Must take an Observatory Approach

- ASTRON / Radio Observatory responsible for long-term coordination of LOFAR astronomical exploitation
- Run as a broad common-user observatory
  - Making the transition from “project” to “observatory”
- Intensive partnerships and coordination needed
  - With all user groups (primarily the KSPs)
  - With the international partners
  - The LAD coordinates the development and commissioning of the astronomical capabilities.
- LOFAR20 must be used to jumpstart science use:
  - Joint development/delivery of technical functionality
  - Pilot for operations
  - Pilot for science projects

MSSS and LOFAR20 use

- MSSS is a calibration survey to **prepare** LOFAR for science
  - Nothing special in hardware: LOFAR ..., 18, 19, **20**, 21, 22,
  - But an excellent moment to make other developments converge:
    - Operations software
    - Pipelines

- MSSS is a calibration survey to **prepare** LOFAR for science observing:
  - Generates GSM
  - Forces / tests “production” readiness

- Other preparatory observing programmes may be needed

- But MSSS and its products may yield useful/initial science
  - May be able to tweak MSSS design/setup to this end

- MSSS coordination and adjudication/mediation:
  - Primarily via LAD
  - Science use via PC

The PC or "Time Allocation" process

- Programme Committee:
  - international composition
  - assessment by scientific experts
- "Time" allocation is about access to:
  - Telescope time (opportunity to determine setup/configuration)
  - Data storage capacity and throughput
  - Processing capacity and throughput
  - Data / archive access, for specific science purposes
- Balancing act:
  - Recognition for contributions, past and future
  - Broadening the user community

1 PC with 3-Tier Resource Allocation

Several quite different goals must be accomplished:

- Sustained LOFAR operations need to be secured:
  - Financial and in-kind contributions to central operations
  - Extend LOFAR (hardware and software) capabilities
- Investors, including both long-standing KSP scientists and more recent international partners, need to be given proper recognition:
  - Started major undertakings in good faith before policies were clear
  - Contributions are highly valuable
- Substantial Open Skies are needed from an early stage:
  - To foster the user community
  - For best overall and long-term scientific success
- Uniform and high standards of research projects and output must be assured.

The PC; overall perspective

- A single, independent PC will give uniform scientific and technical assessment of all projects (proposals, progress).
- But some projects will be assured (initially) of observing resources because their investigators have reserved access through contributions via the 3-tier mechanism.
- The division of resources will initially favour past contributions.
- The unified PC assessment may, optionally, be used by contributors such as a KSP consortium or an International group, who have to divide their access rights amongst multiple (internal) candidates.
- The unified PC assessment could be used if needed to address poorly performing projects. Rectification or discontinuation of individual projects can take place without violating the underlying rights of parties to reserved access under the 3-tiered scheme; they can redistribute their rights to other projects.

Resource Allocation in the next 18 months

- Technical Use of LOFAR must get priority
  - To advance development, rollout, and commissioning
  - Will be set in coordination with LAD and TWG
- MSSS and other observing may allow initial science use
- Should encourage some outside/novice users a.s.a.p.
- Take advantage of a “jump-start” iteration with the PC
  - Proposals by the end of this year
    - Define desired science in 2009, in particular with LOFAR20
    - In the context of the overall envisaged science over 3-4 years
  - Allows consortia to consider adjusting and refined proposals for “full-scale” science in2009Q3, without opportunities lost
  - “data rights” to LOFAR20 data can start in 2009 under the 3-tiered allocation scheme

Three-Tier Resource Allocation

- PC assessment directly determines project allocations in Tier 3.
- Rights to access within Tier 1 and/or Tier 2 are held by the parties (institutes, user groups, consortia) making relevant contributions.
- Each party is free to designate the users/groups or projects on which it bestows its access ("adoption possible"):
  - Decisions can be either fully internal, or a party can choose to take account of the PC assessments.
  - Any projects, KSP or other, internal or external, may receive rights.
- Collaborations to be decided primarily on scientific grounds by the groups themselves. Additional observing time or other resources offered may be a powerful incentive to collaborate.
- Scheme is an incentive for parties to continue to invest/contribute.

Three-Tier Resource Allocation

- Based on currently identifiable types of contributions, let's try to come to a specific model and its parameters:
  - A) Overall Tier fractions and their evolution
  - B) Keys to determine relative access levels within each Tier, related to value of contributions/investments of different parties

- Parameters must be announced in the first call for proposals this autumn.

- For "detailed "accounting" (as in B) to work
  - definitely the number of parties earning/assigning rights must be manageably small,
  - preferably the number of eligible projects must also be manageably small.

Three-Tier Resource Allocation

- Otherwise, have to work with a simpler model used by other multi-partner observatories:
  - Simple “binary” access rules to a small number of bins or tiers.
  - Some start-off allocations to recognise current (KSP) project expectations.
  - Afterwards for all individual projects or user groups, within their “rightful tier”, scientific merit predominates.
  - Allocations and rights balance out over time by virtue of balance between investigator numbers, stamina, and finances.

Three-Tier Resource Allocation

Proposed model to be discussed:

- Tier 3 (Open Skies) to start at 5% on shared-risk basis as soon as 20-station operations begin (2009), and to increase annually by at least 15% until at least 50% is reached, or more if other tiers receive low contributions.

- Tier 2 (Investments) to give rewards over at most 4 years.
  - Recognise past/current heavy investments and expectations by starting Tier2 at 80% in 2009, dropping away by 2013.
  - New investments and rewards are always possible (as is Open Skies follow-up).

- Tier 1 (Operations) to stay in the range 15-45% always.

Three-Tier Resource Allocation

- Tier 2: Study the investment reward key to determine the internal balance more closely, but agree to cap the reward value of the NL investments to date (at 3/4 of Tier2 ??), to give international partners and new groups more incentive to invest.
- Tier 1: internal balance to be governed by relative fractions contributed. Cap and/or scale the reward value for large contributors (perhaps mainly ASTRON, to 1/2 of Tier1 ??), but require a minimum annual contribution to operations costs to qualify for the tier (e.g. 10% of the price of their station/s). This gives smaller operational partners more incentive to participate.

The Position of KSPs

- All projects which are designated as KSP drive the design of LOFAR.
- The KSP research groups are all expected to participate in development work, leading to accumulated Tier2 rights.
  - All groups are now or will soon be involved in the LAD.
  - Can build up individual rights depending on their level of contributions.
- The classical NL KSP groups have by far the longest history of involvement with ASTRON/LOFAR R&D, and DCLA investments.
  - Tier2 rights resulting from all NL investments to date could be attributed in equal measure to the 4 current NL KSPs.
  - Distribution in time may have to be adjudicated to account for ability to use partial LOFAR.
- But Tier1 rights resulting from ASTRON operations could be made available to any and all “NL-affiliated” (t.b.d.) groups, with priorities/proportions based on assessment by the PC. Would make this a sort of NL Open Time (possibly - later - fully Open Time).

The ASTRON Programme Committee

- Members selected by ASTRON first and foremost on expertise
  - Must cover a wide range of fields
  - International composition
  - Independent assessment of all projects
- Dedicated partner for the Radio Observatory
  - Technical expertise
  - Optimisation of schedule
  - Some Observatory resources shared between LOFAR and WSRT
  - Transparent and inviting user contacts
- Single integrated PC for uniform and independent scientific assessment of all projects
- Actual allocations made according to the 3-tier scheme with agreed parameters, to accommodate interests of various parties
- Some parties may choose to incorporate the PC assessment in the assignment of their Tier 1 or Tier 2 access rights.

The ASTRON Programme Committee

- LOFAR Consortium and in particular VAT exemption aspects could lead to constructs, such as:
  - A Process Guardian or “Steering Committee” for resource allocation
  - “Bills” sent to parties who have Tier1 or Tier2 rights, corresponding to contributions (to be) made, and mentioning data access provided by ASTRON or LOFAR.

- Further (legal) expert opinions being sought. Any such constructs will not be allowed to compromise:
  - scientific independence of PC
  - principles of 3-tier allocation (access rights for contributions to exploitation, for investments, plus significant open time).

Observing Resources

- Traditionally: Telescope Time
- Additional aspects and resources include:
  - Instantaneous bandwidth
  - Instantaneous beams
  - Data transport capacity
  - Data processing capacity
  - Data storage capacity
  - Interrupt/standby privileges
  - Piggyback privileges
  - Archive processing, proprietary rights
  - Support scientist, data analyst, or operator assistance
- Some allocations may consist of permitting specific use of specific data for a specific period, with others groups allowed other use of the same data.
- Very hard to make every definition airtight now: let the PC work pragmatically in the spirit of fostering the best science and working with the 3 tiers.

When and How to Start

- PC must start this autumn, in order to address issues arising for 2009:
  - 20-station LOFAR will allow lots of real science, and all groups are chomping at the bit to start on their own projects.
  - There will immediately be a shortage of resources, and it will immediately be clear that the scope envisaged by each individual project is too large.
  - In the mean time the LAD effort needs continued cohesive and collaborative development.
- Therefore all (key) science projects should be stimulated to present a clear plan for the autumn PC meeting:
  - How to transit from true commissioning into actual first science.
  - Detailed “core” and “secondary” parts of their programmes, with required resources and intended milestones over several years.
- These plans will all be reviewed by the PC. Apart from the usual criteria, ask for specific comments on:
  - Timelines
  - Cohesion
  - Parts of key programmes which should be left “out-of-scope”, and may therefore be picked up by others and/or in open time

When and How to Start

- Comments can be taken into account by the LAD in organising the commissioning work
- The (key) science projects can use all comments for an iteration of their plans, to be submitted for the next deadline when “competition” and allocation will be “for real”.
- Immediately allow “expressions of interest” from new groups, but avoid the combination of offering open skies and immature data to inexperienced users.
  - 5% open time in 2009, rapidly rising thereafter
  - Be open to many forms of guidance/tutoring/shared-risk to attract wider community.
  - Initially stress “shared-risks” and “joint commissioning goals”

Institute Organisational Remarks

- Relationships between “operating institutions” and “user groups” have to be clarified, and may be quite different in various countries at present. Operating institutions may “adopt” certain users/groups, i.e. designate as eligible to observe.
- Do ASTRON partners always have to be “national”. It is certainly a preference not to have too many factions.
- The NL user group interests may be represented via the bilateral connection between LOFAR-CV (of which they are part) and ASTRON.

A Three-Tier Allocation Model

Year	Tier1	Tier2	Tier3
2009	15%	80%	5%
2010	20%	60%	20%
2011	25%*	40%*	35%
2012	30%*	20%*	50%
2013+	45%*	0%*	55%*

* - New Investors may tilt the balance towards the Tier2 fraction and away from the other tier(s) with an asterisk.
- New Operators may tilt the balance towards the Tier1 fraction and away from the other tier(s) with an asterisk.