

IDS: Overview/Goals

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IDS Goals

- Specify/compute physics performance of neutrino factory
- Define accelerator and detector systems
- Compute cost and schedule
- Identify necessary R&D items

IDS Products

- Interim design report (c. 2010)
 - Engineering designs for accelerator and detector systems
 - Cost and schedule estimates
 - Work plan to deliver reference design report
 - ✧ Report production itself
 - ✧ Outstanding R&D required

IDS Products

- Reference design report (c. 2012)
 - Basis for a “request for resources” to get serious about building a neutrino factory

IDS Working Groups

- Physics and performance evaluation
- Detector
- Accelerator

IDS Baseline

- Define a set of parameters and outline design to start with
- Keeps everyone working on the same page
- Significant inertia to make major changes
 - Especially when these changes cross working groups
- Based on the ISS results

IDS Baseline Parameters

Physics Related



- 25 GeV muon beams in two storage rings
- Two baselines: 3000–5000 km, 7000–8000 km
- 5×10^{20} muon decays per year per baseline
- Muon beam divergence of $0.1/\gamma$
- Detector: 50 kton magnetized iron or 10 kton magnetized emulsion cloud

IDS Baseline Parameters

Accelerator Related

- Proton driver
 - 5–15 GeV
 - 50 Hz pulse repetition rate
 - 3 proton bunches per pulse
 - 1–3 ns bunch length
 - 4 MW proton beam power
- Liquid mercury jet target

IDS Baseline Parameters

Accelerator Related

- Front end
 - Tapered solenoid channel & decay channel
 - Neuffer buncher/phase rotation
 - Modest amount of LiH RFOFO cooling
- Acceleration
 - Linac to 0.9 GeV
 - Two RLAs to 3.6 and 12.6 GeV
 - Linear non-scaling FFAG to 25 GeV

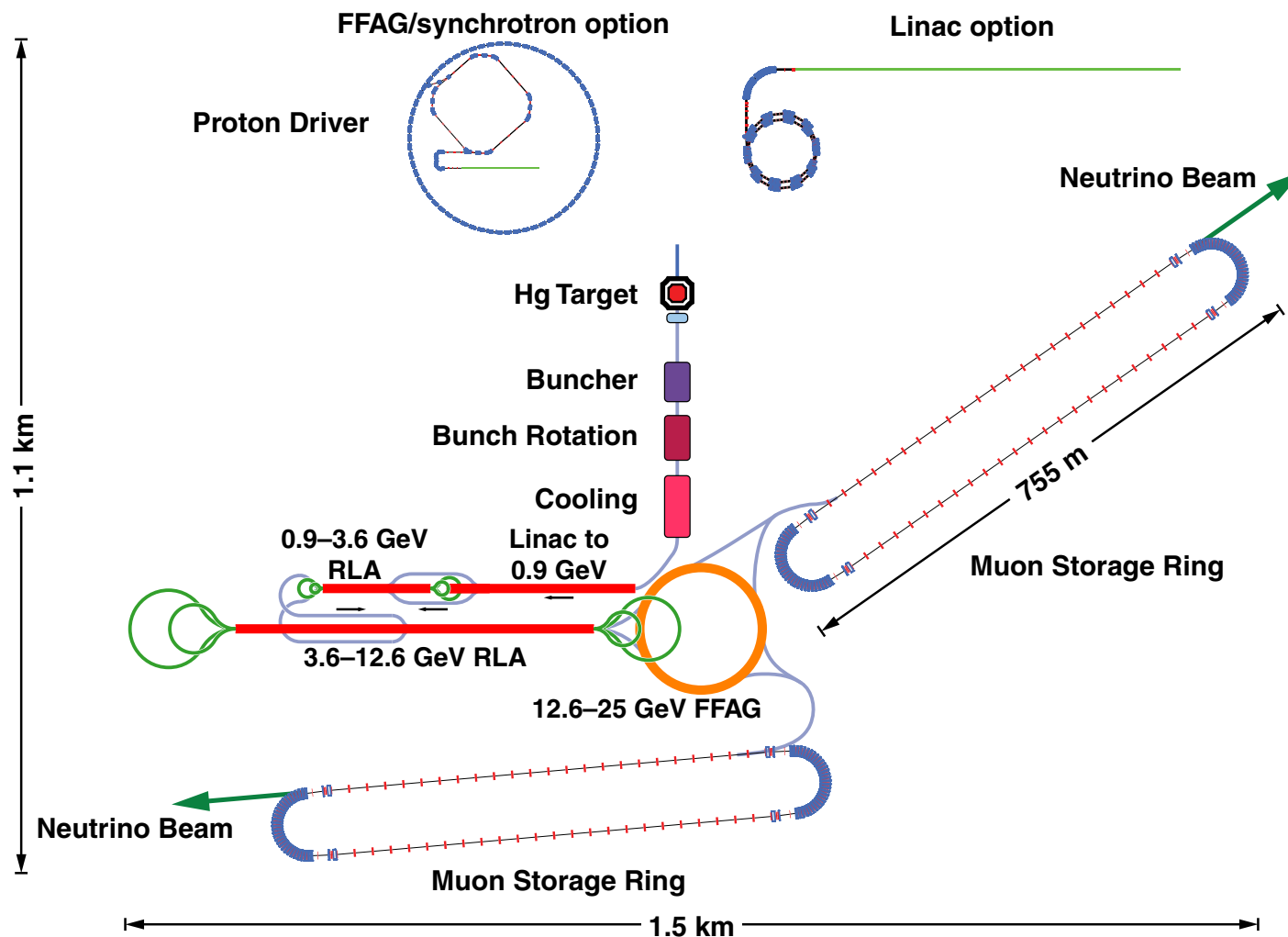
IDS Baseline Parameters

Accelerator Related



- Storage ring
 - Two racetracks
 - Allow both signs simultaneously
 - Holds three sets of bunch trains
 - 100 ns spacing between bunch trains

IDS Baseline Accelerator



Workplans

- Each working group has a work plan
- Divide up work, assign responsibilities
- Physics and performance working group
 - Evaluate performance
 - Comparison to alternatives
 - Making the physics case to the community
 - Making connections to theory
 - Answering specific list of questions

Workplans

- Accelerator working group
 - Each subsystem above has two coordinators
 - We have a detailed work plan
 - Subsystem coordinators work out details

Workplans

- Accelerator working group, specific issues
 - Target bunch train structure
 - Gradient limitations on RF in front end
 - Do FFAGs really offer advantages over RLAs?
 - Tracking through entire system
- Will hear about subsystems NFMCC is contributing to
 - Target covered earlier

Acknowledgments

- This is the work of a large group
- Special recognition to Ken Long who has been doing a good job holding all this together
- More info at <https://www.ids-nf.org/>