

The image features several colorful geometric shapes, including triangles and lines in shades of blue, green, yellow, orange, pink, and purple, scattered across the background. A large, multi-colored triangular shape is prominent on the right side. The text 'LIVE WORX 16' is centered, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the upper right of the '6'.

LIVE
WORX 16™

TAKE A FRESH LOOK AT THINGS

liveworx.com



CHANGING THE CULTURE OF A BUSINESS - WHAT IS A PART?

Terry Powell
IT Business Consultant

6/7/2016

liveworx.com | #LIVEWORX



AGENDA

- Setting the Stage
- Chapter 1 - Disbelief
- Chapter 2 - Entrenchment
- Chapter 3 - Hear Only What You Want
- Chapter 4 - Retreat to the Bunker
- Chapter 6 - Anarchy
- Chapter 5 - Surrender
- Chapter 7 - Passive Resistance
- Chapter 8 - A New Combatant
- Chapter 9 - Gradual Acceptance
- Chapter 10 - Words of Wisdom

SETTING THE STAGE

THE COMPANY (JUST A PART OF IT)



We are a defense contractor with a blended culture resulting from age, acquisition, geography, and merger. We design things, build things, and service things. For many years we benefitted from an internal Information Technology department. We had programmers and business analysts who, together with the business, created 5 year functional technology maps. That meant every five years the IT team would work determinedly on programming a selected function's business systems. When the year cycle was up, the team moved on to a different function.

For engineering, the effort went towards configuration management and automating the creation of parts lists. Remember, CAD was in its infancy, and Mylar had been replaced by paper and graphic reproduction techniques. Nothing was in place to create parts lists and communicate them to manufacturing. Enter ACSAS stage right.

SETTING THE STAGE

ACSAS

The Automated Configuration Status Accounting System was a marvel for its time. Before spreadsheets, and before word processors, ACSAS was humming along placing cadence on engineering's development efforts. It reserved drawing numbers, tied a component part to its assembly, provided for quantities per and find numbers for those greater than 1. Since drawings and parts were synonymous (a drawing was the only way to define a part), ACSAS allowed documents to be linked with other documents.

Each five years that passed, ACSAS would become more powerful and more constraining. Under the direction of [Redacted], a clerk who's meticulous memorization of MIL-STD-100 made him the defacto expert in configuration management, ACSAS prepared Technical Data Packages in Army, Navy, and Airforce versions, constructed design baselines and managed net changes (misnamed CRDLs), routed change notices through customizable workflows by program, and communicated to various incarnations of line-of-balance, MRP, and ERP (remember the 5 year cycle).

As ACSAS grew in power, so did [Redacted]. He controlled ACSAS and his commanding presence and the unwillingness of others to challenge him, soon blurred the boundaries between [Redacted]'s mind, the true requirements of MIL-STD-100, and the spaghetti code which gave ACSAS life.

Besides birthing ASCAS, [Redacted] created an entire organization to care and feed ACSAS. Each person was hand picked for being detail oriented and smart, but not smart enough to threaten [Redacted]'s power. Duties were segregated, with no cross training being allowed until retirement or death made it necessary..

CHAPTER 1 - DISBELIEF

SYSTEMS STRATEGY

We had just benefitted from being dominant in the merging of two like size organizations. Part of the spoils of the merging would be a centralized Information Technology operation. That meant a one time opportunity to implement some world class systems across the enterprise.

1. CREO & Others for design
2. PTC Windchill for Configuration Management
3. World Class Quality System
4. Midrange ERP System

CHAPTER 1 - DISBELIEF

THE EXECUTION PLAN

1. Six Month Implementation to:

- Migrate ACSAS Configuration Data into PTC PTC Windchill
- Migrate Teamcenter Change Management Workflow into PTC PTC Windchill

2. Executed along with CAD migrations from Intralink to PTC PTC Windchill

CHAPTER 1 - DISBELIEF

THE ENGINEERING TEAM'S PERSPECTIVE



No one thought it was possible to eliminate ACSAS (especially in six months). Prior scoping estimated 3 years and \$7M.

No one thought the new central leadership would invest so much in systems.

No one thought IT had the capability.

CHAPTER 2 – ENTRENCHMENT

PRONOUNCEMENTS FROM ENGINEERING



“We are not going to change our practices just because IT wants to get rid of ACSAS”

- Even though engineering selected PTC PTC Windchill
- Even though engineering is knee deep in PTC CREO, struggling to move to model based definition
- Even though the company leadership (not IT) pronounced ACSAS dead

CHAPTER 2 – ENTRENCHMENT

DUMBING PTC WINDCHILL DOWN



Only CM people will be allowed to create documents in PTC Windchill.

Only CM people can create Technical Data Packages for suppliers

No Manufacturing Parts (even though they were designed with CAD, and were in ACSAS) would be allowed in PTC Windchill.

CHAPTER 2 – ENTRENCHMENT

DUMBING PTC WINDCHILL DOWN



“In other words, a handful of configuration management people would control the input, the output, and the content.”

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Parts v. Documents

- ACSAS, hence the culture, was drawing centric
 - Parts must carry the same number and the same revision of the drawing
 - The drawing is always the lead document, and must reference everything else
 - The drawing is the only document important enough to force a part revision
 - AS9102 requires first article inspections whenever the drawing changes

CHAPTER 3 – HEAR ONLY WHAT YOU WANT

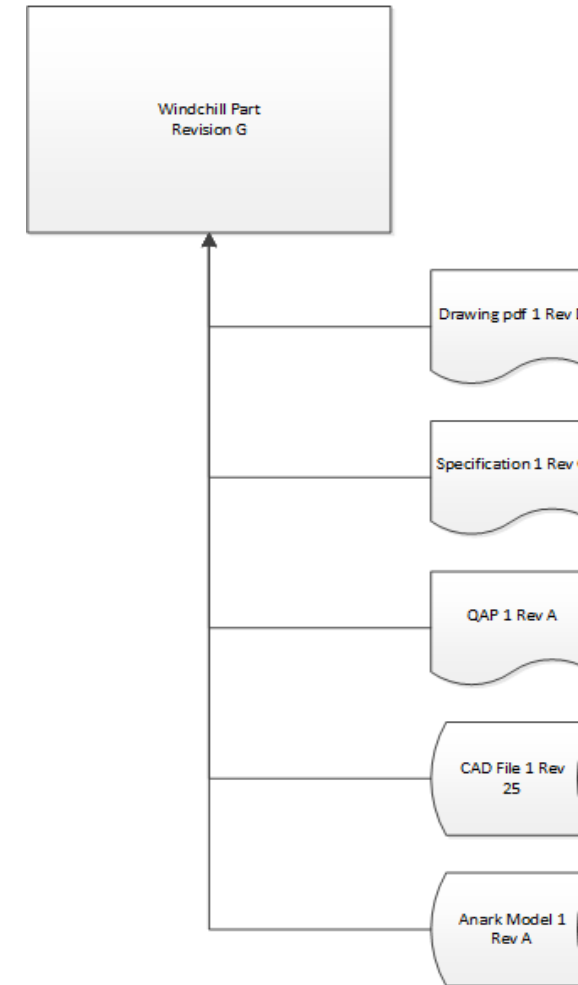


Parts v. Documents

“A part is synonymous with a drawing.”

Parts v. Documents

- PTC Windchill uses a part container concept
 - Many documents, at various revisions, with equal importance, define parts
 - A CAD model could be in the part container

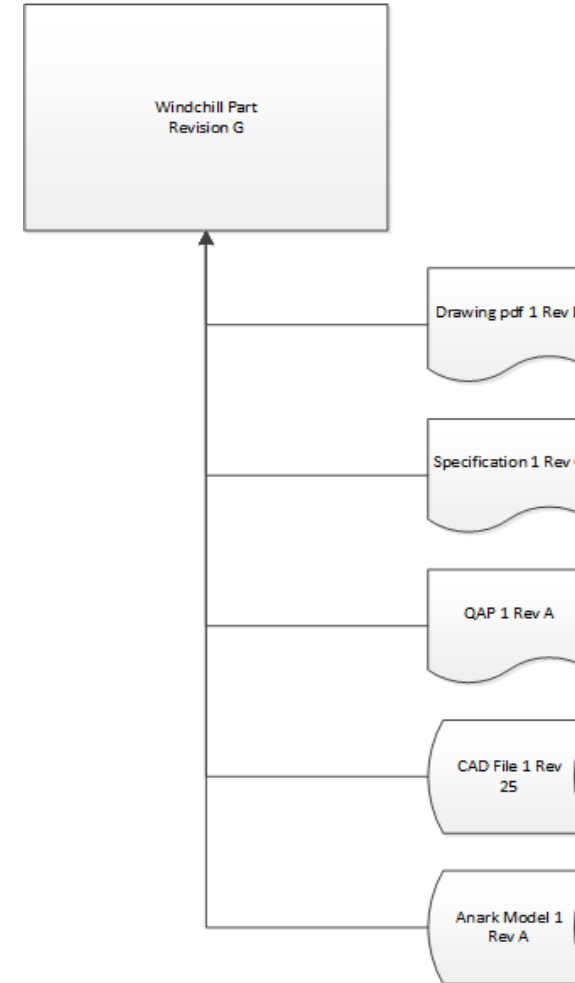


CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Parts v. Documents

“But we will need to do more first articles.....”



CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Revision Schemes

60+ years of drawing practice left us with:

- Dash

_ Underscore

Blank

1

A1

A

XA

_A

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Revision Schemes

Humans may see the logic in:

A1 revises to B

ERP and most computers think:

A1 revises to A2

And certainly X1 can never get back to -

Revision Schemes

Users were allowed to continue using these revision schemes for documents, but were asked to refrain from using them with parts, since:

- None of the reports work when the revision scheme is outside of the ASCII sort
- ERP will not accept a part revision that goes backwards in ASCII sequence

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Revision Schemes

Users still work hard to make the part revision equal the drawing revision.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



As Required / As Needed

- ERP will not accept a unit of measure which really isn't a unit of measure
- Each, Ounce, Gallon, Foot, Inch, Mile are all units of measure that you could and should use

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



As Required / As Needed

Users still use As Required / As Needed and the interface to ERP still throws errors because of it.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Effectivity

From Date: The date by which the new configuration must be incorporated in product that is delivered to the customer.

To Date: The last date which the current configuration can be incorporated in product that is delivered to the customer.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Effectivity

Engineering says“Effectivity is manufacturing’s problem.”

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Effectivity

Manufacturing says “Effectivity is just a plan.”

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



EBOM v. MBOM

The point at which an EBOM stops and an MBOM begins is defined at the moment the design team stops designing.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



EBOM v. MBOM

aka

PTC Windchill v. ERP

aka

Engineering v. Operations

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Manufacturing needs to touch every part / BOM, because important decisions like the proper unit of measure to replace “As Required” cannot be trusted to an engineer.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



“Engineering is the record of authority for the design. How thick to apply the paint is manufacturing’s problem.”

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Hanging Paper (Unincorporated Changes)

- ACSAS addressed Configuration Management through meticulously tracking changes
- A part was defined by number, revision, and change notice level

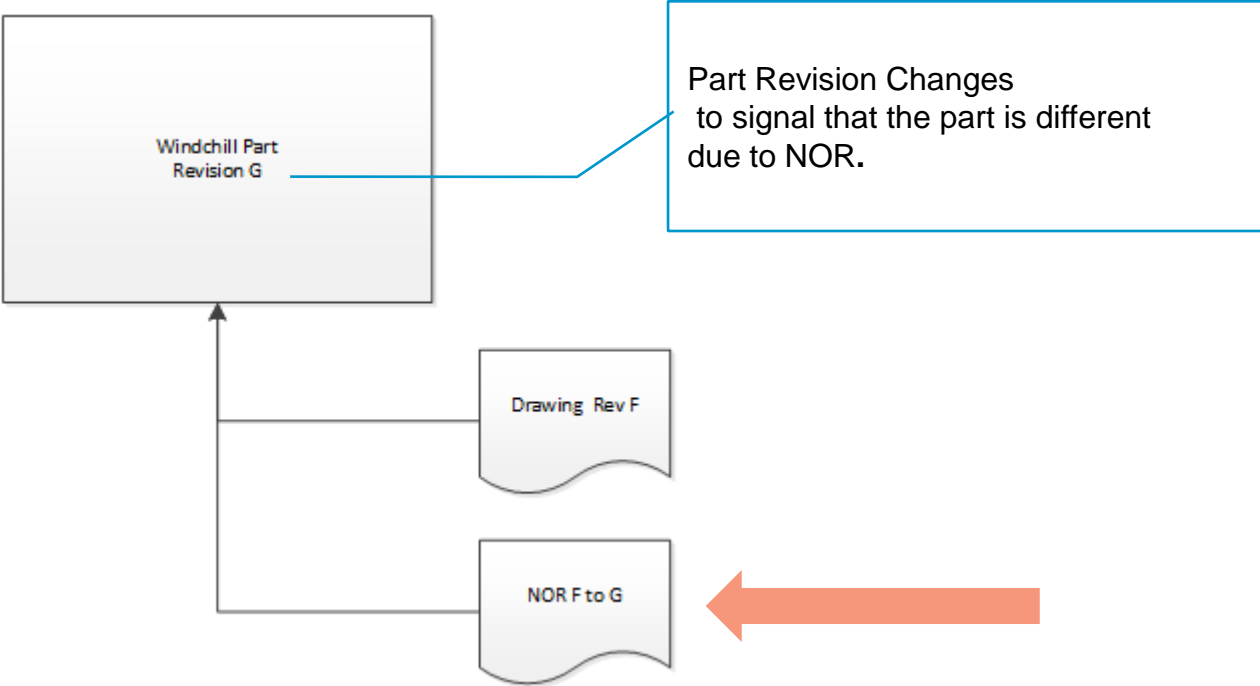
13951525 Rev. G CN 01

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Hanging Paper (Unincorporated Changes)

Change Notice becomes Notice of Revision (NOR)



CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Hanging Paper (Unincorporated Changes)

Change Notice becomes Notice of Revision (NOR)

The engineers immediately went into the re-drawing mode so that they wouldn't need hanging paper.

CHAPTER 3 – HEAR ONLY WHAT YOU WANT



Hanging Paper (Unincorporated Changes)

Change Notice becomes Notice of Revision (NOR)

I will take that as progress.

CHAPTER 4 – ANARCHY



The cultural attachment to drawings is so great, the engineering team implemented a 3d Visual Communication tool (fancy drawing) to sit with the CADs

Not to be outdone, the quality team demanded a different popular bubbling tool for creating inspection planning.

CHAPTER 4 – ANARCHY



“So....we design in CAD, communicate in 3D .pdf, and inspect in a bubble.”

CHAPTER 4 – ANARCHY



“And we have forgotten about that world class quality system, which has perfect capability to inspect key characteristics, record trends, and perform FAls.....”

CHAPTER 5 – RETREAT TO THE BUNKER



ACSAS' output consisted of a series of highly specialized reports. "Let's make IT program the exact same reports as ACSAS", even though the functionality exists in PTC Windchill screens.

ACSAS Report Recreation

PTC Windchill Equivalent

Parts List – in 3 flavors

CREO Parts List

Bill of Material – in 2 flavors

PTC Windchill Structure Tab

Number of Change Requests

Simple Advanced Search

Baseline Report (parts and documents)

PTC Windchill Structure Tab with Documents

TDP Report

Package Manifest

CHAPTER 5 – RETREAT TO THE BUNKER



ACSAS kept track of the document numbers and revisions within the Technical data Packages (TDP) sent out to suppliers.

Rather than use the package function, the CM people are collecting the documents one at a time, making a folder on a shared drive containing each document, running the TDP Report mentioned earlier for inclusion in the folder, and zipping and sending.

CHAPTER 5 – RETREAT TO THE BUNKER



“In other words, the engineering team has not changed its process one bit.”

CHAPTER 6 – SURRENDER?



Recent Progress

1. We are slowly hooking CAD documents up to the parts through Autocreate.
2. CAD authors can now release CAD documents, and attach them to the PTC Windchill parts, with a proper approval cycle.

“Seeing the CAD documents next to the .pdf drawing might be the key to removing the revision handcuffs.”

CHAPTER 6 – SURRENDER?



Recent Progress

3. Maybe we can let quality put some of their electrical test instructions into PTC Windchill, and maybe we can link them to the parts to which they relate.

“Allowing manufacturing related documents into the PLM system is a giant leap. It only happened when we threatened to give the quality lead CM privileges.”

CHAPTER 6 – SURRENDER?



Recent Progress

4. It took a mis-placed hole in the continuity path of a printed circuit board to build consensus that Gerber files should be attached to, and change with, the wt.Part.

“Now I am feeling the Art to Part groove.”

CHAPTER 7 – PASSIVE RESISTANCE



Constant complaints over how much longer the new system takes.

Management team unwilling to take on process re-engineering.

Burgeoning business in IT Service Requests

CHAPTER 8 – A NEW COMBATANT



ERP Implementation Team Dictates

- The new ERP needs to be fed unique parts across the enterprise
- The EBOM will be created in PTC Windchill, and then transferred to ERP where it will be reviewed for implementation.
- The MBOM will be created in ERP
- The results of any change process in PTC Windchill will invoke a second change process in ERP

CHAPTER 8 – A NEW COMBATANT



ERP Implementation Team Dictates

“More them v. us.”

CHAPTER 9 – GRADUAL ACCEPTANCE



Signs of PLM spring are appearing:

- The CAD team is asking for process help from PTC to accelerate integration of models with the ACSAS fed wt.Parts.

CHAPTER 10 – WORDS OF WISDOM

OVER COMMUNICATE



- Both in Intimate (Watercooler) Settings and Formal (Group) Meetings
- Take a Page from The Donald – Reduce Complex Concepts into a Sound Bite
- Give them the new “Concept of Operations” in excruciating detail, using their names and roles
- Listen to what is Really Being Said, and Evolve your Communication

CHAPTER 10 – WORDS OF WISDOM

UNDERSTAND THE OPPOSITION



“That will never work”

Worried about job loss

“That will take more time”

“We are already overworked”

Repeatedly Arguing the Same Point

Convinced their idea is best

“We are not going to change our ??? standards”

Change Averse

“It was never a problem before”

“We have always done it that way”

“??? system did it like this”

“Our contracts / customers require us...”

CHAPTER 10 – WORDS OF WISDOM

RESTRUCTURE THE ORGANIZATION FIRST



Integrated Systems will always Straddle Existing Functional Borders

- Design the most efficient process path
- Create, destroy, merge organizational functions to fit the process path

Do not engage user organizations in isolation of each other

- If you must have a project sponsor, go to the highest common organizational leader with responsibility for all affected organizational functions
- Make sure they care

Do not show users how the system works outside of the context of the integrated process path

- The organizational functions will view the system through the lens of self interest
- The users will carve the integrated system quicker than a Thanksgiving Turkey
- Tell the organizational functions that there will be some dark meat; some may do more to benefit others

CHAPTER 10 – WORDS OF WISDOM

NEVER CUSTOMIZE



You are implementing a “world class” system

- Fully understand how the system was intended to be used
- Design your processes accordingly

Minimize Configuration

- Use bare bones until the organization is experienced
- Do nothing without a clear change in corresponding integrated process

Watch the Interfaces

- Use an integrated systems change process with upstream and downstream business systems

CHAPTER 10 – WORDS OF WISDOM

PAY ATTENTION TO CLERKS



Clerks are:

- Compulsive
- Insular
- Determined
- Absolutely necessary to a successful business

But:

They have no business developing processes.

CHAPTER 10 – WORDS OF WISDOM

ALLOCATE SYSTEMS SCOPE



Who should not participate in scope allocation between systems:

- Consultants engaged in implementing competing systems
- IT folks engaged in implementing competing systems
- The User Functions

Optimization of an integrated process should be balanced against the cost of the alternatives, and should be done at the leadership level.

CHAPTER 10 – WORDS OF WISDOM

TAKE YOUR TIME



The goodness of the world class system(s) that you are implementing will eventually wear down organizational opposition to it.