



GE Astro Space

ENGINEERING PROCESS IMPROVEMENT BRIEFING

PRESENTED TO

AIR FORCE SPACE DIVISION

JULY 16, 1990

ENGINEERING PROCESS IMPROVEMENT

A GE AEROSPACE BUSINESSWIDE EFFORT TO GENERATE BROAD ENGINEERING DESIGN METHODS IMPROVEMENTS WITH THE AIM TO ACHIEVE INCREASED PRODUCTIVITY

- IDENTIFY BEST PRACTICES
- COMMONALITY IN DESIGN / HANDOFF TO AOD
- COMMON TOOLS FOR AUTOMATION
- TRAINING

AEROSPACE BUSINESS GOALS

- TO HELP TRANSFORM GE AEROSPACE INTO THE LOWEST COST PRODUCER IN THE WORLDWIDE AEROSPACE / DEFENSE BUSINESS
 - LOWEST HEADCOUNT PER DESIGN
 - SHORTEST DESIGN CYCLE TIME
 - MORE EFFECTIVE DESIGN TO COST
- TO OPTIMIZE AND LEVERAGE GEA'S RESOURCES BY INTEGRATING AND STANDARDIZING THE ENGINEERING FUNCTION ACROSS DEPARTMENTS

ASTRO PLAN FOR BEST PRACTICE IMPLEMENTATION

Best Practice	Analog	Digital	Software	Systems	Microwave	Mechanical	Astro Plan
Design Automation	●	●	○	○	●	●	CAE/CAD via Mentor, Teamwork & TBD MCAD
Requirements Automation	○	○	○	○	○	○	RTrace Templates, Guidelines, Timing Requirements Definition
Documentation Automation	○	○	●	○	○	○	Interleaf, Document Templates, Configuration Control Interface
Design Guidelines/ Process Std.	●	●	●	●	●	●	Design Handbooks, Process Flows, Reference to Procedures, Tool Definition
Design Reuse	●	○	●	●	●	●	Standard Design Lists, Catalogues Central Libraries
Concurrent Engineering	●	●	-	○	●	●	Design Teams with AOD Representatives Through Design Cycle
Design Reviews	●	●	●	●	●	●	Continue Using Best Practice, Participate in GEA-wide Design Review Process

● = Implemented = 7

○ = To Be Implemented = 15

● = Partially Implemented = 19

- = Not Applicable/No Implementation = 1

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WORK-OUT!

***A FOCUS ON
TOTAL QUALITY MANAGEMENT
AT ASTRO-SPACE DIVISION***

GENERAL ELECTRIC.

WORK-OUT! - GE STRATEGY FOR THE 90'S

IN THE WORDS OF JACK WELCH, GE CEO:

SPEED

- GE MUST BE FAST TO COMPETE IN A GLOBAL ECONOMY

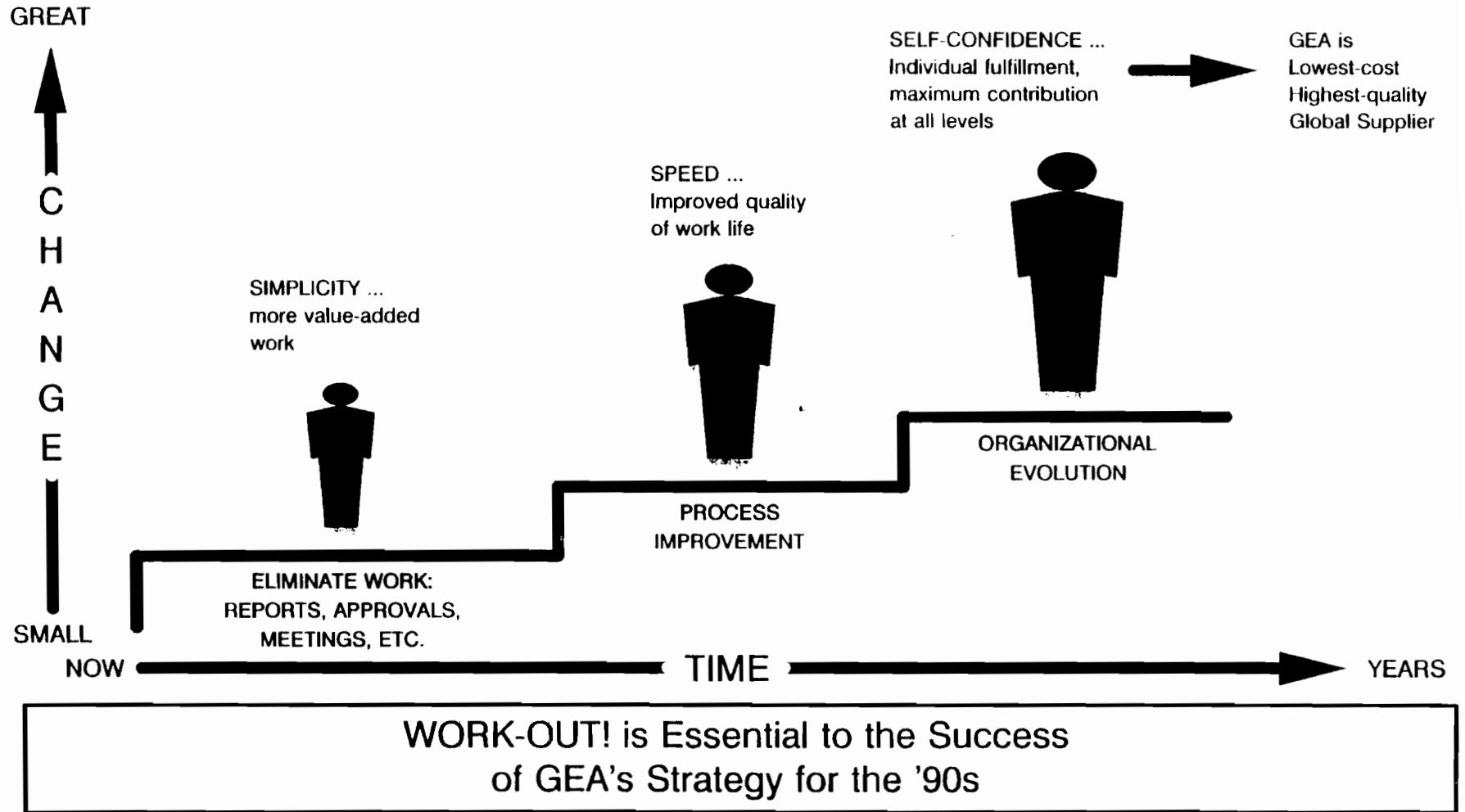
SIMPLICITY

- ESSENTIAL TO ACCOMPLISH SPEED
REMOVE BUREAUCRACY, SIMPLIFY BUSINESS SYSTEMS
TRANSFER BEST PRACTICES ACROSS COMPANY

SELF CONFIDENCE

- FREE PEOPLE FROM THE CONFINES OF THEIR BOX ON THE ORGANIZATION CHART

WORK-OUT! ... The 'People' Factor in GEA's Strategy



ASTRO-SPACE DIVISION VISION

GOALS: BE THE # 1 GLOBAL SUPPLIER OF SPACE SYSTEMS

FULLY SATISFY THE CUSTOMER

REALIZE A PROFITABLE RETURN TO THE CORPORATION

VALUES: SET HIGHEST STANDARDS IN BUSINESS ETHICS AND INTEGRITY

PROVIDE INTERESTING AND REWARDING WORK FOR EMPLOYEES

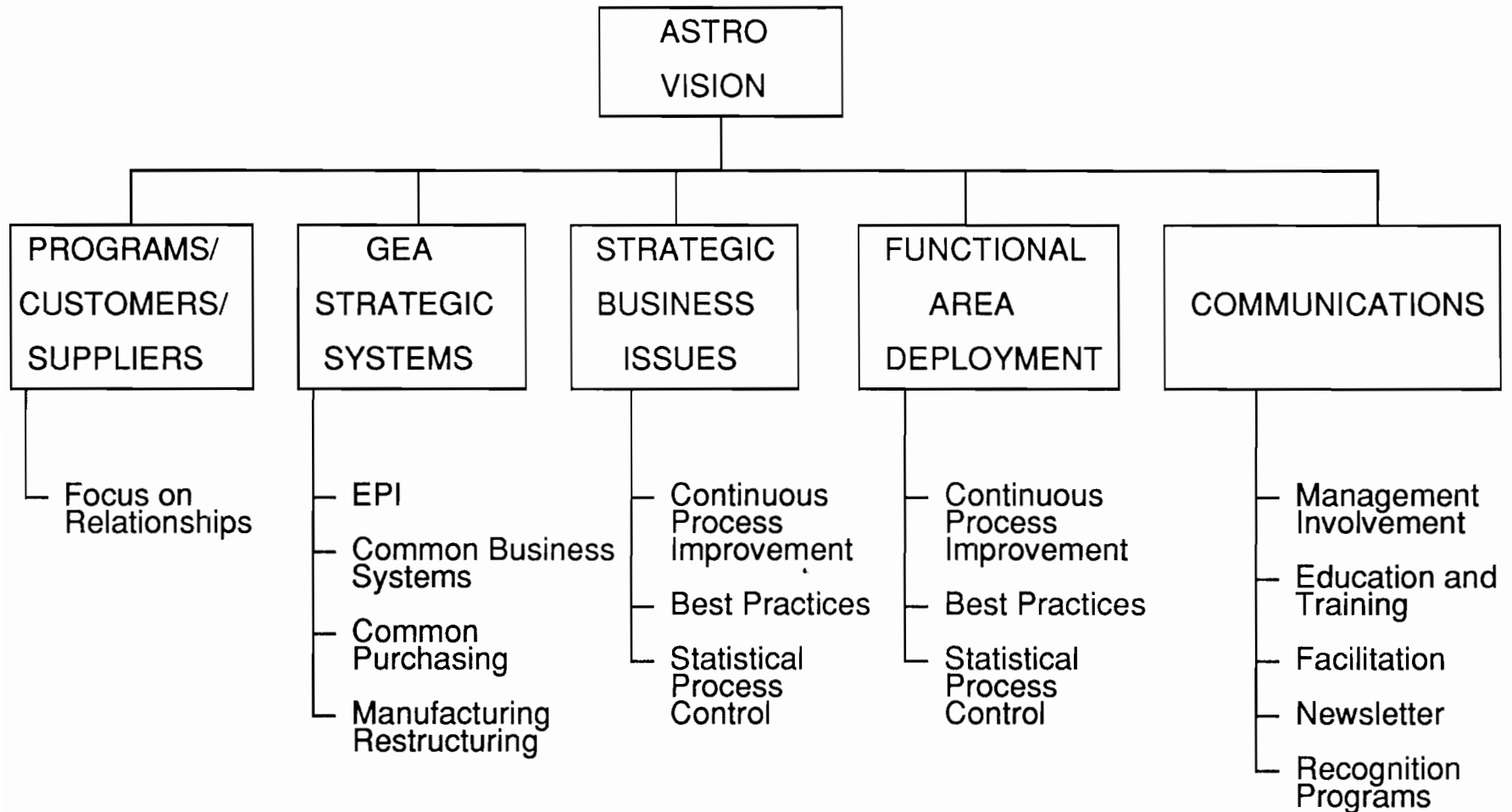
CRITICAL SUCCESS FACTORS: EMPHASIZE PRODUCIBILITY

IMPLEMENT DESIGN-TO-COST

DELIVER ON SCHEDULE AND WITHIN COST

HIGHEST QUALITY PRODUCT

ASTRO'S WORK-OUT! IMPLEMENTATION



**TOP DOWN IMPLEMENTATION ADDRESSING AREAS
CRITICAL TO THE BUSINESS**

WORK-OUT! SCHEDULE

November '89	Town Meeting (Group 1)	Critical issues impacting Business
January '90	Feedback Session (Group 1)	Status Review
February 22	AF/GE Astro Executive Forum with Gen Schnelzer	Govt/Industry Contract Streamlining for new Acquisitions
February 27, 28	Telstar Program WORK-OUT! (Group 2)	Program Focus Session
March 12, 13	Space Power WORK-OUT! (Group 3)	San Jose Operation Town Meeting
April 16, 17	DMSP Program WORK-OUT! (Group 4)	Program Focus with Govt Customer Representation
April 20	Telstar Feedback Session (Group 2)	Status Review
May 14, 15	Astro/Americom WORK-OUT! (Group 5)	Program focus with Commercial customer representation

WORK-OUT! SCHEDULE (Continued)

June 19,20	Space Video WORK-OUT! (Group 6)	Process focused session
June 29	Telstar Feedback Session #2 (Group 2)	Status Review
July 10	Astro/Americom Feedback Session (Group 5)	Status Review
July 16	Space Video Feedback Session (Group 6)	Status Review
August 28,29	LANDSAT Program (Group 7)	Tentative
September 13,14	DSCS Program/Customer (Group 8)	Tentative
October 11,12	GGs Program/Customer (Group 9)	Tentative

One WORK-OUT! Session/Month Scheduled
for the Remainder of 1990

RESULTS FROM WORK-OUT! SESSIONS

	<u>Astro Town Meeting</u>	<u>Telstar</u>	<u>Space Power</u>
Group Participants (GE)	54	49	32
Group Participants (Customer)			
Issues Identified in Session	117	189	114

Quick Hits

● Number Identified	35	150*	63*
● Approved at Meeting	20	150	63
● Implemented to Date	20	119	40
● Still Under Investigation	7	25	23
● Discounted	8	6	0

Major Issues

● Number Initially Defined	82	39	51
● Action Plans Identified	19	10	8
● Major Focus	9	10	8

* Personal Commitments

RESULTS FROM WORK-OUT! SESSIONS

	<u>DMSP</u>	<u>Americom</u>	<u>Space Video</u>
Group Participants (GE)	15	13	24
Group Participants (Customer)	16	9	
Issues Identified in Session	50	42	30

Quick Hits

● Number Identified	7	48 *	0
● Approved at Meeting	7	48 *	0
● Implemented to Date	2	0	0
● Still Under Investigation	5	0	0
● Discounted	0	0	0

Major Issues

● Number Initially Defined	50	42	30
● Action Plans Identified	3	3	30
● Major Focus	3	3	2

* Personal Commitments

ASTRO PROCESS IMPROVEMENT TEAMS

- MATERIAL ORDERING AND FLOW TEAM
 - Works with material ordering and in house handling process
- TRAINING TEAM
 - Defined technical training needs and identified courses to address needs
- PRODUCIBILITY TEAM
 - Developed Producibility Handbook and training for Engineers to improve producibility of designs
- MACHINE SHOP PROCUREMENT TEAM
 - Developing procedures and methods for electronic transfer of design files to outside machine shops. Nine shops currently on-line (6/29)

ASTRO PROCESS IMPROVEMENT TEAMS

- **DRAWING RELEASE PACKAGE TEAM**
 - Improving the process involved in design and drawing releases
- **FASTENER TEAM**
 - Developing procedures in all functions to deal with counterfeit fasteners
- **PAPERLESS WORK ENVIRONMENT TEAM**
 - Developing methods to electronically archive technical memos, reports, etc.
- **SPACECRAFT PERFORMANCE & ORBITAL ANOMALY TRENDS TEAM**
 - Developing a uniform system to track orbital anomalies across all Astro programs

ASTRO-SPACE DIVISION WORK-OUT!

- THE COMMITMENT FOR QUALITY AND PRODUCTIVITY IMPROVEMENT COMES FROM THE GE CEO
- CONTINUOUS QUALITY IMPROVEMENT IS KEY TO ASTRO-SPACE DIVISION'S STRATEGY FOR LEADERSHIP IN THE 90'S
- WORK-OUT! IS BEING IMPLEMENTED WITH A COMBINATION OF NEW INITIATIVES AND EXISTING IMPROVEMENT PROGRAMS
- WORK-OUT! IS A LONG RANGE PROCESS THAT WILL SUSTAIN ASTRO'S IMPROVEMENT THROUGH THE 90'S
- WORK-OUT! IS A PEOPLE ORIENTED PROCESS TO ACHIEVE ASTRO'S GOAL OF A SEAMLESS ORGANIZATION

**WORK-OUT! REQUIRES A TOP DOWN COMMITMENT
AND PARTICIPATION FROM EMPLOYEES
TO ASSURE QUALITY AND PRODUCTIVITY IMPROVEMENT**