



# Data Rates

- **Nominal data rate between CERN and all Tier-1s**  
→ the long term sustained average data rate
  - *Raw data + ESD*
  - *Calculated by me from the computing model papers – **to be verified after the LHCC Review next week***
  - **Mbytes/sec – network and magnetic tape**

	<i>ALICE</i>	<i>ATLAS</i>	<i>CMS</i>	<i>LHCb</i>	<i>Total</i>
CERN	600	750	300	150	<b>1.8 GBytes/sec</b>
Av.Tier-1	100	75	40	25	<b>240 Mbytes/sec</b>

- **To achieve this –**
  - we must be able to run for long periods at  
***at least twice this rate***



# 2005 Q1(i)



## SC2 - Robust Data Transfer Challenge

### Set up infrastructure for 6 sites

- Fermi, NIKHEF/SARA, GridKa, RAL, CNAF, CCIN2P3

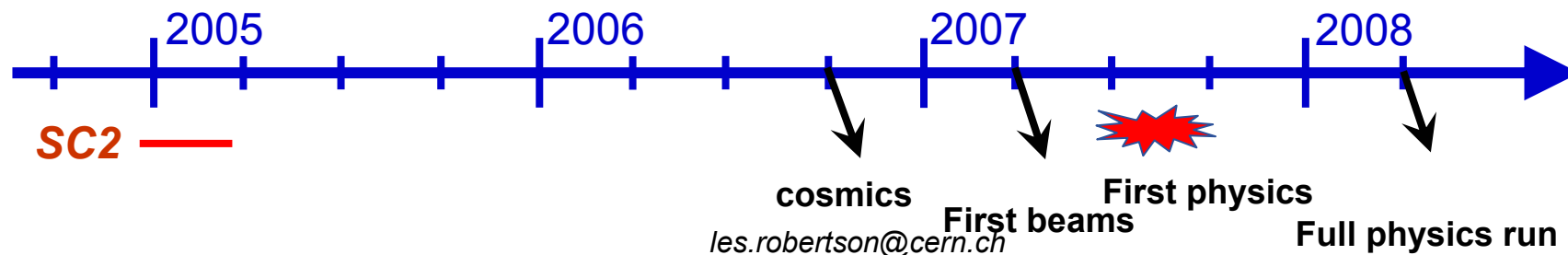
### Test sites individually

– at least two at 500 MByte/s with CERN

### Agree on sustained data rates for each participating centre

Goal – by end March sustained 500 Mbytes/s aggregate at CERN

**In parallel** - serve the ATLAS “Tier0 tests”





# 2005 Q1(ii)



## Prepare for the next service challenge (SC3) -- in parallel with SC2 (reliable file transfer)

### Build up 1 GByte/s challenge facility at CERN

- The current 500 MByte/s facility used for SC2 will become the *testbed* from April onwards (10 ftp servers, 10 disk servers, network equipment)

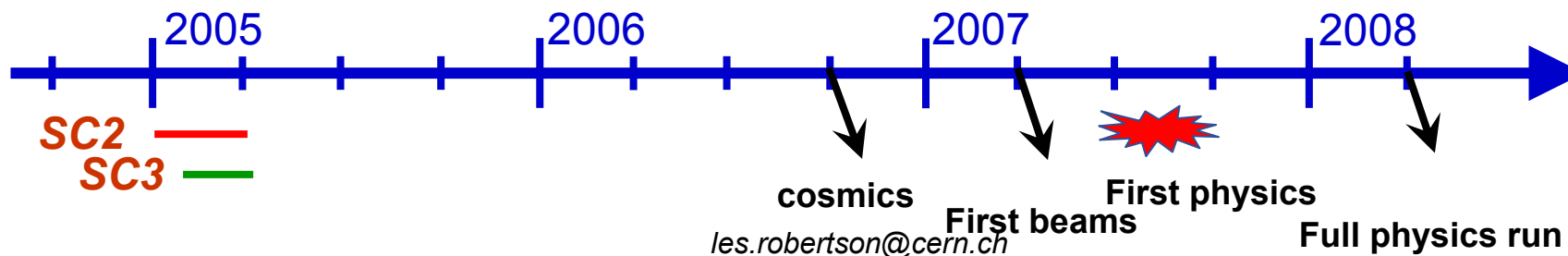
### Build up infrastructure at each external centre

- Average capability ~150 MB/sec at a Tier-1 (to be agreed with each T-1)

### Further develop reliable transfer framework software

- Include catalogues, include VO's

**disk-network-disk bandwidths**





# 2005 Q2-3(i)



## SC3 - 50% service infrastructure

- Same T1s as in SC2 (Fermi, NIKHEF/SARA, GridKa, RAL, CNAF, CCIN2P3)
- Add at least two T2s
- “50%” means approximately 50% of the nominal rate of ATLAS+CMS

Using the 1 GByte/s *challenge* facility at CERN -

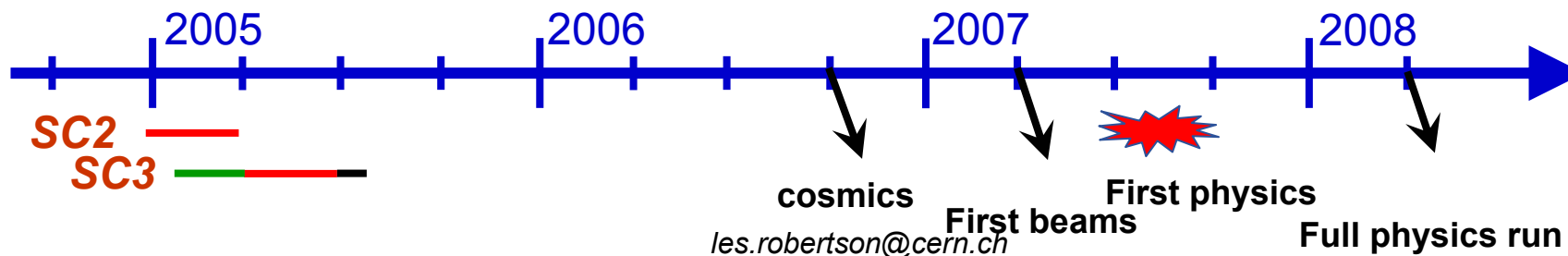
- Disk at T0 to tape at all T1 sites at **60 Mbyte/s**
- Data recording at T0 from same disk buffers
- Moderate traffic disk-disk between T1s and T2s

Use ATLAS and CMS files, reconstruction, ESD skimming codes  
(numbers to be worked out when the models are published)

Goal - 1 month sustained service in July

- **500 MBytes/s** aggregate at CERN, **60 MBytes/s** at each T1

tape-network-disk  
bandwidths





## 2005 Q2-3(ii)

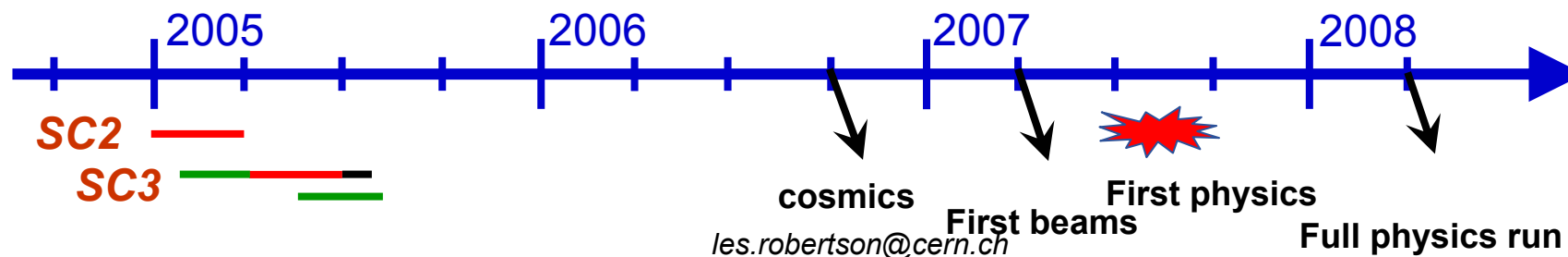


**In parallel with SC3 prepare additional centres using the 500 MByte/s test facility**

- Test Taipei, Vancouver, Brookhaven, additional Tier-2s

**Further develop framework software**

- Catalogues, VO's, use experiment specific solutions





# 2005 – September-December (i)



## 50% Computing Model Validation Period

The service exercised in SC3 is made available to experiments for computing model tests

Additional sites are added as they come up to speed

End-to-end data rates –

- 500 Mbytes/s at CERN (aggregate)
- 60 Mbytes/s at Tier-1s
- Modest Tier-2 traffic

