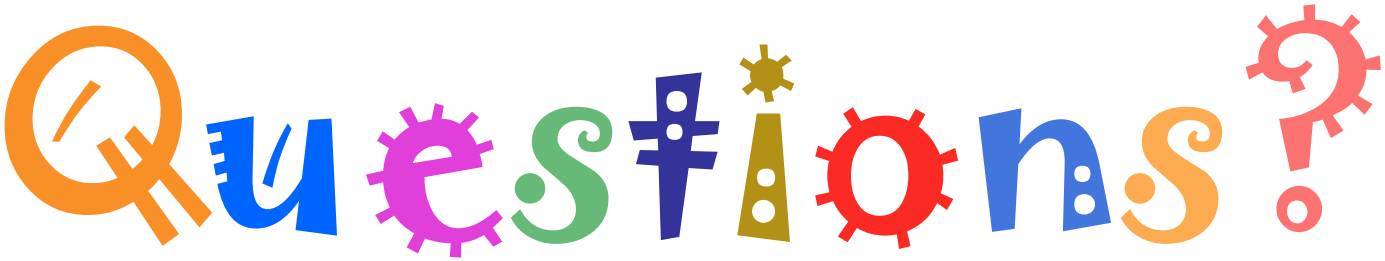
Discussion

- All kidding aside, I hope that these thoughts are useful to you as you prepare and deliver technical briefings.

- Good *form* and *content* are accomplished ahead of time, as you plan and build your presentation materials.
  - It takes time to prepare a good talk, but well-designed slides can be re-used many times with little (or no) revision.
  - There is no excuse for a poor job here.

- Good *presentation* takes practice.
  - Everyone is a scared rabbit the first time out !
  - Improve your skills by volunteering to present at every opportunity.


Questions?

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A Few Notes on Briefing Government and Military Personnel

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Briefing Military Personnel

- *Officers rotate through new positions every few years.*
  - Even when they are responsible for large organizations or significant decisions, they may still be in "learning mode".
  - It is essential that you provide them with enough background information to understand how your work fits into the "Big Picture".
- *Good officers are, by nature and by training, decisive.*
  - They take in relevant information, consider the alternatives, make a firm decision, and move on.
  - Summarize the most important points on the first few slides.
  - Use the remainder of the presentation to provide supporting data, illustrations, examples, and details.

I often place a "banner" on my first slide that states <u>exactly</u> how the work impacts the military mission.

Government Agencies

- **Many different government and military agencies and organizations fund work at places like Sandia.**
  - **They *differ in terms of their mission and focus*; the technical sophistication of the decision makers varies.**
- **Organizations that *support basic research* include:**
  - **DARPA, Military Research Labs (AFRL, ARL, NRL), National Geospatial Intelligence Agency (NGA).**
  - **(Most of these also support more mature, program-related developments.)**
- **Organizations that are *primarily transition-oriented* include:**
  - **Military TENCAP (Tactical Exploitation of National Capabilities) agencies (AF, Army, Navy, Marine).**
  - **Mission-focused groups: Air Combat Command, Joint IED Defeat Organization, US Border Patrol, etc.**

Briefing Government Agencies

- **When preparing a briefing for government representatives, tune your message to the audience!**

- ***DARPA program managers are usually PhD-level scientists*** **or engineers, with deep knowledge in one or more technical fields.**
  - ***A higher level of technical complexity is appropriate here*****; expect detailed questions and prepare back-up slides covering controversial issues that may arise.**
  - **But, do not omit background materials that motivate the research and demonstrate how it fits into the program!**

- ***AF TENCAP program managers may be senior fighter pilots*** **on a stateside rotation.**
  - **Very bright, quick thinkers, but not focused on the technical details.**
  - **They want to understand how your technology will impact pilots and/or soldiers in theatre, so *focus your talk on programmatic impact.***
  - **Offer copies of a white paper that covers the technology in depth.**

SETAs

- SETA (Systems Engineering and Technical Assistance) contractors are *ubiquitous in Government research*.
- Some are primarily administrative (logistics, liaison, budgets, etc.)
  - Often retired military.
- Others are tasked with technical oversight (Aerospace, MITRE).
  - Generally MS or PhD-level scientists or engineers.
  - They may ask LOTS of questions during technical presentations.
- On many large, on-going programs, *SETAs provide the continuity* as government civilian and military program managers rotate through.
  - A new PM's first impression of Sandia may be the opinion of the SETA.
  - Although they do not generally make programmatic decisions, SETAs are often in the room when such decisions are made.
- ***Stay on good terms with all SETAs, always!***

Addressing Risks

- **When briefing military or government agency personnel, *always be up-front about technical and programmatic risks*.**
  - **Anticipate what might go wrong, and how you would plan to address it.**
  - **Build a reputation for honesty and integrity!**
- **Dependencies (outside of your control):**
  - **"This work relies on deployment of satellite ZZ by date MM-YY."**
  - ***Impact on your schedule* if launch is delayed.**
  - ***Impact on your program* is deployment is unsuccessful.**
- **Risks associated with your work.**
  - **"The primary technical challenge is XX. We plan to use approach YY."**
  - ***Backup strategy* if approach does not meet performance thresholds.**

Program Success

- **Whenever possible, *negotiate in advance with your sponsors* regarding success criteria.**
  - **Many organizations support pre-defined "Goal" and "Threshold" Key Performance Parameters (KPPs).**
  - **Try to achieve the goals; but the program is still deemed worthwhile if the (more lenient) threshold levels are met.**
- ***Everyone looks good if the program succeeds!***
  - **Program Managers, SETAs, University collaborators, Sandia.**
  - **Work together before and during program execution to remove any logistical or bureaucratic obstacles to success.**

Conclusions

- ***Know your audience in advance,*** **and tune your presentation accordingly.**
  - **Adjust technical level based on expectations.**
  - **NEVER omit the Big Picture: Motivation and Background.**
- ***Understand the roles of the SETAs,*** **and how they support the government or military program managers.**
- ***Be straightforward about technical and programmatic risk.***
  - **If something goes wrong, you don't want to blindside your sponsors.**
- **Everyone wants to be associated with a successful program!**