Lessons Learned
and easily forgotten

Dr. Robert Lainé

Spacinov

Supporting innovation in space and on Earth

Lessons Learned from Space ?

- **This presentation highlights human aspects learned from Space projects, human aspects often shadowed by detailed technical, administration or political considerations.**

- **In all technical domains, technical leaders will have to deal with a very different environment and people's needs from that we know today.**

→ **Take this opportunity to look at project leadership from a different perspective.**

Project, project team, what is it ?

- Projects are the visible part of space activities, and they underline our ability to lead and develop people's expertise in various fields (System work).

- A <u>project</u> is a task which has a clearly **identified objective** to be reached with finite resources and within a finite time.
  - projects which go on for ever become bureaucracies.

- A <u>project team</u> is a group of people who individually take the project objective as a personal objective and voluntarily agree to work together to make the project a success.

- **These definitions are easily forgotten…**

Key Factors in project success

- **Space & INNOVATION = 99% added value = Human work**
- **Space = Must work first time...**
- **Space project success is always based on team work**
- **Managing successfully projects is <u>leading people</u>:**
  - Continuous interaction with people
  - Identifying factors which hamper progress
  - Helping people to perform
  - Making sure that no mistake gets through
- **Software and Hi-tech projects call on the same skills**

Interacting with people

- **Europe's space community is small :**
  - Highly qualified basis, but wide differences of culture and language.

- **We all depend on others doing their share of work:**
  - Work sharing adapted to the partner's capability,
  - Recognition and respect of the work done by each partner,
  - Helping each other = helping project to succeed.

- **Facing reality**
  - Facts will not go away! => Deal with them honestly.

- **Listening**
  - The <u>solution</u> to a problem is always there…
  - Just look, listen and ask the right questions… to find it.

Factors which hamper progress

- **#1 : a 'Customer' who does not know what he really needs**
  =>> **unclear objective & rules => diverging project**
  =>> Let's remember that Project or System engineers are the 'customer' for all technical suppliers...

- **Self imposed constraints, negative thinking, negative talking, looking backward, fear…**

- **Absence or poor bi-directional human communication**
  - E-mail and memo broadcasting trap just adds noise
  - Passing judgment of value on people blocks progress

- **Emotional relations in decision process, personal ambition, hiding errors, posturing + playing "Games", etc…**

➤ **All lead to Collective Failure,**

➤ **All these need to be stopped at once!**

Helping people to perform

- **Reformulate the objective until positively understood**
- **Give people the freedom to do their job!**
  - Extremely important in innovation
  - Often, System Engineering blocks progress by dictating constraints which have no relation to the project objective
- **When something does not work, provide alternatives or even solutions but let the people implement them and succeed.**
- **Stick to the objective, do not accept excuses "yes but…"**
- **Transparency at all levels helps to build confidence**
- **Acknowledge and reward success => positive feedback**

System engineering & the Human factor

- **System engineering is designing "<u>for others to do</u>":**
  - Set the common objective (end goal) and keep track of it

  - Fuzzy requirements mean more mistakes => "K.I.S."

  - Design must be achievable and verifiable => S.M.A.R.T.

    - No point in asking for the impossible !

  - Be aware of « Software » as the almighty solution :

  ➢ It is often virtual reality replacing reality… until it catches up!

  ➢ Be as strict in defining software as you are with hardware

  ➢ Sometimes a little hardware can be more predictable than software...

Engineering & the Human factor

- **Mistakes are made all the time:**
  <u>Accept that reality and get organised to deal with it.</u>

- **A day without finding a mistake is a day lost !**
  - Set clear criteria to measure progress and detect anomalies

  - Check positively that each function does what it is supposed to do and NOTHING ELSE !

  - Ask yourself and others « where is today's error ? »

  - <u>Be sensitive</u> to the body language of others, it often gives the best warning of up-coming problems.

Complex Systems = Team work

- No one can resolve a complex system alone !
- Humans have different personalities, each with competences, strengths and weaknesses
- Team work = <u>summation of strengths and competences</u> >>do not dwell on weaknesses, we all have some !
- Team work = trust and open communication between members to reach the common objective
- Team work place is not a "country club" nor easy life…

➤**Teams have to be consciously built for each project, HR is there to provide training and development support.**

Preferred project leadership style

- Acceptance and respect of the competences and responsibilities of all partners despite cultural differences.

- Transparent, Open and Direct Communication in order to:
  - Ensure understanding of the objective to be reached,
  - Encourage upward and lateral communication,
  - Anticipate problems and speeding up resolutions,
  - Provide regular feedback to all participants, share the same vision.

- Be open minded to different approaches to achieve the result.

- Keep the team focused strictly on the end objective.

> **Don't shoot people, just solve the problems.**
> **No Games … Be honest and Stay honest.**

I thank you for your attention.