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# Programming Can Be Fun

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# What Makes Work Fun?

Challenge: interest and excitement

Ownership: responsibility and autonomy

Commitment: a motivated and cohesive team

Winning: consistent success

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# Work Can Be Fun: Challenge

➡️ Challenge

Ownership

Commitment

Winning

Version 1.0

# The Submarine *Scorpion* -1

May 1968: *Scorpion* was lost at sea.

Navy knew its last reported location.

Vague idea of
- heading
- speed
- problem

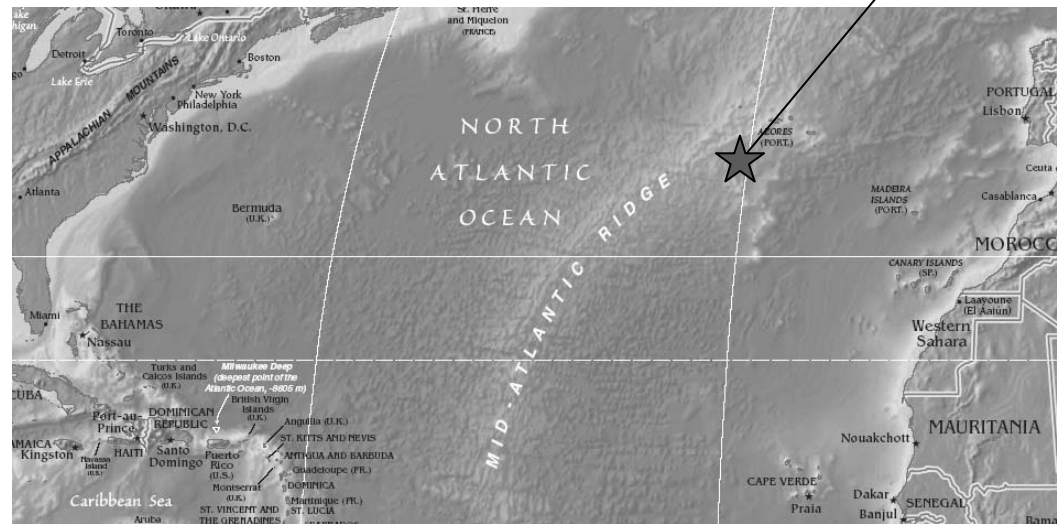Problem: Loaded with nuclear missiles and secret gear.

# The Submarine *Scorpion* -2

500 square miles of deep ocean

Where to start?

Last known location

# The Submarine *Scorpion* -3

Group of specialists
- submariners, mathematicians
- submarine specialists, salvage experts
- others

Mathematical model

# The Submarine *Scorpion* -4

Model parameters
- when the sub ran into trouble
- how fast it was going
- its heading
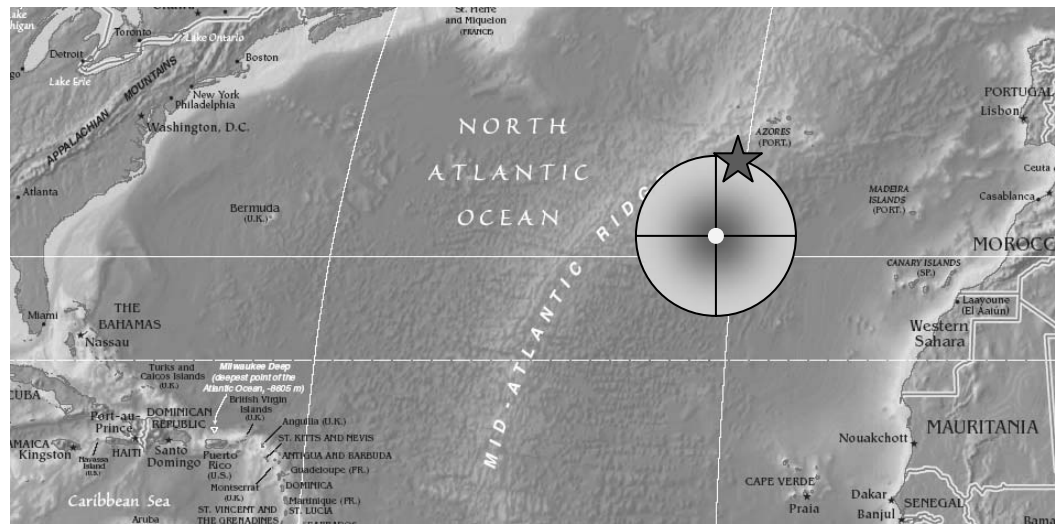- its rate of descent when sinking
- many other parameters

# The Submarine *Scorpion* -5

Specialists made judgments and ran the model.

Navy salvage vessel found wreckage 220 yards away.

# What Made This Team Successful?

Expert knowledge

Mix of disciplines

Effective leadership

# Is That Enough?

Lots of teams have
- experts
- multiple disciplines
- leadership

Since many of these teams still fail, this must not be enough.

What is missing?

# The Problem

Ever been on a team where you are told how to do the job?

You don't own the job, it owns you.

Such jobs no fun.

They often fail.

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# Work Can Be Fun: Ownership

Challenge

➡ Ownership

Commitment

Winning

Version 1.0

# The Meeting



## November 20, 1963

- Vin Learson, Senior VP for Marketing and Engineering
- Frank Carey, President, IBM Marketing Division
- George Kennard, President, IBM System Development Division
- Watts Humphrey, Engineering Manager, Advanced Systems Marketing

# The FAA Proposal

U.S. en-route air traffic control computer system

Due January 1, 1964

Largest contract in IBM history: $100 million

Design issues

# The Team

Clear goal

Ran our own show

Settled issues openly

Management trusted us

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# The Best Jobs

Important, high-pressure, and exhausting

Memorable and rewarding

A great team

Fun

Version 1.0

# The FAA Contract



Forty years later, an enhanced version still controls U.S. airspace.

# What Made This Team Successful?

Expert knowledge – again

We ran the job

Management trusted us

# Is That Enough?

Other teams have
- experts
- multiple disciplines
- leadership
- ownership
- trust

Since some of these teams still fail, this must not be enough.

What is missing?

# The Problem

Ever work on a job where you must meet an arbitrary and unrealistic schedule?

You start out in trouble and generally end up in trouble.

Such jobs usually fail.

# Work Can Be Fun: Commitment

Challenge

Ownership

➡️ Commitment

Winning

# A War Story -1

IBM: new line of computers
- hardware being delivered
- software schedules slipped three times
- director of software was fired
- the teams had no plans

# A War Story -2

I got the job to lead the software group.

My software group had:
- 4,000 people
- 15 laboratories
- 6 countries

# A War Story -3

Needed realistic commitments
- teams made own plans
- I reviewed all plans

It worked.

Met all dates for 2½ years.

# What Made This Team Successful?

Expert knowledge – again

Teams made their own plans

Defended these plans

The teams were publicly committed

# Is That Enough?

Other teams have
- experts
- multiple disciplines
- leadership
- ownership
- trust
- public commitment

Since some of these teams still fail, this must not be enough.

What is missing?

# The Problem

Even with the best designs and plans, you can still fail.

While committed teams can often do extraordinary work, teamwork is not magic.

If you don't use sound methods, you are likely to fail.

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# Work Can Be Fun: Winning

Challenge

Ownership

Commitment

➡ Winning

# Vicarious Visions -1

The electronic game industry is a good example of modern software challenges.

Game developers contract with game distributors.

Game distributors provide two kinds of payment.
• progress payments for development
• royalties for game sales

# Vicarious Visions -2

Because new games are often late and defective, distributors have tough contracts.

Penalty provisions
• Late deliveries incur penalties
• Royalty cut for every defect

For their new Spiderman game, Vicarious Visions used the Team Software Process.<sup>SM</sup>

# Vicarious Visions TSP Results

|  | Spiderman | Typical |
|---|---|---|
| Delivery date | On schedule | On schedule |
| Functionality | Planned | Reduced |
| System test defects | 12 | 30 to 60 |
| Acceptance test defects | 8 | 30 to 60 |
| Post-delivery defects | 0 | Some |

# What Made This Team Special?

This team had
- experts
- leadership
- ownership
- trust
- commitment

In addition, they knew how to
- consistently meet commitments
- routinely produce quality products

# Team Practices

The members of this team
- used a defined and measured process
- planned and tracked their work
- measured and managed product quality

This enabled them to consistently
- meet commitments
- deliver quality products

# Management Trust -1

To earn and retain management trust, teams must
- make responsible commitments
- regularly report status
- do what they say they will do
- deliver quality products

# Management Trust -2

With management's trust, teams can
- make their own plans
- manage their own work

Then, if they do quality work, the job will be fun.

# PSP<sup>SM</sup> and TSP

The Personal Software Process (PSP) applies scientific principles to a developer's personal work.

The Team Software Process (TSP) applies these scientific principles to development teamwork.

While the PSP concepts are simple, they are not easy.

The problem is consistently working the way we know we should.

**SM**
   **PSP and Personal Software Process are service marks of Carnegie Mellon University.**

# PSP and TSP Success

Thousands of developers have been PSP-trained

PSP and TSP show developers how to
- measure their work
- plan and track their projects
- deliver quality products

Self-directed TSP teams
- share common goals
- define their own processes and plans
- run their own show
- consistently meet their commitments

# TSP Users

Some of the organizations using the TSP include

| | |
|---|---|
| ABB | Lockheed |
| AIS | Microsoft |
| Bechtel | NASA Langley |
| Census Bureau | Raytheon |
| DFAS | Samsung |
| EDS-SDRC | Teradyne |
| Erickson | TI |
| Honeywell | USAF: Hill AFB |
| IBM Japan | USN: NAVAIR |
| Intuit | Xerox |

# Adoption

Organizations using, piloting, or preparing to pilot the TSP.

ABB
ABC Informatica
Advanced Information Services
Advanced Maturity Services, Inc.
Alan S. Koch Consultants
Ambient Consulting
**AMCOM***
Boeing
Centre De Investigacion En
Matamaticas
**Census Bureau***
CQG, Inc.
CRSIP / STSC / DRAPER
Davis Systems
DOE / Los Alamos
DOE / Naval Reactors
DPC Cirrus
Dynamics Research Corp.
EDS
Halex Associates
Heath Solutions, Inc.
**Helsana***

Honeywell
IBM
**Intuit***
Iomega
I.Q. Inc.
KPMG
L. G. Electronics
Lockheed Martin
LogiCare
Los Alamos National Laboratory
M/A-Com Private Radio Systems, Inc.
Microsoft
Motiva
NASA Langley
NAVAIR
**Naval Reactors***
**NAVOCEANO***
NUWC
NCR/Teradata
NCS Pearson
Northern Horizons
Northrop Grumman

NSWC / Keyport
Prodigia S.A. de C.V.
PS&J Consulting - Software Six
Sigma
QuarkSoft
Respironics
Rockwell Collins
SAIC
Samsung SDS
Siberlink
STPP, Inc.
STSC
Trilogy
TYBRIN Corporation - Air Logistics
University of Alabama / Huntsville
University of Queensland
**Vicarious Visions***
Xerox

**\*Organizations we are currently
working with**

# TSP Productivity Gains
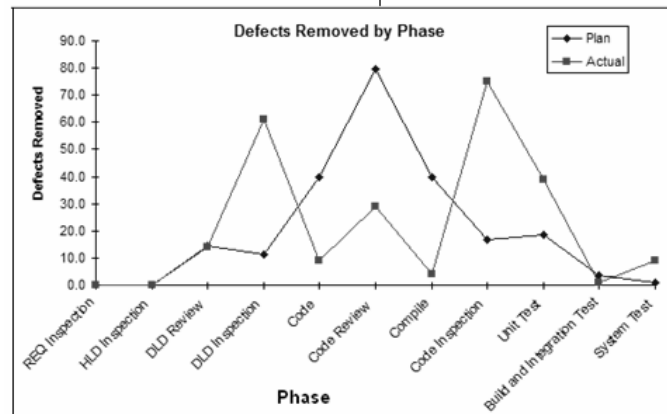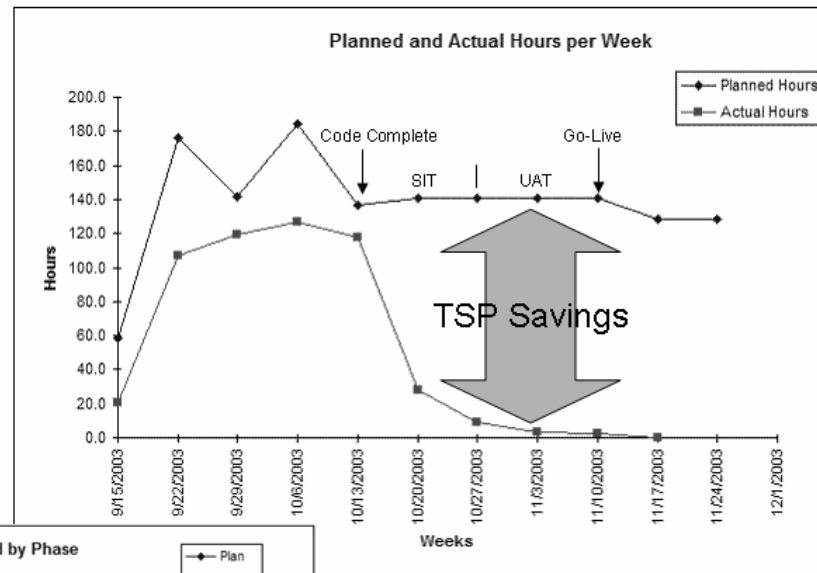


**4,255 New & Change LOC**

| | Defect Density |
|---|---|
| 4 bugs in SIT | 0.94 defects/KLOC |
| 1 bug in UAT | 0.23 defects/KLOC |
| 0 bugs RTC | 0 |

# Developers Like the TSP

"This really feels like a tight team."

"Design time is way up but code time decreased to compensate."

"Tracking your time is an eye opener."

"Really good teamwork on this project."

"I'm more productive."

"Team really came together to make the plan."

"I feel included and empowered."

# Conclusions

For a job to be fun
- Managers must trust the developers.
- The developers must be worthy of that trust.
- They must use scientifically based development methods.

Programming is then fun.

# For More Information

**Visit the PSP or TSP Web sites**

http://www.sei.cmu.edu/tsp/psp.html

**Contact SEI customer relations**

Software Engineering Institute, Carnegie Mellon
University, 4500 Fifth Ave., Pittsburgh, PA  15213
Phone, voice mail, and on-demand FAX: 412/268-5800
E-mail: customer-relations@sei.cmu.edu

**See the books**

*Winning With Software: An Executive Strategy*, by
Watts Humphrey, Addison-Wesley, 2002
*PSP: A Self-Improvement Process for Software
Engineers*, by Watts Humphrey, Addison-Wesley, 2005