Advanced Graphics and Interaction 2015: Lecture 11

Mario Romero 2015/10/12

KTH VETENSKAP OCH KONST

VICSTHLM
VISUALISATION INTERACTION COLLABORATION

AGI15 Calendar: link

- Mon 31 aug 15:00-17:00 Lecture 1 – Introduction
- Tue 1 sep 13:00-17:00 Lecture 2-3: Forming Groups and Brainstorming
- Mon 7 sep 15:00-17:00 Lecture 4: Proposals
- Thu 10 sep 10:00-12:00 Lecture 5: Discussion based on Proposals
- Mon 14 sep 15:00-17:00 Lecture 6: Hello World Demos
- Thu 17 sep 10:00-12:00 Lecture 7: Discussion based on the Hello World Demos
- Tue 22 sep 10:00-12:00 Lecture 8: Preparing ForskarFredag 2015
- Fri 25 sep 8:00-16:00 ForskarFredag
- Mon 28 sep 15:00-17:00 Lecture 9: Reflecting on ForskarFredag
- Mon 5 oct 15:00-17:00 Lecture 10: Agile Development 1 towards Comic Con - Gamex 2015
- Mon 12 oct 15:00-17:00 Lecture 11: Agile Development 2 towards Comic Con - Gamex 2015
- Fri 30 oct 9:00 – Sun 1 Nov 16:00 Comic Con Gamex
- Mon 2 nov 15:00-17:00 Lecture 12: Reflecting on Comic Con Gamex
- Tue 3 nov 13:00-17:00 Lecture 13-14: Forming new groups and brainstorming project 2
- Tue 10 nov 10:00-12:00 Lecture 15: Proposals Project 2
- Tue 17 nov 10:00-12:00 Lecture 16: Hello World Demos for Project 2
- Tue 24 nov 10:00-12:00 Lecture 17: Agile Development 1 for Open House
- Tue 1 dec 10:00-12:00 Lecture 18: Agile Development 2 for Open House
- Fri 4 dec 15:00-19:00 VIC AGI15 Open House

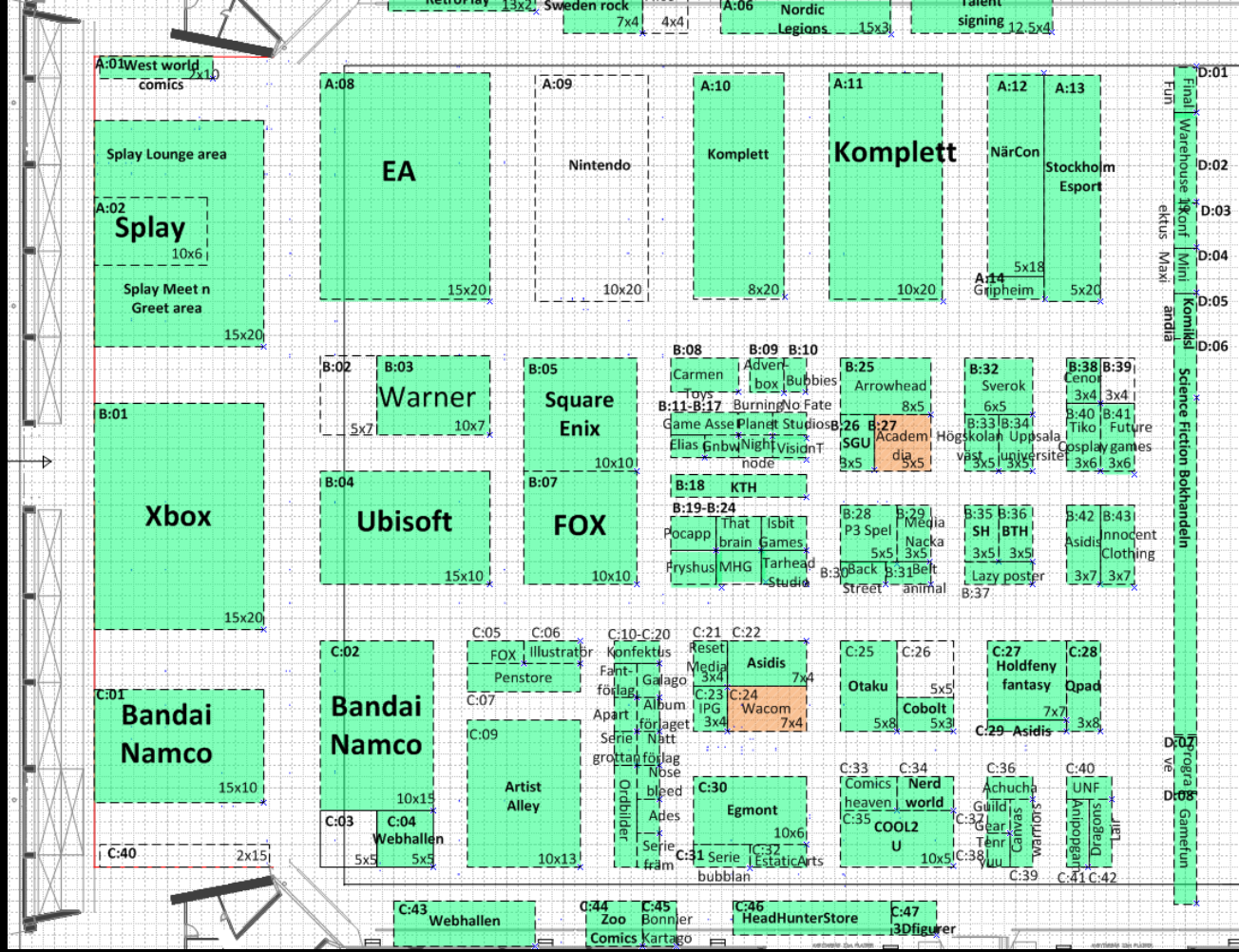
Agenda

1. Logistics Comic Con Gamex
    1. Schedule
    2. Space
    3. Content
    4. Equipment
    5. Trip
2. Work plans
    1. Group
    2. Individual
3. Word from Henrik
4. Agile Development
    1. MadSand
    2. BrARwl
    3. Blopper
    4. Shmooning
    5. TeamTris
    6. Padawan 101
5. Schedule individual meetings
    1. MadSand
    2. BrARwl
    3. Blopper
    4. Shmooning
    5. TeamTris – Oct 21 13:00 – 14:00
    6. Padawan 101

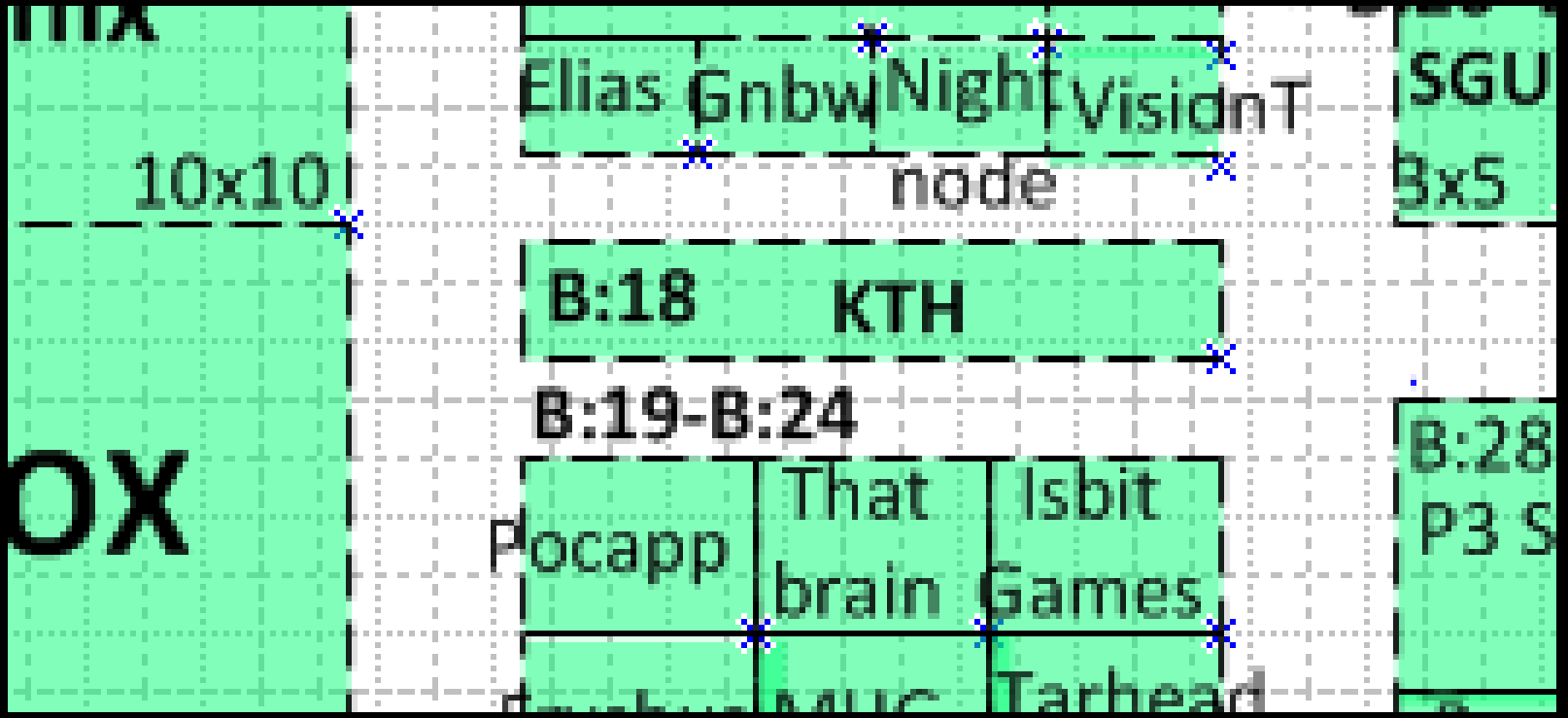
Logistics Comic Con Gamex

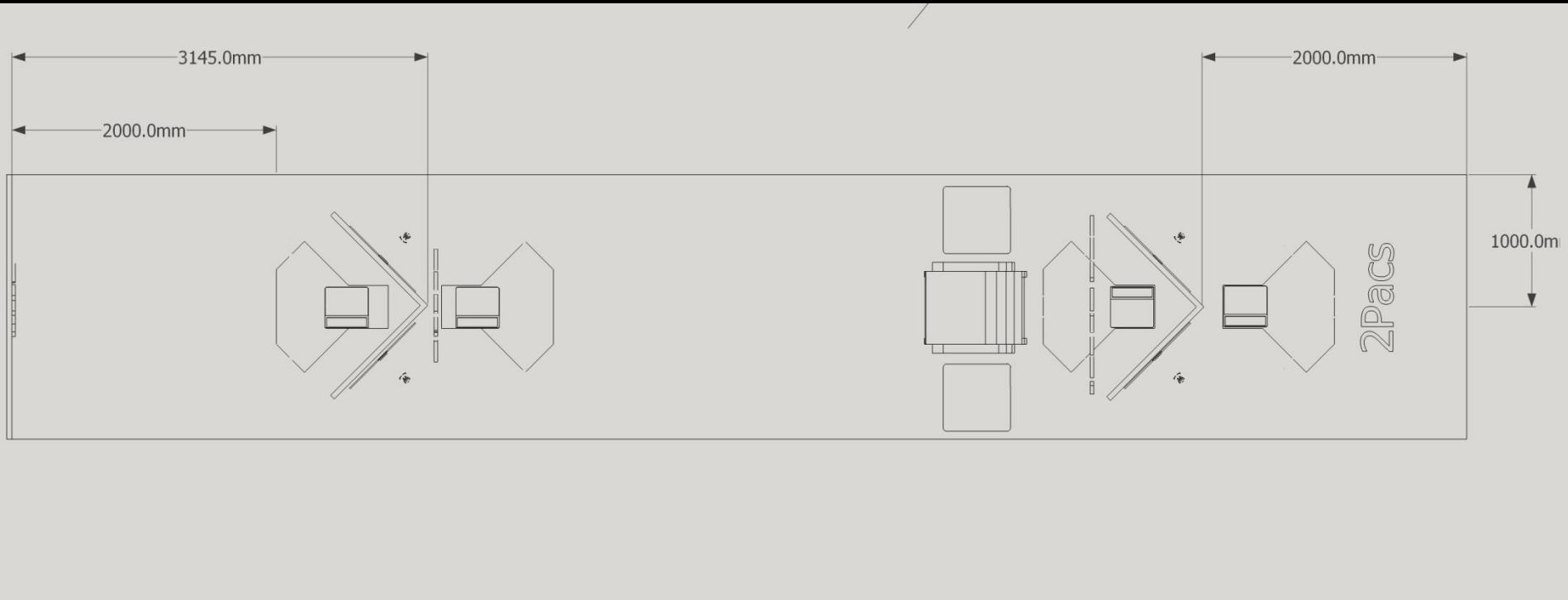
Schedule (https://goo.gl/D3SskU)

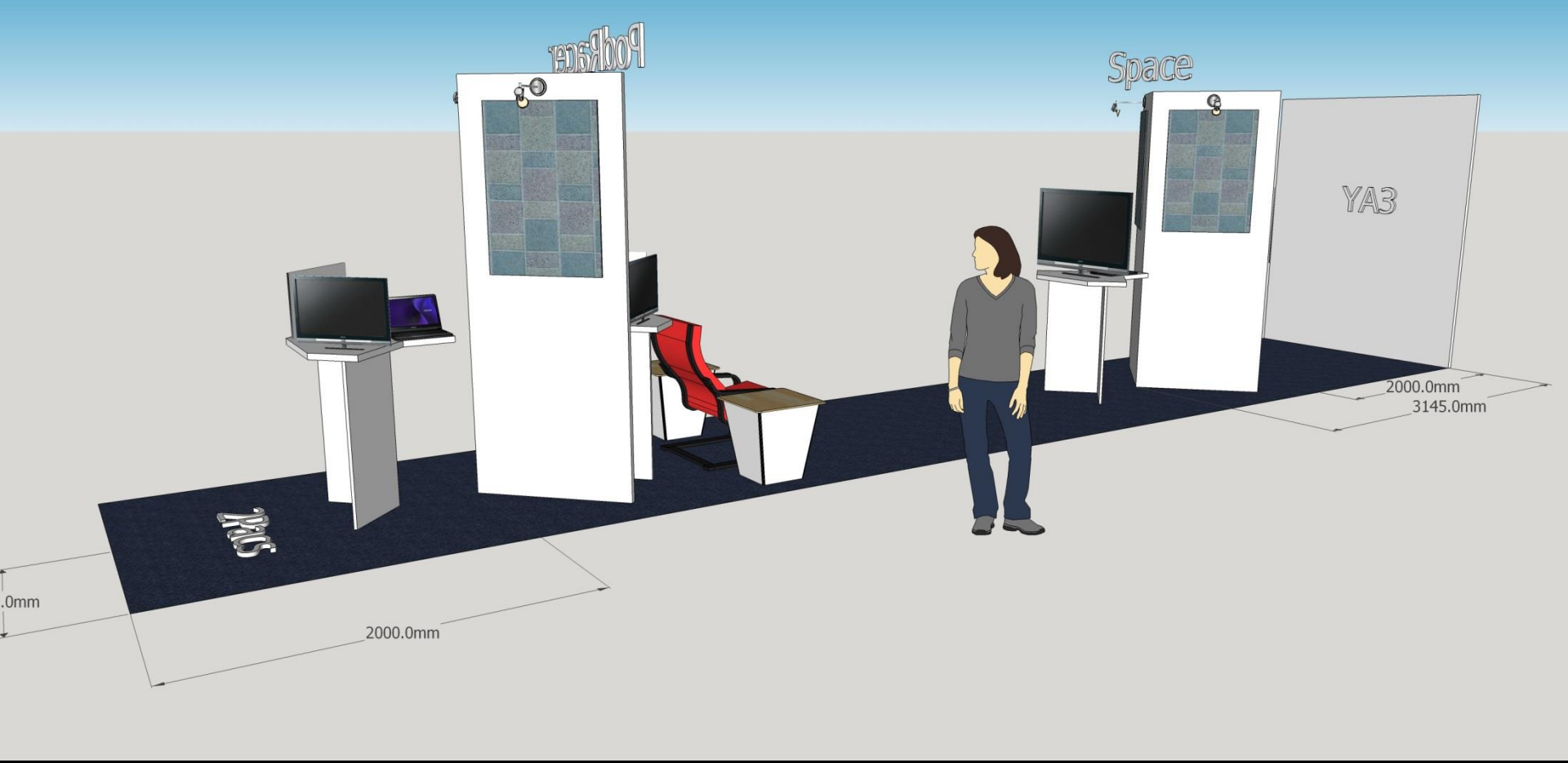
Friends Arena



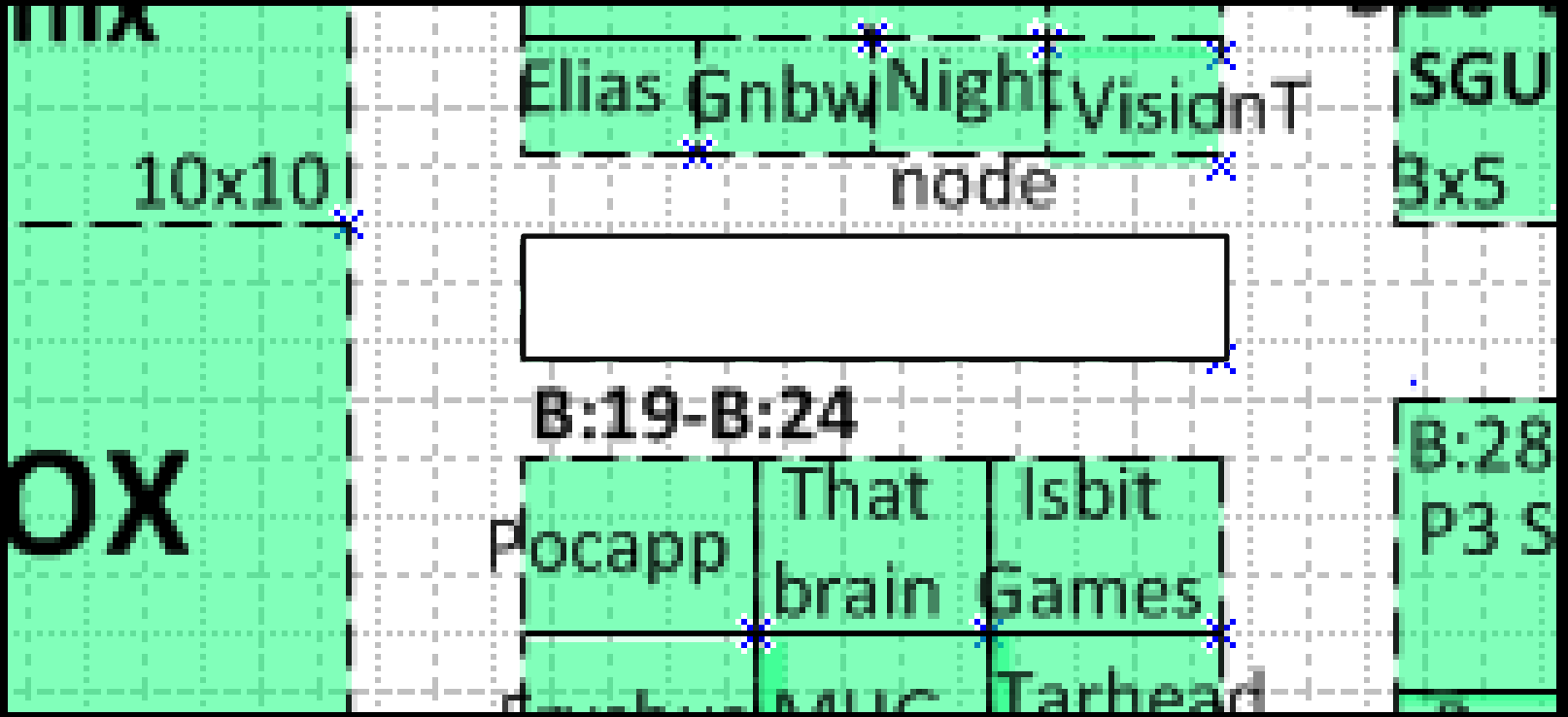
Friends Arena



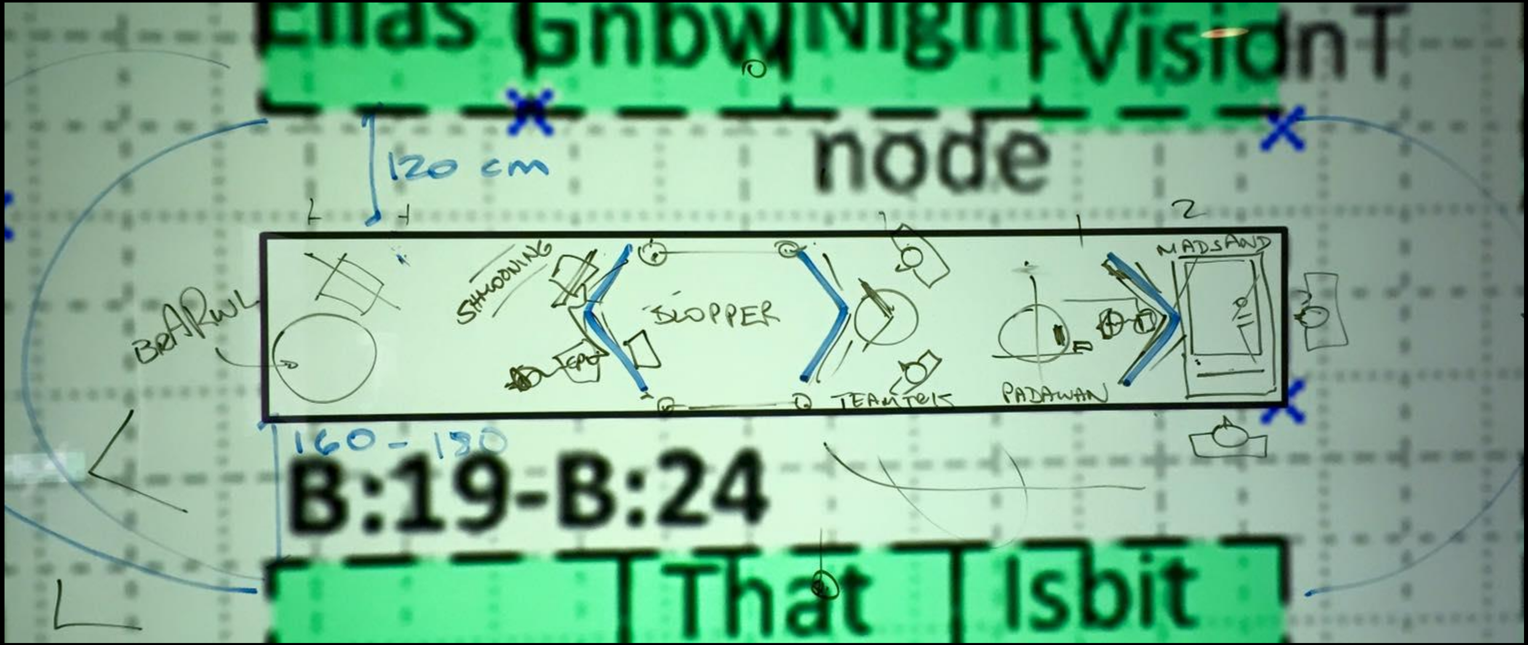

3145.0mm
2000.0mm
2000.0mm
1000.0m
2Pacs


Space
YA3
2000.0mm
3145.0mm
2000.0mm

Friends Arena



Space Draft



node
120 cm
SLOPPER
TEAMTEK
PADAWAN
MADSAND
160 - 180
B:19-B:24
That
Isbit

Remember: Deliverable Oct 23

- Webpage with:
  - Description
    - Goal and motivation of the project
    - Explanation and Justification of the graphics and interaction technologies used and developed
    - Challenges
    - Obstacles
    - Related work
    - Lessons learned
  - Look at AGI14 web pages
  - Photos
  - "Making of" documentary (2 minutes)
  - Demo Reel (30 seconds)
  - Optional PR material (logo, trailer, flyers, posters, catalog)
  - User testimonials (what did people say)

Task

1. Next phase development (quickly fix interaction problems and focus on advancing the graphics)
    1. Special Effects
        1. Particle Systems
        2. Mathematically model simulations of light interacting with complex objects …
    2. Rendering quality
        1. Un-Aliasing
        2. Shadows
        3. Reflections
        4. Refractions
2. Focus on your own goals
    1. Make feature that is:
        1. Non-critical
        2. Independent
        3. Focused on your learning goal
        4. Easily integrated

What to deliver?

- Freedom to fail
- Show work
  - Research
  - Paper reading and understanding
  - Development
  - Integration
- Write a short individual report (?)
  - At most
    - 1000 words
    - 3 references
    - 3 figures
    - 1 video-figure
- If working, working code

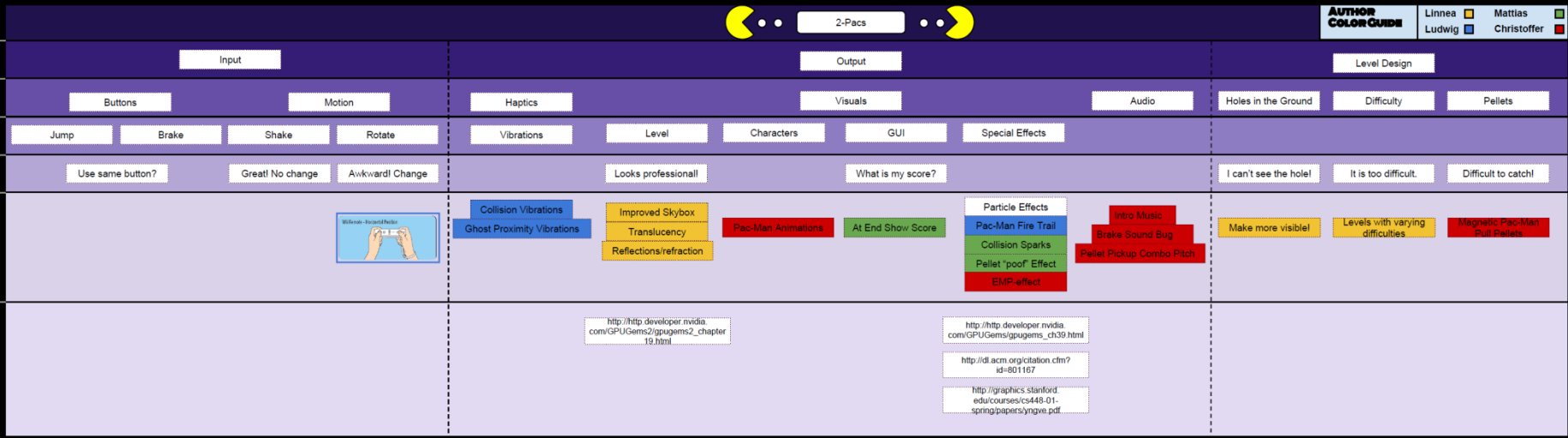
Ahead of you

- Phase 1 – fix interaction issues and work on core graphics together
- Phase 2 – research and propose a feature that works independently from the rest of the project and implement a simple version of it.

Example work plans from AGI14

- The following are plans made between ForskarFredag and Comic Con…

2Pacs


Awesomeness
2-Pacs
Author Color Guide
Linnea
Mattias
Ludwig
Christoffer
General Categories
Input
Output
Level Design
Specific Categories
Buttons
Motion
Haptics
Visuals
Audio
Holes in the Ground
Difficulty
Pellets
Subcategories
Jump
Brake
Shake
Rotate
Vibrations
Level
Characters
GUI
Special Effects
Feedback
Use same button?
Great! No change
Awkward! Change
Looks professional!
What is my score?
I can't see the hole!
It is too difficult.
Difficult to catch!
Features
Collision Vibrations
Ghost Proximity Vibrations
Improved Skybox
Translucency
Reflections/refraction
Pac-Man Animations
At End Show Score
Particle Effects
Pac-Man Fire Trail
Collision Sparks
Pellet "poof" Effect
EMP-effect
Intro Music
Brake Sound Bug
Pellet Pickup Combo Pitch
Make more visible!
Levels with varying difficulties
Magnetic Pac-Man Pull Pellets
Related Work
http://http.developer.nvidia.com/GPUGems2/gpugems2_chapter19.html
http://http.developer.nvidia.com/GPUGems/gpugems_ch39.html
http://dl.acm.org/citation.cfm?id=801167
http://graphics.stanford.edu/courses/cs448-01-spring/papers/yngve.pdf

YA3

Gameplay

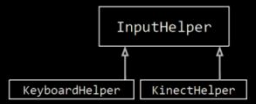
- Gameplay encapsulates tree pipeline
- search-for-player loop
- Cinematic tour of the forest while waiting

Tree Pipeline

Input Interface | Tree Data | Tree Data Simulation Data | Shader Data

Input → **Tree Generation** → **Simulation** → **Tree Construction** → **Rendering**

- **Input separated from Interaction**
- Abstract Input Interface



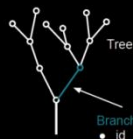
Interface:

- HandShoulderAngle()
- HandShoulderDist()
- HandShoulderDist3D()
- ElbowShoulderAngle()
- ElbowShoulderDist()
- ElbowHandAngle()
- ElbowHandDist()
- HandTorsoDist()
- ElbowTorsoDist()
- TorsoTiltAngle()
- ...

Logging, Debugging:

- log Actions
- replay sessions
- use debugging view
- behavior statistics

- Interaction is handled here
- *Abstract representation of the tree*



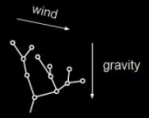
Branch Data:

- id
- parent
- children[]
- position, rotation, scale
- age, depth
- leaves, flowers, lateral buds

- **not rendering specific!**
  - no vertices, faces, normals
  - no colours
  - no shaders

- Apply physics simulations
- Store in separate SimulationData structure.

- => Wind, Gravity …
- Also other systems:
  - Leaves in air
  - Particle Systems
  - Day-night cycle



- Creates full tree model
- Ready for rendering
- Data to GPU!

- Tree ready to be rendered

- Deferred Rendering Pipeline
  - First pass: *to gBuffer* (positions, normals, materials..)
  - Second pass: fragment shader using data in gBuffer

- **NPR** - Non Photorealistic Rendering

- Lots of things to add:
  - DoF
  - Motion blur
  - Anti-aliasing
  - Volumetric light scattering
  - Bloom effects
  - Godrays
  - …

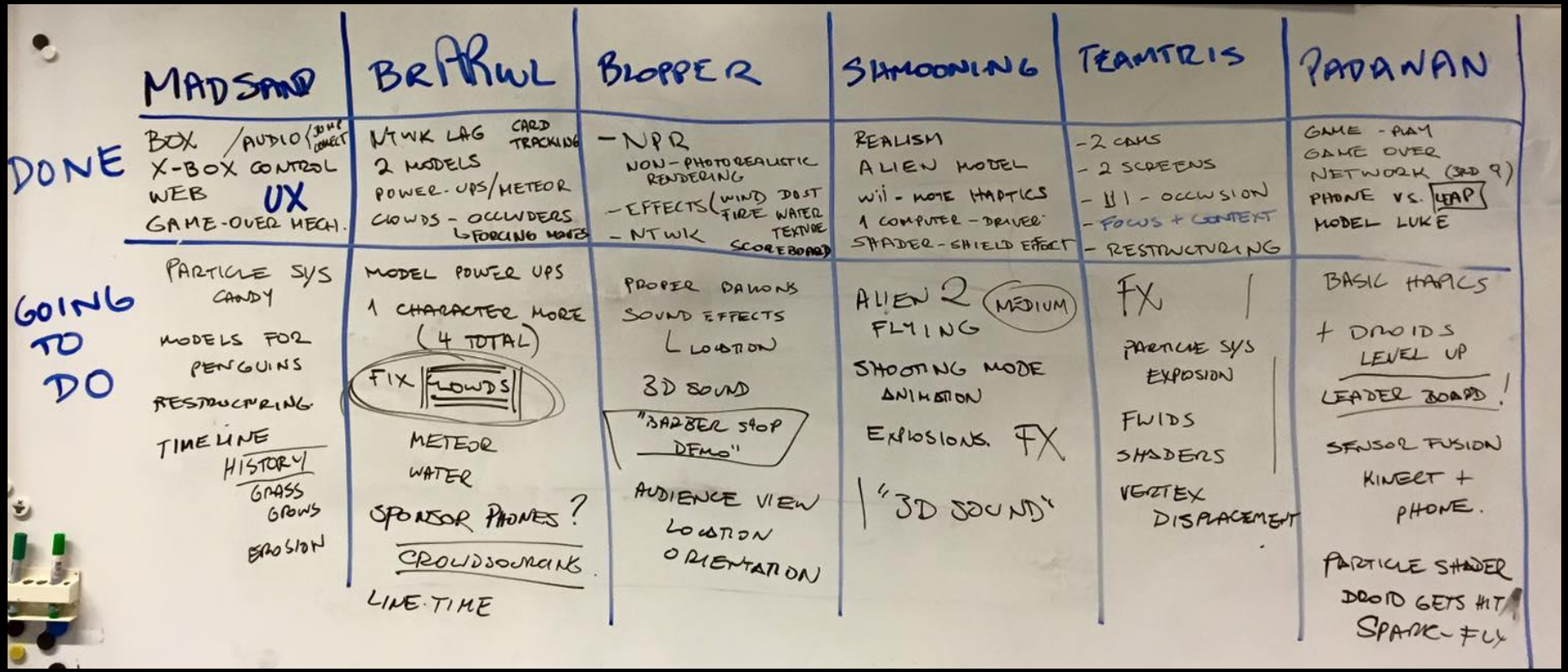
Pod Racer

- Focus on the graphics
  - Fire
  - Electricity
  - Dust
  - Pseudo-realism
  - Advanced effects
  - Avatar with arms controlling the pod
  - Visualization of engine thrust
  - Map?
  - Virtual arrows?
- Sound
  - Location?
  - Special effects
  - Sound track
    - Expert: Roberto Bresin
  - You may justify spending time on good sound by calling it ”advanced interaction” but I will not force you to do it.
- Change track
- In-game tutorial

Space Survival

- Controls
  - Hard
  - Confusing
  - Vertical thrusters
- In-game tutorial
- Self-localization
  - Map?
  - Virtual Arrows?
  - On avatar's body?!
- Space dust – speed and direction
- Look at 3D movie creation – layering
- Sound in helmet
  - Sonification
  - Early warning
  - Communication with ground control, mission command, or space craft

Agile Development 2



Thank you!

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