



Project Introduction

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This is one *exciting* project ...

- Scientifically rich
 - EOR, Solar, Transients, Pulsars, RRLs, etc.
- Technologically innovative
 - Leading the way in multiple simultaneous areas
 - Trailblazing!
- Excellent partnership
 - Common goals + motivations (a taste from ED program)
 - Abundance of talent and energy
- Enormous growth potential
 - Inexpensive hardware, Moore's law
 - LFD/xNTD synergy, path to SKA
 - Opportunities abound, for Australia, US, global community

And we are FUNDED!

Three Huge Challenges:

- Multiple simultaneous technical innovations
 - This is new ground, it will take all our skills
- Short timescale
 - Driven by political and financial necessity
 - Our schedule must not slip!
- Distributed project team
 - Physical distance and timezones
 - Cultural differences, some subtle

We need more than just talent and energy.

Can we do it?

Absolutely!

But it will take:

- Discipline
- Coordination
- Focus
- One coherent team
- *Common purpose!*

Origin of the MWA-LFD

- LOFAR disintegration, late 2003
- Hawaii meeting, March 2004
 - LOFAR at Mileura, \$70M? **NO CAN DO!**
 - Last day – radical de-scope
 - 500 tiles, no long baselines, \$7M excluding infrastructure
- The de-scope worked!
 - Partnership formed
 - Viable proposal written (2004), funding acquired (2006)

Natural selection \Rightarrow genetically lean

Culture of uncompromising focus

Focused Science Drivers

- Already limited the physical scope (Hawaii)
 - Chopped off long baselines
 - Removed most of the collecting area
 - Hardware costs in viable range

Software costs still unbounded ...

- Must next limit functional scope
 - Digital capacity
 - Observing modes
 - Flexibility, agility

Focused Science

Fundamental to Demonstrator Feasibility

Complexity is the Enemy

- Complexity costs time and money
 - Few understand complete system
 - Those who do understand it less deeply
 - Errors harder to foresee and prevent
 - Recovery from errors is expensive
 - KISS!
- Complexity + highly innovative system = death
 - Would need more resources than we have
- Project philosophy – bare essentials only
 - Strip system down to minimum
 - Make it **work!** Soon.
 - Add functionality *after* it works

Version 1, version 2+

- Much of the system complexity is software
 - Traditional code (mainly real time computer)
 - FPGA bitcode (correlator, receiver node)
- Software complexity comes from *modes*
 - LFD hardware is inherently flexible
 - Huge temptation to exploit that flexibility - *resist it!*
- Version 1 – core functionality only (few modes)
 - Keep it simple, even if some code is later discarded
 - Code re-use can be sacrificed if necessary
 - Project perspective, even when in the trenches

Even for v1, software cost >> hardware cost

KISS - Examples

- Overall design
 - Physically small (easy ionospheric calibration)
 - Full cross correlation (lower downstream software complexity)
 - Fixed time/frequency resolution (single-mode correlator)
- Version 1 software
 - Contiguous frequency channels
 - System-wide cadence (8 sec)
 - “Lagging” calibration (don’t buffer)
- “Core” system enough over next 2-3 yrs
 - Plenty of time to get fancy after that!



Creeping Specifications

Demonstrator, not Facility

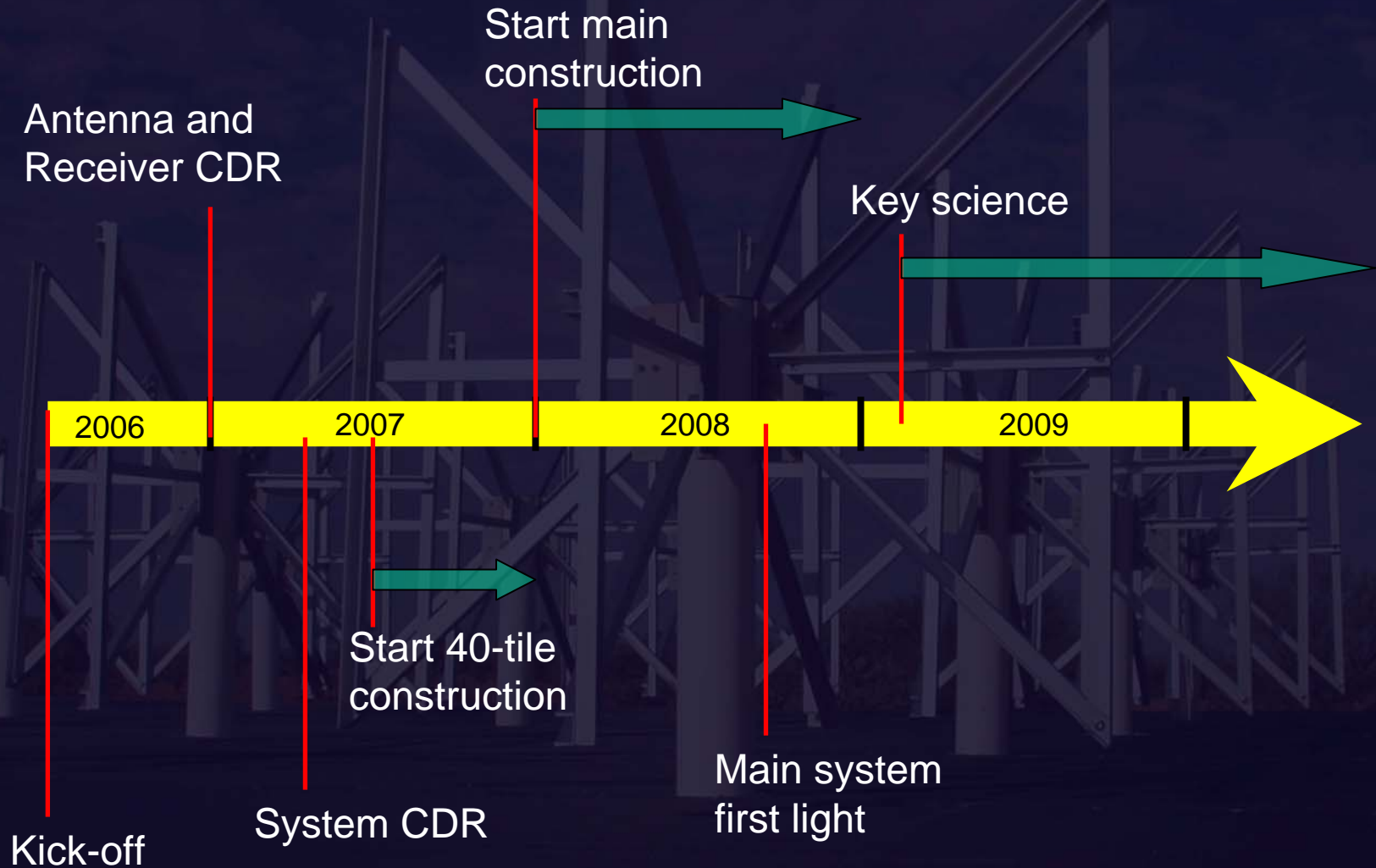
- Facility
 - Observing proposal mechanism
 - User support for observing, data reduction
 - Responsiveness to needs of general users
 - *User-friendly*
- Demonstrator
 - Build a working instrument
 - Experts coaxing results from it
 - “Yes, this technology works!”
 - Low budget, not user-friendly

It's not the colour of the money
It's the quantity!

Demonstrator Schedule

- Science
 - Funding peer review based on science as well as technology
 - Science results are a *deliverable* within 4 years
 - Science-capable operation must be rapid (2-3 yr)
- Post-demonstrator phase
 - No significant money without decadal review endorsement
 - Deliberations start in 2008
 - New NSF proposal would be due 2009
 - If we have ambitions, need to make *progress!*
- Response to slippage – ~~stretch~~ or de-scope?

Schedule Outline



Focus on Core System

- “Version 1” is the immediate goal
 - Fully intend to do version 2+, but not now
- Contributions - Core v1 systems
 - Needed urgently, needed now
 - Primary purpose of this meeting – HOW, not what or when
- Contributions – non-core and v2+
 - Valuable and **needed** for future health
 - Priority commensurate with 3+ yr timescale
 - **Should not complicate or delay core v1 work**

Common Purpose

- Are we all OK with this philosophy?
 - Do we accept the rationale?
 - Definition of core system OK?
 - Core science goals OK?
 - Phasing time-scale OK?
 - Demonstrator nature of core system OK?
 - Focus and priority on de-scope OK?

If not ...

This meeting is the time and place!

Common Team

- We must function as one team
 - Initial common purpose can decay
 - Remain a team after we leave here
- Challenge!
 - Distance, Timezones
 - Cultures, Priorities
- Opportunity
 - We can set the example

Commitment to Communicate

Communication

- **Must use all available tools**
 - Web-based collaboration aids
 - Email (reply, acknowledge, use vacation programs ...)
 - Telecons, videocons
 - Travel, Project meetings
 - Memos, drawings, schematics ...
- **Share information**
 - Benefits entire group
 - Project team, or institutional IP?
 - Open project culture

Continue what we start here ...

And more communication

Communicate even if you think you don't need to

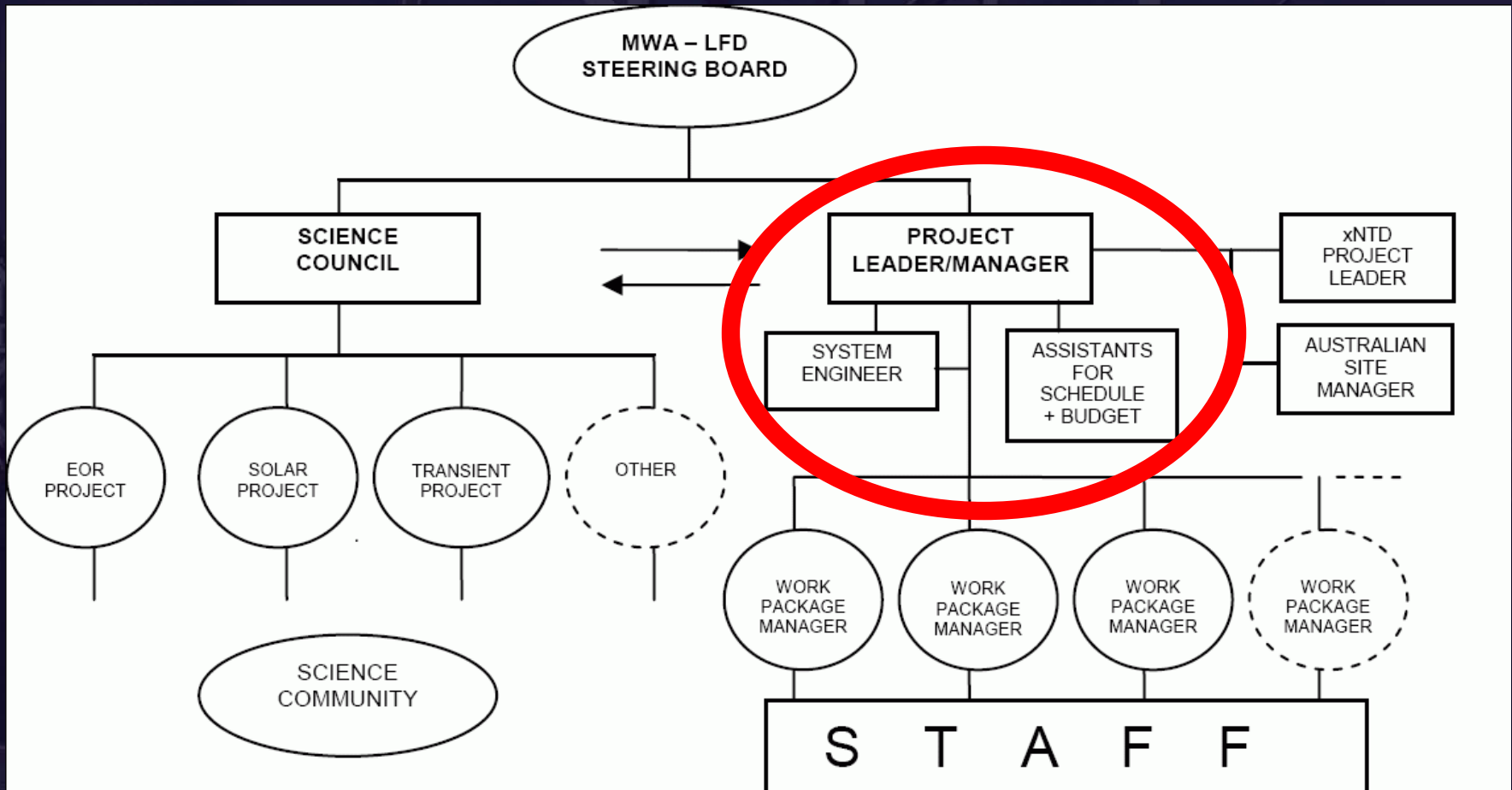
Communicate even if you *know* you don't need to

Communicate even if you don't need to

Communicate

Project Office

- Project Office functions include:
 - Budget and schedule control



Kick-off Goals

- Understand the project
 - Goals, motivations, priorities, phases
 - Systems, design principles
 - Challenges, issues, risks
- Understand the team
 - Who is involved?
 - Who has what expertise?
- Distribute the work packages
 - Commitments, deliverables, schedule
- Start the work
 - Technical working groups

A Final Thought

- Project is challenging
 - Technically
 - Politically
 - Logistically

But it is also FUN

**Let's build on ED spirit and
make some waves!**